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Contract Report 81-C06

December 1981



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**Determining Industrial  
Comparative Advantages  
In Areas Of Proposed  
Water Navigation Projects:**

**An Industrial  
Location Analysis**

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER  Contract Report No. 81-C06		2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)  Determining Industrial Comparative Advantages in Areas of Proposed Water Navigation Projects: An Industrial Location Analysis.		5. TYPE OF REPORT & PERIOD COVERED  Contract	
7. AUTHOR(s)  Samuel Ben-Zvi		6. PERFORMING ORG. REPORT NUMBER	
9. PERFORMING ORGANIZATION NAME AND ADDRESS  U.S. Army Corps of Engineers Tulsa District		8. CONTRACT OR GRANT NUMBER(s)  DACW 56-81-C-0001	
11. CONTROLLING OFFICE NAME AND ADDRESS  Water Resources Support Center Institute for Water Resources Fort Belvoir, Virginia 22060		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE  December 1981	
		13. NUMBER OF PAGES  120	
		15. SECURITY CLASS. (of this report)  Unclassified	
16. DISTRIBUTION STATEMENT (of this Report)  Unlimited		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Industrial Location                      Analysis Techniques Survey Studies                              Water Resources Development ILS Model			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The purpose of this study is to select a methodology that will provide a screening mechanism with which project areas can be evaluated as to their comparative advantage to attract manufacturing entities. The method of analysis deemed most appropriate to accomplish the study's purpose will be selected, described and evaluated as to its applicability to the Corps of Engineers' projects.			

DETERMINING INDUSTRIAL COMPARATIVE ADVANTAGES  
IN AREAS OF PROPOSED WATER NAVIGATION PROJECTS:

An Industrial Location Analysis

a report

submitted to

U.S. Army Corps of Engineers  
Water Resources Support Center  
Institute for Water Resources

by

U.S. Army Corps of Engineers  
Tulsa District

Samuel Ben-Zvi

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Springfield, Virginia 22151

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## 1.0 Introduction

### 1.1 Background

The economic feasibility of investments in water development projects is traditionally evaluated in terms of anticipated stream of benefits discounted to the present. These benefits are matched against present and discounted future stream-of-costs to yield a benefit-cost ratio.

The implementation of a benefit-cost framework requires estimates of direct and indirect benefits and costs, over time, associated with the project. To arrive at such estimates requires an understanding of the chain of processes that must be triggered by the project to bring about the anticipated benefits. Equally important, is an understanding of the conditions that need to prevail in the project area in order to yield the benefits to justify the project.

The triggering event produced by a project is, first and foremost, a reduction in the price of the resource(s) supplied by the project (for a given level of output). This event renders the project area an improved competitive position relative to other areas. Since producers react to regional differentials in resources availability and cost, the project, it is argued, induces industries to locate and/or expand operations in the project area. The ensuing expansion in employment, output and income are the economic benefits emanating from the project. The question is, however, are these conditions sufficient to attract producers to locate in the area?

Unfortunately, while there are a number of theories discussing the chain of events that must be triggered by public investment to induce economic benefit, there is little analysis concerning the conditions that must prevail in a project area to allow such economic benefits to materialize.

In fact, most analyses of public projects and the analytical tools used in these analyses assume an infinitely elastic supply schedule of the production factors needed to satisfy the projected increases in output resulting from a project. Similarly, markets are assumed to exist such that any incremental output induced by the project can be absorbed. Stated simply, projected benefits induced by a water development project rest on the assumption that the project area possesses the right conditions for such benefits to materialize. These assumptions, obviously, oversimplify reality in that they fail to recognize the complexity and dynamics of the location decision of producers. These decisions are determined by a multitude of factors, all of which bear in some way on firms' cost-revenue relationships. While the provision of the resource made available by the project (say, transportation services) might be a necessary condition for a firm to locate or expand in the project area, it might not always be a sufficient condition. To assume otherwise, therefore, might lead to an overstatement of projected project economic benefits and at times, to the approval of projects that are economically unfeasible. Equally important, such overstatement of benefits tends to raise project area inhabitants' expectation which, when fail to materialize, cause disappointment, bitterness and justified criticism.



## 1.2 Purpose

Given these observations, it is the purpose of this study to select a methodology that will provide a screening mechanism with which project areas can be evaluated as to their comparative advantage to attract manufacturing entities. This screening mechanism should have a dual capability. First, it should allow investigators to determine what kind of manufacturing operations can successfully operate in the project area, given the area's inventory of productive factors and other location attributes, and given industries' locational requirements. Second, since many locational factors are variables subject to policy decisions (industrial parks, for example), the screening mechanism should allow to determine which areas' resource deficiencies should be corrected, through policy decisions, to maximize the area's attractational pull to target industries.

The end result of the selected methodology should be the provision of an analytical tool with which analysts can evaluate project areas' potential for industrial development, determine which specific industries or types of operations are most likely to locate in the area and finally, help determine what corrective action should be taken to increase the area's attractiveness for industrial location.

The results of such analyses, when combined with projected output of a water development project should allow for a more accurate determination of regional benefits triggered by the project.

## 1.3 Methodology and Outline

Consistent with the purpose of this study to select a methodology by which areas with proposed water navigation projects can be evaluated

as to their comparative advantage for industrial operations, it is proposed to conduct the analysis within the framework of industrial location theory and the relevant industrial location analysis procedure.

To accomplish this, the first part of this study will establish a general framework of a cause-effect relationship of water navigation projects and their effect on regions' economies. Within this framework, part two will focus on the locational behavior of industries. This will be done by first presenting a general overview of the theory of the location of manufacturing to be followed by a discussion of major determinants that influence the location decision of firms and industries. The theory of location and the general observations made relative to locational factors will be supported by the finding of various empirical studies. Part three of the study will present and analyze various analytical tools currently used in the analysis of industrial location. Finally, the method of analysis deemed most appropriate to accomplish the study's purpose will be selected, described and evaluated as to its applicability to the Corps of Engineers' projects.

## 2.0 Regional Impact of Water Resources Development

An appropriate point of departure for the analysis of the effects of water navigation projects on regional industrial development is an overview of the manner by which water resources developments affect regional economic activities. If indeed investments in water projects induce regional economic development, it should be possible to trace and identify the sequence of events that lead to such development.

Lewis, et al [5] list a sequence of what they term, "microchanges in the regional economy" that describes the process of economic growth emanating from water resources development. This sequence includes the following phases:

- (1) Resources development
- (2) Changes in relative factor productivities
- (3) A broadening of the range of producer and consumer choice
- (4) Intra- and interregional movement of capital and labor
- (5) Direct and indirect forward and backward linkage effect
- (6) Second order impacts associated with agglomeration and scale economies and the attainment of minimum threshold levels for development of specific economic activities

These phases Lewis, et al point out, "are not necessarily independent; they tend to reinforce as well as to occur serially" [5, page 81]. Also, the project size bears on the degree of the development potential that can be realized. For the analysis of these phases it is assumed that the project provides water transportation, water supply, flood control, hydroelectric power and recreation. This assumption is accepted for the purpose of this study for water navigation projects

quite often generate these services as a by-product. The following is a brief elaboration on some key occurrences that might take place at each phase:

(1) Resources development--activity potential:

The main objective of the project--a navigable waterway--is expected to yield an alternative mode of transportation, one that is both competitive with and complementary to existing modes of transport. A navigable river is competitive with other forms of transportation in that it offers, in most instances, lower rates per ton/mile shipments of certain commodities to certain distances (usually long hauls of barge-load lots). It is complementary to other modes--truck and rail--in that it offers service which is restricted to locations along the river and, therefore, such service needs to be augmented with truck and/or rail service to reach destinations away from the river. The significance of the navigation project in the regional scheme of development lies with the introduction of a new transportation alternative; it offers transportation services at low rates and it exerts downward pressure on rates charged by competing modes. Consequently, regional firms realize reduced production and distribution costs and the associated impact on factors' productivity.

(2) Changes in relative factor productivities:

Phase two, Lewis, et al [5, page 82] point out ". . . is perhaps the most fundamental, as it will lead to those changes in factor returns and industrial cost structure that are associated with both the interregional movement of people and productive capacity,

and increases in the productive capability of existing labor and capital." The significance of this phase will be emphasized later when industrial location decisions are discussed. At this point it should be mentioned that the reduction in transport costs, brought about with the introduction of the navigation project, will prompt the profit maximizing firm to substitute inputs whose costs have been lowered, within technical constraints, for inputs whose costs remain unchanged. It should be pointed out that a transportation service per se is not a productive factor that can be substituted for other inputs. However, lower transportation rates allow in-bound shipment of certain raw materials, for example, that heretofore were too "expensive" to be used as an input. These raw materials are substituted for the ones currently being used. Thus, transportation services are, in a roundabout manner, a substituting factor input. For the profit maximizing firm, factor substitution is prompted by the expected result of such action--higher factor returns, both labor and nonlabor factors. The increases in factor returns result in an increase in regional income, which is the third phase in the development sequence.

(3) A broadening of the range of producer and consumer choice: The broadening of the range of producer and consumer choice, brought about by the project, is manifested in a variety of ways. First, the increase in the marginal productivity of labor results in higher wage rates and, therefore, income (the magnitude of such change depends, of course, on changes in the supply function of labor). This change in income affects

consumers' choice relative to the quantity and type of goods, services, leisure, etc. that are purchased. Second, increased production activities broaden both the range of employment opportunities and the range of services heretofore unavailable: for example, a new lake that serves as a recreational facility. Finally, the navigable channel, offering a new transportation mode, lower costs of inbound and outbound shipments and increased supplies of productive factors (including, for example, industrial parks that are usually built in port locations), broadens producers' choices.

(4) Intra- and interregional movement of capital and labor: If the project and its by-products (flood control, increased water supply, recreation facilities, etc.) enhance the region's resources availability, quantity and quality, relative to other regions, it might be expected that both inter- and intraregional factor movement will occur. The attraction of higher wage rates, employment opportunities and recreational amenities should stimulate the movement of people to the region. Similarly, the availability of water transportation and other resources now made available with the project should serve as an inducement to industry to locate in the region. The interaction of changes in relative factor productivities and the influx of production factors--labor and non-labor--will result in changes in both input-output relationships and the composition and level of final output of industries.

(5-6) The sequence of the four previous events culminate with phases (5) and (6):

In phase five, the increase in population and economic activities induce an increased level of activities in the retail, wholesale and service sectors to satisfy both consumer and industrial demand. Obviously, the degree to which all these activities and associated income can be captured by the region depends to a great extent on the level of the region's development prior to the introduction of the project. Thus, the lower the level of development, the higher the leakage to surrounding regions. However, as a certain threshold level of scale economies and agglomeration is achieved, the lower will be the need for the importation of services and hence, the stronger the effect of the project and associated developments on the region.

In the forthcoming chapter we propose to focus on one segment of a region's development scheme: the forces that determine the location of manufacturing.

### 3.0 Industrial Location Analysis

The overview of the effects of water resources development on regional economic activities presented in the previous chapter was intended to provide a general understanding of the dynamics of regional growth precipitated by the change in a region's input-output accesses, in our case, investments in a water navigation project. Using this overview as a frame of reference we now move to develop a theoretical framework by which the location of manufacturing can be analyzed. This theoretical framework should provide the basis for an understanding of the factors that determine the spatial distribution of manufacturing in general and the locational decision of the individual firm, in particular.

#### 3.1 The General Theory

In general terms, the multitude of locational factors that influence the location decision of the firm, including labor, raw materials, markets, transportation, energy, water, etc., can be discussed in a framework of supply and demand where the firm's spatial equilibrium is attained by selecting the site that satisfies profit-maximizing demand-supply conditions. The attractiveness of sites (regions) will change as demand and supply condition change. For example, consider the supply side where the cost of labor and materials vary with distance. A declining labor force may require the "importation" of labor either by offering transportation from other locations or by offering higher wage rates to attract labor. Either case increases the cost of labor, thus reducing the attractiveness of the site. Similarly, on the demand side, since the size of the market is



a function of distance, any changes in the market directly bears on the attractiveness of the location as a plant site.

The analysis of locational optimality is a relatively simple one when the firm uses a single input while selling its product in a single market. In such an event, the theory stipulates that the profit-maximizing firm will locate at the source of raw materials when the product is weight-losing and closer to its market when the product is weight-gaining. The locational analysis becomes more complicated when the process of production requires a multitude of inputs which are purchased in different places where price differentials exist among suppliers. To satisfy profit-maximizing conditions, this situation requires distance-pricing of sources of supplies and markets and the development of supply-demand curves for each location.

In the absence of significant cost differentials among suppliers, transportation and factor cost (labor, energy, etc.) become the determining factor as to the optimum location. And this is the case when locational shifts may be induced by a change in transportation costs. These changes may occur as a result of rate changes or by the introduction of new transportation modes. The introduction of waterway transport, of course, is one example. Obviously, these transportation cost changes may take different forms. Interest here lies primarily with those changes that modify regional rates (as opposed to uniform general changes). These are the type of changes that may come about with the introduction of a waterway system. The rates offered will be such that some users will benefit more than others, thus, in all probability, achieving two effects: (1) increasing the competitive advantage of existing regional firms to compete in wider markets;

(2) making the region more attractive to some industries that heretofore could not effectively operate in the affected area.

To this point, the discussion has focused on the locational decision process of the individual firm. It is clear, however, that firms affect and are affected by other firms of the same industry and other industries. These interrelationships among firms and industries explain, to a great extent, the distribution of economic activities in terms of the benefits the firms derive from locating at established economic centers. This interdependency among firms, and hence, their geographical concentration, or agglomeration, is the cause, and the result, of the benefits that the firm can derive from scale and localization economies. Geographical concentration of industries provide firms with an "instant" market and, thus, the ability to take advantage of scale economies. At the same time, this concentration of a variety of industries provides the firm with needed services, a pool of trained labor, transportation facilities, etc.

No discussion of industrial location is complete without mentioning what has become to be known as the "secondary" locational factors. These are the so-called non-economic factors such as community and cultural services, recreation facilities and climate or the "quality of life" factors. It is submitted, however, that these factors, albeit very important, are secondary in the locational decision process in that they may tilt the decision in favor of one location over another only when the availability and cost of the primary factors are equal among the locations considered.

### 3.2 Determinants of Industrial Location

Having established a general theoretical framework of industrial

location, we now turn to the analysis of specific factors that are influential in determining the location of firms and industries. The general theory of plant location presented above can be restated as follows: for each location, the firm is facing a location-specific cost schedule that determines its production costs at that location and for a given level of output. This cost schedule is determined by the price per unit of input and the quantities purchased. Similarly, the firm faces a location-specific revenue schedule which determines the firm's revenue at that location for a given level of demand. For the profit-maximizing firm, therefore, the problem is to find the location where the spread between costs and revenues are maximized.

What, specifically are the factors that bear on these variables? To best understand the locational behavior of the individual firm, some insight must be gained relative to the fundamentals of the determinants of the spatial distribution of manufacturing facilities in general. Thus, it is proposed that the analysis start with some macro considerations of manufacturing activities. The next step should be the consideration of the forces that act upon the concentration of industries in specific geographical areas. And finally, the main concern of this study: location-specific determinants of manufacturing are analyzed.

## A. Factors Affecting the Spatial Distribution of Manufacturing

A necessary condition for manufacturing activities to take place is the existence, in some combination, of five primary factors: markets, raw materials, energy sources, labor, and transportation facilities. (Capital, because of its mobility, is not discussed). The availability of these factors provides a screening mechanism for the selection of a broad geographical area, or a region, within which a manufacturing activity can take place. The following is a brief discussion of the nature of these primary factors:

### (1) Markets

The existence of markets or accessibility to them is a primary condition for manufacturing to take place. Obviously, there is no unique definition to the meaning of markets for "market areas" and "market targets" vary among firms and among industries. Because of population concentrations, the development of distribution systems and the concentration of industries (agglomeration, to be discussed in this section), in metropolitan areas are commonly accepted as market centers for both consumer and producer goods. Unless otherwise indicated, proximity to markets is usually measured from the point where production activities take place to the nearest SMSA.

### (2) Raw Materials

The geographical distribution of raw materials is one of the

major variables explaining the spatial distribution (or concentration) of certain industries. As a general rule, industries using raw materials that lose weight or bulk in the process of production, and industries that use perishables as raw materials are located in close proximity to the raw materials' sources. Examples for such raw materials and industries are various ore processors, lumber and paper mills, canned fruits and vegetables, dairy products, etc. Similarly, industries using outputs of other manufacturing entities but sharing the same raw material characteristics as mentioned above, locate near their source: for example, chemical complexes that are built next to or in close proximity to petroleum refineries.

### (3) Energy Sources

Energy sources, in their various forms, vary in the degree of importance as a localizing factor from industry to industry. For most industries that use small or moderate quantities of energy, proximity to the source is only secondary in importance. However, heavy users of energy such as chemical processors, the metallurgical industries and other raw material processors are frequently oriented to locations that possess an abundant supply of energy sources.

An important observation that should be made relative to energy sources as a location factor concerns the current rapid change in relative factor prices with the cost of fuel as a major contributing factor. This phenomenon influenced in recent years the location decision of certain manufacturing in two ways. First, geographical locations which possess energy sources, especially oil and natural gas, have witnessed an influx of energy intensive

industries. Second, locations along navigable waterways have become increasingly desirable plant site locations for energy intensive industries for this mode of transport is especially suitable for inbound shipment of both coal and imported oil.

#### (4) Labor

Labor as a location factor is discussed in the context of its availability, productivity and cost.

Labor availability in a specific region is a function of the population size, age distribution and the degree of mobility--to and from the region in question. In addition to these basic considerations, labor availability is also analyzed in terms of its sex distribution and skills. While sex distribution--male and female labor force participants--depends upon both demographic and social variables, skill levels distribution of the work force is a function of the quality of schools, the availability of vocational-technical training programs and whether that particular labor force is derived from a predominantly urban-industrial population or from a rural population where industrial jobs supplement earnings derived from agricultural activities.

Labors' productivity depends upon the level of educational attainment of the work force, its training and work ethics, all of which need to be supplemented by industrial organization, management techniques and technology.

Finally, labor's cost, or the wage levels are a function derived from the variables mentioned above. Labor scarcity in general or shortages in workers possessing specific skills will tend to push up wage levels of such workers. Conversely, population

pressure for employment opportunities in rural areas act as a wage level depressant. Given all these variables, the labor aspect of the locational decision process is guided by the specific needs of manufacturing entities with labor intensive industries gravitating to labor surplus--low wage areas. And non-labor intensive industries expanding in, or moving to areas with a skilled and well trained labor force--suburban locations around metropolitan areas.

#### (5) Transportation

The availability of transportation facilities, alternative modes and freight rates are regarded as major determinants in the location of manufacturing. The best evidence supporting this statement is that almost every transportation center in the country is also a place with significant concentration of manufacturing. The relative importance of transportation services varies among industries. Some generalization can be made, however. Industries that are characterized as processors of low-value raw materials where transportation economies are essential will attempt to utilize low-cost bulk hauling modes--water transportation and rail. On the other end of the spectrum are producers of high value products with relatively small bulk shipments that stress transportation efficiency and speed of service. These industries will tend to use air freight and other specialized services. Between these extremes is the majority of industries that constitute the bulk of commercial shippers. These are the industries that utilize, for most purposes, truck and rail service. For these shippers, both the availability of transport services, access road and local terminals are equally important in their locational choice.

## B. Factors Affecting Industrial Concentration

Having discussed the major factors that are basic to manufacturing operations we now move to describe the forces that explain the location of industry, especially as evidenced by concentration of industries in certain locations and the slow but steady shift of manufacturing activities among regions. Miller [8] cites the following factors:

### (1) Economies of Scale

Economies of scale are defined as the attainment of a level of production where average cost per unit output is minimized. The attainment of this level is made possible when production facilities are utilized at an optimum; and managerial and marketing efforts and costs, are optimally spread over the largest scale possible. As a location factor, the attainment of scale economies within the firm is affected primarily by the size of markets and their structure, i.e., the ability to sell large output allows efficient production through optimal use of plant and equipment and better use of fixed managerial and marketing efforts.

Equally important location factors that affect the firm's scale economies are forces external to the firm. These external, or agglomeration forces, are factors that bear directly or indirectly on the firm's scale of operations and cost structure. For example, concentration of an industry at a certain location acts as a locational point of attraction to suppliers of that industry. Thus, scale economies attained by the suppliers may allow them to sell their output at a lower cost. Similarly, a geographically concentrated industry using a particular raw material may attract suppliers of that raw material to establish distribution centers in close



geographical proximity thus reducing the cost of materials' procurement that individual firms will have to incur with the absence of specialized supply sources. Similar examples of external economies of scale that are attained at specific locations are the convergence of specialized services to that location, concentration of research facilities to service industries in that location and finally the creation of a trained pool of labor that firms in the industry can draw upon.

(2) Technological Innovations

Technological innovations, manifested by the introduction of new industries, products or processes may alter the location of industry by forcing existing industries to shift to new locations through the establishment of facilities in areas heretofore with no, or very little, industry. An example of such forces in motion is the recent development of techniques by which oil can be extracted from shale rock. Although still in the development stages, a noticeable movement of people and capital to shale rock deposit areas in the Rocky Mountain Region is the beginning of what might become a new industrial center in that part of the country.

(3) Geographic Concentration

Geographic concentration of industry is initiated by the existence of one or a combination of factors that attracts one or a group of industries to locate in a specific area. For example, certain raw material deposits in one area act as a catalyst in attracting specific industries to the region. Agglomeration forces--the attraction of backward and forward-linked industries--follow the initial move to force a coherent industrialized region. The recent shift of manufacturing to the sun-belt region of the country prompted by the

availability of energy sources and labor supplies is a good example of a geographical shift and the formation of new geographical concentrations of manufacturing.

(4) Regional Development Policies

Regional development policies, although diminishing in importance as a localization factor, are responsible for, and partially explain, the initial move of industry to various parts of the country.

Although varied in nature and scope, regional development policies are defined, for our purpose, as all action taken by government agencies--Federal, state and local--to promote regional or local industrial development. In practical terms, these policies included a wide range of inducements in the form of grants, tax incentives, training programs, etc. that were offered by regional commissions, state industrial development agencies and local development organizations to attract industry to specific locations. The concentration of industry in previously underdeveloped parts of the country are, at least partially, explained by such inducements. In recent years, however, similar efforts taken by most states lessened competitive advantages that some areas have enjoyed in granting such inducements.

C. Factors Affecting Plant-Site Selection

Finally, we need to analyze those location factors that bear on plant site selection. The discussion of these factors is conducted within the framework established by the findings of empirical studies in which the reasons why specific sites were selected are forwarded by executives responsible for the location decision.

The various location factors can be divided , as Greenhut [2] points out, into three major groups: (1) demand (2) cost (3) personal considerations. Each of these groups include specific factors as follows:

#### Demand (Market) Factors

1. The shape of the demand curve for a given product
2. The location of competitors
3. The importance of proximity to buyers in terms of service required-- type and speed.
4. The need for personal contact between buyer and seller
5. The extent of the market area (also determined by cost factors and pricing policies)

#### Cost Factors

1. The cost of land
  - a. Rent
  - b. Taxes on land
  - c. Availability of capital and its cost
  - d. Insurance (availability of police and fire protection)
  - e. Cost of fuel and power
2. The cost of labor and management
  - a. Community amenities
  - b. Housing facilities
  - c. State laws
  - d. Unions
3. The cost of materials and equipment
  - a. The location of competitors
  - b. The price system in the supply area
  - c. The extent of the supply area

4. The cost of transportation
  - a. The topography, roads, railways
  - b. Transport facilities available
  - c. The characteristics of products and raw materials

The demand, or market factors are those that determine the firm's location in relation to its market(s). The need for proximity to markets is determined by the industry's structure, size and shape of the market area and the nature of the product. For example, a competitive industrial structure with little price or product differentiations leaves quality and speed of service as the firm's main competitive advantage thus dictating close geographical proximity to customers.

Cost factors as determinants of location are analyzed in terms of factor substitutability. In most instances, the matrix of various production costs are matched against transportation costs to determine the profit maximizing location (market conditions assumed to remain constant). For example, the cost of higher freight charges for some materials are weighted against lower rent costs at a particular location.

In addition to direct production costs, other cost of operations such as local tax structures, and tax incentives are part of the locations specific array of costs that are considered.

Finally, all other factors, sometimes referred to as personal considerations, enter the decision matrix. These include personal affinity of owners or executives to locate in home states, a desire to locate in areas with certain climatic conditions, the availability of recreation and cultural amenities, etc.

### 3.3 Industrial Location Determinants: The Empirical Evidence

The general theory of industrial location and the stipulated locational determinants of industry are based upon and tested against observed phenomena. In this section we propose to offer some empirical evidence in support of the assertions and observations made previously. This evidence, in the form of studies concerning the location of manufacturing, should serve three purposes: first, it will allow to draw some general conclusions relative to major locational factors that concern manufacturing at present; second, it will present statistical evidence in support of the methodologies used and the conclusions reached by the various studies; and third, it will serve as a prelude to the examination of the various analytical techniques used in industrial location analysis to be presented in the next chapter.

#### General Plant Location Surveys

A common and widely used method to analyze industrial location determinants is the "empirical-subjective" approach. In this method, decisionmakers in firms are asked to rank, in order of importance, those locational attributes that were important in attracting the firms to particular locations.

One of the most extensive research projects in the area of industrial location determinants is a survey of manufacturing firms conducted in 1969 for the Economic Development Administration, U.S. Department of Commerce [14]. The purpose of that survey was to assist local agencies to identify and attract those industries with locational requirements compatible with the area's resources. The study surveyed some three thousand firms in industries with above-average growth potentials, asking decision makers in each firm to specify their locational requirements.

Those requirements were categorized as community size and community attributes, plant site size and attributes, and locational objectives to be achieved.

Before specific requirements are summarized, here is a summary of general preferences expressed by the majority of firms surveyed:

- Geographic Preference: The majority of firms preferred to locate in suburban or non-metropolitan areas.
- Community Size Preference: The majority of firms preferred to locate in communities no larger than 250,000 population. Over 50 percent preferred a community no larger than 100,000 population.
- Plant Site Preference: Most firms interviewed preferred a site of 20 acres or less.
- Labor Force: Most of the firms in the sample employed more than 100 employees.

Tables 1, 2 and 3 provide a summary of community attributes, plant site features and locational objectives, respectively, as indicated by a sample of 2616 usable questionnaires.

Special attention is called to those locational factors rated "A" and "B" where the former indicates a critically important factor without which a community will not be considered and the latter indicates a very significant factor.

A summary of the various attributes shows the availability of the following as the primary factors in each category:

- Community Attributes:
  1. Fire protection
  2. Contract trucking
  3. Police protection

4. Pool of trained workers
  5. Pool of unskilled workers
- Plant Site Features:
1. Highway access
  2. Natural gas service
  3. Scheduled rail service
  4. Industrial water supply
  5. Plant site size
- Locational Objectives:
1. Market considerations (proximity to existing or ability to serve new markets)
  2. Improvement in transportation efficiency and economy
  3. Labor force considerations
  4. Proximity to raw materials or suppliers
  5. Availability of land
-

TABLE 1

## Ranking of Community Attributes in Plant Location

	A <sup>*</sup> (%)	B(%)	C(%)	D(%)
(1) Air passenger service. . . . .	11	17	36	33
(2) Local industrial bonds . . . . .	3	14	23	55
(3) Vocational training facilities . . . . .	2	22	42	30
(4) Higher educational facilities. . . . .	1	14	41	39
(5) Tax incentives or tax holidays . . . . .	8	38	32	19
(6) Fire protection. . . . .	43	30	20	3
(7) Contract trucking. . . . .	30	28	21	16
(8) Public warehousing . . . . .	1	5	17	73
(9) Public refrigerated warehousing. . . . .	0	0	2	93
(10) Police protection. . . . .	28	27	37	5
(11) Local industrial development group . . . . .	3	15	42	37
(12) Pool of trained workers. . . . .	18	35	35	9
(13) Pool of unskilled workers. . . . .	17	29	35	15
(14) Lenient industrial zoning. . . . .	6	23	49	19
(15) Strict industrial zoning . . . . .	3	14	45	34
(16) Community population, as preferred in Item III . . . . .	5	26	52	12

\* A) of critical value; B) of significant value;  
C) of value; D) of minimal value

TABLE 2

## Ranking of Plant Site Features

	A <sup>*</sup> (%)	B(%)	C(%)	D(%)
(1) Highway access (within 30 minutes of major highway interchange) . . . . .	37	39	17	3
(2) Scheduled air freight service. . . . .	12	25	31	28
(3) Water transportation . . . . .	3	5	9	79
(4) Scheduled rail service . . . . .	23	17	22	34
(5) Piggy back facilities (rail) . . . . .	5	12	25	54
(6) Industrial water supply (processed). . . . .	23	22	29	22
(7) Industrial water supply (raw). . . . .	16	17	27	35
(8) Natural gas service. . . . .	31	27	25	13
(9) Industrial sewage processing . . . . .	20	26	32	18
(10) Solid waste disposal . . . . .	17	25	35	20
(11) Soil load-bearing capabilities . . . . .	14	22	35	24
(12) Plant site size, as preferred in Item IV . . . . .	23	39	30	5

\* (Rating scale same as Table 1)

TABLE 3

## Locational Objectives in Site Selection

	Percent of firms*
(1) Improvement in transportation efficiency or economy . . . . .	45
(2) Availability of larger parcel of land . . . . .	25
(3) Closer proximity to resources and/or major suppliers. . . . .	31
(4) Closer proximity to other plants of your company. . . . .	11
(5) Closer proximity to your distributors and/or customers. . . . .	49
(6) Closer proximity to other firms in same or related industries. . . . .	2
(7) Ability to serve new and/or expanded markets. . . . .	59
(8) Minimize competition from other plants for labor force. . . . .	33
(9) To secure factors of location unique to your industry (special energy requirements, etc.) . . . . .	10

\* (Percentage of firms selecting item. Respondent could select as many as three objectives.)



## Water Transportation as a Location Factor

Since one of the main concerns of this study is the relationship between water navigation projects and their effect on industrial location, we isolated these industries in the sample that specified waterway transportation as an important location factor (rating of "A" or "B"). The list of industries identified includes:

<u>SIC</u>	<u>Product</u>
24	Wood products
26	Paper
27	Printing
28	Chemicals and allied products
29	Petroleum and coal products
33	Primary metals
34	Fabricated metals
35	Machinery
37	Transportation equipment

Before analyzing the locational factors mentioned by firms as significant in their locational decision, it is interesting to analyze the major production characteristics of these firms for these characteristics will determine the transportation needs.\* Not surprisingly, the firms that stressed the importance of waterway transportation in their locational decision share some very distinct common characteristics. The most significant of these are the following:

1. Inputs--The inputs used in the process of production by most firms are either raw natural resources (e.g., wood, petroleum, iron ore, and coal) or basic raw materials (e.g., basic chemicals, paper, iron, and steel--bars, sheets, etc.). These inputs are bulky, heavy, require special loading and unloading facilities, and lend themselves to carload or bargeload shipments.

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\* Industry characteristics are provided by U.S. Department of Commerce, Economic Development Administration: Manufacturing Plant Characteristics, 1970 [13].

2. Output--Basically, the "transportability" characteristics of these firms' output is quite similar to their input characteristics; i.e., it is bulky, heavy, and requires special loading facilities. Like the material inputs, these firms' final product lend themselves to tanker shipments (chemicals) and carload and bargeload shipments of lumber, paper, and fabricated metals.

3. Production processes--Although the production processes of the list of industries are quite diverse, there is one major common denominator to most of these industries--the need for large quantities of water, mainly for cooling purposes. As a matter of fact, the paper, chemicals, petroleum, and primary metal-producing industries account for approximately 85 percent of water used by industry. As will be seen later, some of these industries state a dual purpose in locating along waterways: to enjoy the availability of water transportation and an abundant supply of water to be used in the production process.

The summary of locational requirements is presented in Table 4. These common characteristics emerge:

1. Plant site features--All of the industries listed require industrial water supply. Most of them stress the importance of good connections to at least one additional mode of transport to supplement waterway transportation.

2. Community attributes--The main concern of most of these industries is a pool of workers, skilled and/or unskilled.

3. Locational objectives--There is some ambiguity as to the statement concerning the locational objectives to be achieved. However, it seems that the overriding goal of firms in these industries is to achieve maximum transportation efficiency in both in-bound shipment of raw

materials and delivery to markets of finished products. Not surprisingly, we find about half of the firms in the survey stressing proximity to raw materials and the rest stressing the ability to serve new markets as a major locational objective.

TABLE 4

SUMMARY OF MAJOR REQUIREMENTS FOR INDUSTRIES SPECIFYING  
WATER TRANSPORT AS AN IMPORTANT LOCATION FACTOR

SIC	Major Plant Site Features	Community Attributes	Location Objectives
(1)	(2)	(3)	(4)
243--Plywood	Rail service Industrial sewage processing	Pool of trained workers	Close proximity to resources
262--Unbleached kraft paper	Rail service Industrial water supply	Pool of trained workers Vocation training	Close proximity to resources
275--Commercial printing	Industrial water supply Solid waste disposal	Pool of unskilled workers	Improvement in transportation efficiency and economy Ability to serve new markets
281--Coal tar intermediates	Rail service Industrial water supply	Tax incentives Contract trucking Pool of trained workers	Proximity to resources Ability to serve new markets
291--Liquified industrial bases (for feed stock and other uses)	Industrial water supply Rail service Solid waste disposal	Vocational training Higher education facilities Tax incentives	Close to resources Ability to serve new markets

TABLE 4 (Continued)

SIC	Major Plant Site Features	Community Attributes	Location Objectives
(1)	(2)	(3)	(4)
332--Cast iron pressure/pipe & fittings	Natural gas service Rail service Industrial water supply Industrial sewage processing	Tax incentives Pool of trained workers Vocational training	Improvement in transportation efficiency and economy Ability to serve new markets
344--Fabricated structural iron & steel	Industrial water supply	Tax incentives Pool of skilled workers	Ability to serve new markets Improvement in transportation efficiency and economy
354--Rolling-mile machinery	Highway access Industrial sewage processing	Vocational training Higher education facilities Tax incentives	Improvement in transportation efficiency and economy
373--Inbound motor boats	Highway access Natural gas Industrial sewage and waste disposal	Trained & untrained workers Tax incentives	Closer proximity to markets

SOURCE: U.S. Department of Commerce, 1973 [14].

Regional Plant Location Survey: The McClellan-Kerr Navigation Project

In order to assess the impact of the McClellan-Kerr Navigation system on industrial location in a tier of counties adjacent to the river in Arkansas and Oklahoma, an IWR report [16] presents the results of a survey of firms that either located or expanded operations in the Arkansas Waterway area. Somewhat similar to the survey methodology utilized in the national study reported above [14], firms in the Arkansas and Oklahoma portions of the waterway were asked to rank locational factors that were conducive in attracting them to their respective sites.

A follow-up to this 1975 survey was conducted in 1979 [17]. The recent survey, conducted among a sample of 213 firms that located or expanded operations since the waterway became operational was similar to the 1975 survey in that it covered the same geographical area and that it restricted itself to the same locational factors that firms were asked to consider in 1975.

Not surprisingly, the six most important factors that were mentioned in 1975 were repeated by firms' executives in 1979. Similarly, the same percentage of firms (17) indicated, in both surveys, the importance of access to water transportation in their locational choice.

Of some interest is the relative shift in locational priorities that occurred between 1975 and 1979. This is especially manifested in the greater emphasis placed on proximity to markets in the latter survey and the relative decline in the importance of land cost as a locational determinant.

Finally, when the results obtained in these surveys are compared to the national survey conducted in 1970 [14], the universality of industrial locational determinants must be recognized. In the three surveys--

one conducted among firms across the nation and the other two in a relatively small region on the Oklahoma-Arkansas border--market consideration, labor cost and availability, proximity to raw materials and land availability and its cost seem to be the most prominent factors that determine the location of industry.

Table 5 presents the ranking of the six most important factors of location as determined in two surveys in Oklahoma. (For the comparison with the national survey's results see page 26 under the heading "Locational Objectives.")

TABLE 5

FACTORS AFFECTING LOCATION AND EXPANSION OF MANUFACTURING PLANTS  
IN SELECTED COUNTIES, ARKANSAS WATERWAY AREA, 1975 and 1979

Factor	<u>Percentage of Plants Indicating Importance</u>	
	<u>1975</u>	<u>1979</u>
Availability of labor	51	48
Labor costs	47	31
Accessibility to markets	45	54
Land costs	43	27
Accessibility of raw materials	41	30
Personal preference of management	40	40

SOURCE: U.S. Corps of Engineers, Southwest Division 1977, published by IWR [16].

U.S. Corps of Engineers, Tulsa District, 1979 [17].



### 3.4 Corroborating the Findings of Survey Studies

A major issue concerning survey studies as a tool for analyzing the factors that determine the location of manufacturing is whether answers provided by firms' executives reflect popular opinions only or whether indeed such opinions are also followed by action. In this section we propose to summarize the findings of studies that were designed to test whether firms' expected locational behavior corresponds to actual location choices.

#### Case Study I

Addressing itself to the very same question posed above, an IWR study [15] has followed a unique approach in investigating the issue of "comment vs. action" in the location choice of the chemical industry.

Comments made by chemical plants' executives concerning the relative importance of various locational factors are gathered annually by "Chemical Week" [12]. These comments are summarized in Table 6 below. Focusing on one factor--transportation--the IWR study attempted to ascertain the extent at which this factor indeed influenced the location decision of chemical plants. To accomplish this, the IWR study investigated the geographical distribution of new plants and plant expansion provided by Industrial Development magazine in 1972.

Reported new plants and plant expansions were divided into a water-intensive group and a control group of non-water using industries. The next step involved the determination of communities nearest the site of the proposed new or expanded plants with communities being classified as to whether or not they were located near or on a navigable waterway, river or lake.

TABLE 6

LOCATION FACTORS IDENTIFIED BY ANNUAL CHEMICAL WEEK  
SURVEY, SELECTED YEARS

Factor	Comments
Transportation	<p>1971--"single most important factor"</p> <p>1972--"pushed into the background"</p> <p>1973--"taking new significance...(due to) the energy crisis"</p> <p>1978--"transportation's often-dominant role... has been the result of its cost (5-10% of sales) and the necessity of quality service. Both factors are still very much in evidence."</p>
Energy	<p>1971--"a top factor in site selection"</p> <p>1972--"single most important element in chemical plant location"</p> <p>1978--"because chemical producers are the second-largest consumers of industrial power, energy is always of prime concern."</p>
Water	<p>1971--"regional variations in pollution control are no longer an attraction"</p> <p>1972--"Cooling water availability the primary water issue"</p> <p>1973--"renewed interest in water availability" (due to tougher pollution control)</p> <p>1978--"in time...groundwater problems may have greater impact on site selection than air quality" (due to various water acts and state implementation plans)</p>
Labor	<p>1973--"construction labor scarce"</p> <p>1978--"labor is a factor of at least moderate importance in the site-selection process"</p>
Taxes and incentives	<p>1973--"medium significance"; "in startling resurgence of industrial land issues" for pollution control investments</p> <p>1978--"industrial development land...will grow in utility"; "some industrial development specialists hold that incentives have (been) growing in significance to big investors"</p>

SOURCE: Chemical Week, 1978. [12]

Out of 31 new plants and 43 expansions reported, 24 and 40 plants respectively, were located in or nearby communities situated along navigable waterways. A close examination of the data reveals that those plants which chose to locate on navigable waterways were dominated by chemical plants and refineries. These plants accounted for 18 out of 24 new plants and 23 of the 40 expansions. These findings, when coupled with the findings of the various survey studies, corroborate that indeed, in the majority of cases, expected and expressed locational behavior closely correlates with actual choice of plant sites.

#### Case Study 11

Reacting to "...recent research that has questioned the usefulness of location theory as an explanation of spatial distribution of manufacturing..." Logan (6) attempts to discuss the following questions: (1) what are the variables considered by entrepreneurs in making locational decisions; (2) to what extent does the distribution of industry correlate with the factors that individual firms list as being important (in the locational choice) and (3) what are the distinguishable characteristics of those firms located at sites that are not in accord with the occurrence of the factors most firms claim to be important.

The answer to the first question was provided through a survey conducted in a sample of 446 manufacturing firms that established operations in the State of Wisconsin between 1962 and 1967. Locations factors that were ranked as most important in selecting Wisconsin as plant location were:

1. Markets (consumer and industrial)
2. Home area, personal reasons
3. Labor availability

4. Land and buildings availability

5. Raw materials

To determine whether firms chose locations in accordance with stated preferences, a regression model was developed to test the hypothesis that locations are chosen on the basis of factors' availability, as stated above. The quantification of these factors was accomplished through the use of surrogate variables. The resulting model included six dependent variables that measured either the number of new firms or the number of jobs created and eight independent variables representing the reasons given by firms relative to their locational choice. For example, market considerations were represented through the use of a market accessibility index. The surrogates for labor were percentage net migration, number of unemployed, percentage of unemployed, etc.

The results of the regression analysis demonstrate that, with the exception of branch plants, "...not only to entrepreneurs consider economic forces (in the choice of location), but they can select locations where these forces may be optimized." (6)

For our purposes, this conclusion is also an endorsement of the assertions made in location theory, and the methods of analysis used, as valid and reliable tools in evaluating and analyzing the location of industry, in explaining existing locations and in predicting future ones. With this observation in mind, we now turn to the analysis and evaluation of specific industrial location analysis techniques.

#### 4.0 A Survey of Industrial Location Analysis Techniques

As has been stated previously, the purpose of this study is to adopt industrial location analysis as an analytical tool in the determination of regions' comparative advantages for the location of industry. This determination can then be used as an input in the evaluation of economic benefits associated with the development of water projects in general and navigation projects in particular.

Consistent with this purpose, this chapter describes the various methods and techniques that are being used in analyzing industrial locations. Since there are a number of adequate summaries of these techniques (see Isard [3]), no attempt will be made here to present an exhaustive and detailed treatment of all possible techniques. Instead, for those techniques that seem most applicable for the purpose at hand, a brief outline will be presented and their advantages and limitations pointed out.

Some of the most prominent techniques--linear programming, input-output analysis and econometric modeling are discussed elsewhere.\* Four equally important techniques are analyzed here. They are comparative cost analysis, industrial complex analysis, correlation and regression analysis, and survey studies.

#### 4.1 Comparative Cost Analysis

To determine the firm's least-cost location, comparative cost analysis focuses on plants' locational costs at various sites. In a theoretical sense, the number of locations that could be considered is unlimited. However, in reality the number of locations that are actually

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\* The adaptation of these techniques for benefit assessment of water navigation projects is currently being undertaken by IWR. At the time of writing this report, no publication date has been set.

evaluated is reduced to a manageable number because of the firm's pre-defined market area and because of the existing geographical distribution of raw materials. For example, a decision to penetrate southwestern markets will, in all likelihood, restrict the search for plant location to a five or six state area. Similarly, firms in the lumber and paper industries will seek locations that are in close geographical proximity to forest and abundant water supply areas.

Thus, given these constraints, comparative cost analysis enables the investigator to determine the location in which the firm, or the industry, will operate at the lowest cost, for a given output, where cost of operations are defined as production and distribution costs.

The procedure of conducting a comparative cost study is relatively simple and straight forward. In principle, the analysis requires sufficient data to calculate total production costs for the firm (industry) in each location. And the location that offers the lowest production costs (including transportation charges) should, other things being equal, be selected. However, since the concern is with total cost differentials, and since some costs do not vary among locations, the task is reduced to the analysis of those production and transportation cost elements that differ among locations. Essentially then, comparative cost analysis is a procedure by which locations' comparative advantages are determined for individual firms or industries.

The main limitation of comparative cost analysis as a tool to investigate the location of firms lies with its underlying assumption that both markets and price-cost structures are given. As long as the analysis is confined to one firm (or a small industry) this assumption might be accepted. However, when more than one firm is considered, the

effect of these firms on local markets (demand) and price-cost structures should be carefully evaluated. This evaluation, however, could be done more efficiently with other analytical techniques (input-output analysis, for example) and therefore, comparative cost analysis should be limited to the investigation of individual firms. Another drawback of this technique is that it does not provide for the evaluation of interindustry relationship effects, i.e., the secondary and tertiary effects of a change in one industry's (or firm's) activity on other firms or industries. To overcome this drawback, industrial complex analysis was developed. This technique is discussed below.

#### 4.2 Industrial Complex Analysis

The limitations of comparative cost analysis as a "one industry analysis" technique on one hand, and the generalities generated by inter-regional input-output analyses, on the other hand, have prompted the development of a hybrid analytical tool. This tool, industrial complex analysis, gives cognizance to economies of scale, localization economies and regional price variations unaccounted for in input-output analysis; and at the same time it recognizes the interindustry relationships that are ignored by comparative cost techniques. As the name implies, industrial complex analysis analyzes the location of industrial activities in the context of a "set of activities occurring at a given location and belonging to a group (subsystem) of activities which are subject to important production, marketing, or other interrelations" [3, page 377].

To determine the type of industrial activities that can be accommodated by a region, given its resources, industrial complex analysis starts with an initial survey of a region's resources. This survey will

reveal certain initial advantages and limitations that the region possesses for the development of manufacturing activities. This initial survey provides the basis for the investigation of various industrial complexes. Once such potential complexes are identified, the next step requires the construction of input-output tables indicating the various inputs and outputs associated with the various processes. In this manner, certain complexes for which required inputs are unavailable and/or outputs that cannot be economically marketed, are eliminated. This process of elimination provides the investigator with a small number of potential complexes that are deemed feasible and for which comparative costs analysis is warranted. Assuming certain market configuration, the analysis of costs proceeds along typical comparative cost procedures, i.e., regional differentials in the cost of transportation, labor, power, fuel, etc. are evaluated. The end result of this analysis is quite similar to the results obtained from a single-industry comparative cost analysis--the pros and cons for two or more locations for identical complexes. The second step, therefore, expands the analysis to include variable factor proportions and product mixes, and processes substitution. Finally, the effects of agglomeration economies--scale economies--localization and urbanization are evaluated in terms of their influences on complex feasibility at the various locations.

Obviously, the quantification of some of these elements requires brave assumptions relative to the behavior of factor and product markets. For example, how will the wage rates for a given skill be affected when the demand for such skills is increased by a specified number with the introduction of a new industrial complex in the region?



These difficulties notwithstanding, estimates relative to the probable effects of the aforementioned spatial economies point out probable problem areas that may merit further investigation.

To sum up, the main application of industrial complex analysis is in the analysis of resource use, industrial location and general directions of regional development. Its main advantage lies with the ability to identify and evaluate profitable situations and activity combination that cannot be properly evaluated with the use of either comparative cost techniques or with generalized input-output analyses. Yet, because of some of its limitations, industrial complex analysis is best utilized when used as a complement to other techniques.

For a discussion of case studies in the application of comparative cost techniques, industrial complex analysis and a synthesis of the use of these techniques in conjunction with other techniques, the reader is referred to Isard [3].

#### 4.3 Correlation and Regression Analysis

In a major study using regression analysis to explain the location of various manufacturing activities, the rationale for using this technique is stated as follows:

"Multiple regression can explain location patterns that result from the location decisions of individual owners and managers when these decisions are economically rational and are based upon past experience and knowledge of existing area characteristics. Regression can also explain location patterns that are created by a process of differential economic success. For example, if economic success is awarded to electronic plants that locate near universities, a close correlation of growth in electronics

employment with distribution of universities may result either from the actual decisions made by entrepreneurs to locate their plants near universities or by a process of differential success in which plants so located expand while plants located elsewhere fail to expand. [Spiegelman, 11]

The essence of the statement quoted above is that the location of industry can be explained as a function of a set of measurable variables, or stated differently, those location factors that were mentioned throughout this study, if quantifiable, can explain, statistically, the location of industry. The last statement also brings to the fore the limitations of regression analysis. First, for a regression model to be statistically significant, reliable data are necessary. Furthermore, some of the data, because of problems of quantification, may be replaced by surrogates of questionable validity. And thirdly, the nature of the analysis requires cross-sectional data, or, a set of measurements at a point in time. Obviously, ignoring the dynamics of change in both industries' requirements and areas' factor endowments as they change over time, limits to a certain extent the use of regression models as predictive tools for industrial location.

Miller [8] summarizes the mechanics of the application of regression analysis to industrial location.

The Stepwise Approach--The stepwise approach begins with the identification of a relatively large set of independent variables, or, those variables that affect the location of the industry in question. In some studies the number of stipulated independent variables can be as high as 130 variables [Dorf, 1]. The number of variables is reduced by a process of elimination. This is accomplished through an initial two-variable regression analysis where the variables with the lowest correlation with the dependent

variable are eliminated. Thus, the independent variables that have the highest partial correlation are included in the second step. The new regression equation with two independent variables is now derived and the partial correlation is computed for the remaining variables while the first two are held constant. In each successive step, the partial regression coefficients and multiple regression coefficient are obtained. This procedure is followed to the point where the addition of more variables does not significantly help to explain the dependent variable, or, the factor of localization. The second approach utilizes the same multiple regression analysis. However, it is applied in cases where the number of independent, or explanatory variables, is small. In this method, a functional relationship between the dependent and independent variables is hypothesized and then statistically tested to accept or reject the hypothesis.

Some of the limitations of regression models in explaining the location of industry have been discussed above. Other problems are more technical in nature and are concerned mostly with problems of estimations, three of which are of concern--spurious correlation, multicollinearity and the identification problems. A discussion of these statistical problems are beyond the scope of this study. The reader, however, should be aware of the existence of such problems in statistical estimations.

The main advantage of regression analysis in the evaluation of industrial location lies with the ability that this technique renders to isolate from a large mass of data information that is pertinent to the problem on hand, i.e., to isolate and statistically estimate those factors that bear on, and are significant in explaining the location of industry. Furthermore, this technique allows the investigator to

make such determination relative to manufacturing activities in general or to specific industries, performing the analysis in broad geographical regions or in narrow well-defined subregions or any other small areas with data availability being the only constraint to the performance, and quality of the analysis.

#### 4.4 Survey Studies

One of the most commonly used analytical techniques in the investigation of industrial location is the survey, or questionnaire study. Essentially, a survey study attempts to determine the factors that attracted manufacturing entities to a specific location where manufacturing entities are defined as a group of firms belonging to the same industry or a group of firms representing a cross section of a large number of industries. Similarly, the geographical location in question could be as small as a group of counties or that encompass an entire state, or a region that includes a number of states.

These variations in the composition of the observed samples and geographical areas notwithstanding, the data generated by survey studies is quite uniform: a list and ranking of factors that influence the various firms in the sample to locate in their respective sites. Although not always thus specified, the locational factors are usually categorized into three major groups:

##### (1) Overall Locational Strategy Factors

These factors pertain to the firm's overall location strategy. As such, location determinants in this group are those that determine whether the firm is market or raw materials oriented (or neither); the firm's desire to secure an uninterrupted supply of a certain input

(for example, energy sources), whether or not the firm is willing to accept a unionized labor force, etc.

## (2) Cost Factors

The second set of data generated by questionnaire studies pertains to firms' cost factors. These location factors are those that bear on the firm's cost of operations--production and distribution costs--which the assumed profit maximizing firm is trying to minimize. They include labor, power, transportation, cost of land, taxes, etc.

## (3) Amenity Factors

Finally, the last group of location factors are those that can be categorized as amenity factors. These are mainly community and environmental attributes that are especially important in the locational decision of foot-loose industries. The availability of schools, hospitals, cultural activities and recreational facilities fall in this category.

What are the advantages and limitations of survey studies? The comparative costs and industrial complexes analyses previously discussed are basically an input and market location study of an industry for the purpose of determining the location that minimizes the cost of manufacturing and distribution. Thus, when markets are predetermined and resources inputs are available in specific locations, transportation charges become the factor upon which the choice of site is determined. For many industries, however, major inputs are available in many alternative locations and transport cost differentials are not a dominant location factor. Thus, after certain locations are ruled out because either cost or market conditions are unacceptable, there remains a relatively large number of alternative locations that should be considered. The selection of the ultimate site will be determined, therefore, on the basis of location

attributes(s) other than a set of major market or cost considerations. The ability to consider and evaluate the influence of such location factors on the location decision of the firm is the main advantage offered by the survey study. Another advantage of this technique is the ability to analyze the locational preference of a large number of industries on the basis of a single survey study. This is so because many industries, although differently classified, share similar operational characteristics, i.e., they require similar factor inputs and they distribute their product in the same markets. Locational preferences of such industries are, therefore, similar. The ability to make such deductions, obviously, depends on the size of the sample surveyed.

The major weakness of survey studies is the qualitative rather than quantitative data that they provide. Their use, therefore, should be restricted to investigations that require generalized answers only. More specifically, survey studies should be used as an initial screening mechanism that, if needed, can be supplemented with quantitative methods.

#### 4.5 Evaluation of the Analytical Techniques

In this chapter we presented four techniques that are commonly used in analyzing industrial locations. The first two techniques--comparative costs and industrial complex analysis--are used to systematically analyze the operational characteristics of single, or small groups of industries, and areas' locational attributes to determine the profit-maximizing location for these manufacturing activities.

The last two techniques described in the previous chapter were regression analysis and survey studies. As opposed to the first two techniques, which are industry-specific, the latter two analytical tools are area-specific. In other words, the comparative cost approaches first

determine industry's requirements and then seek a location in which these requirements can best be met. The survey studies, on the other hand, determine areas' location attributes (as defined by firms that located there) and thus, make it possible to predict which industries can successfully operate in the area, given industry's locational requirements and the area's locational attributes.

In essence, then, all of these techniques accomplish the same end albeit through different routes--the determination of areas' locational advantages for manufacturing activities.

The basic difference between these two groups of location analysis techniques is manifested in their application. Comparative cost approaches are designed to analyze individual industries or small complexes; survey studies may at times encompass the entire spectrum of manufacturing activities; comparative cost studies analyze a number of probable locations to finally arrive at one optimum location; survey studies analyze one location to determine the group of industries that can operate in that location profitably.

It seems, therefore, that for our purpose--the determination of areas' comparative advantages for the operation of manufacturing--the preferable technique of analysis is the survey study approach. The main reason being the ability to analyze in-depth an area's location attributes and then, for that area, to screen a large number of industries to determine those that might find it a suitable location to operate in.

## 5.0 The ILS Model

In the last chapter we described and analyzed a number of techniques used in industrial location analysis. Of the techniques analyzed, one--the survey study approach--seems to offer the best possibilities as a screening mechanism for the determination of areas' comparative advantages for the location of industry.

In this chapter we propose to present and analyze a survey study and an industrial location model derived from it, that should be considered for adaptation for Corps of Engineers purposes. The model, The Industrial Location Service (ILS) was developed by the Economic Development Administration, U.S. Department of Commerce. We shall first describe the model and analyze its capabilities and then examine its applicability as a tool of analysis in the determination of industrial location benefits induced by water development and water navigation projects.

### 5.1 Model Description

The Industrial Location Service (ILS) is a computerized system designed to match industries with specific geographical areas through a screening process that identifies those industries which can best operate in an area, given the specific industry's locational requirements and the area's locational attributes.

Two purposes guided the development of ILS. First, many designated Economic Development Administration (EDA) assistance areas around the country consist of small, little known towns and cities which, it was felt, were often overlooked by industry or professional plant location firms as potential plant sites. In many instances, however, these towns and cities possess many of the location requirements for successful industrial operations. Thus, the first purpose of ILS was to develop a



mechanism by which plant site seekers can evaluate, at a very lost cost, a large number of towns that were heretofore very seldom considered as potential plant sites.

Since the system is designed with dual capabilities--to evaluate a number of sites in terms of a single industry's locational needs and to determine the various industries that will find sufficient locational factors to satisfy their needs in a specific community--the second purpose of ILS is to assist local planners and Industrial Development agencies in the identification of those industries most likely to find their area attractive and thus, help in narrowing down "target" industries upon which the community can focus in its efforts to attract manufacturing.

Another aspect related to this purpose is the ILS' additional use as a tool of analysis in a community's planning efforts. While the availability of many productive factors and location attributes are beyond the community's control (raw materials, distance to markets, etc.), other location factors can be considered as decision variables that can be affected by the community. Building access roads, vocational schools, waste treatment facilities are only a few examples of the manner by which a community could enhance its attractiveness as a location for industry in general or to accommodate the needs of a specific firm that would locate in the community if certain factors were to become available.

## 5.2 Model Components

The ILS Model consists of two major files:

- Location requirements of industry
- Communities' profile

### a. Industrial Location Requirement:

The file containing the industrial location requirements was

compiled from a special survey conducted in 1971 by the Bureau of the Census of 250 5-digit SIC industry groups that showed the highest rates of expansion during the 1960s and the greatest potential for growth in the 1970s. Within these groups, plants were selected on the basis of the following criteria: (1) they were primarily engaged in the production of growth product classes (represented by 50% or more of the total value of shipments of the plant) and (2) had employed at least 100 employees [14].

Since industrial plants currently in operation reflect location decisions that were made in previous years, data pertaining to sites, locations, and plant characteristics of these plants might be inadequate, or unreliable in identifying locational requirements in current decisions to locate or expand new operations and facilities.

To overcome this problem and to provide a means by which current and historic locational requirements can be distinguished, two report forms were developed for the survey.

To identify the location and operating characteristics of plants in operation in 1970, participants were requested to provide data on manufacturing plant characteristics (see Appendix A). Firms contemplating expansion or construction of new facilities during 1971-1975 were requested to provide industrial location determinants (see Appendix B). This provided a sample of 5,500 entities in operation in 1970 of which 3,800 were identified for inclusion in the report of industrial location determinants. Actual tabulation of usable questionnaires for this report amounted to 2,656, or 70 percent of firms contacted.

The range of data obtained for each industry group relative to its locational requirements are provided in Appendix B. The following is a brief summary of data provided by each firm:

#### General Information--

- firm's plans to establish new plants or expand operations
- type of location preferred for new plant
- community size preferred
- size of plant size preferred
- planned number of employees in new plant

#### Ranking of Community Attributes--

Firms were asked to rank as "critical" (location not considered in absence of factor), "very significant," "average," "less significant" and "minimal factor" 16 community attributes. These attributes can be categorized as:

- transportation services
- education and vocational training
- taxes and public financing
- community services (fire, police Dept.)
- labor availability

#### Ranking of Plant Site Features--

Firms were asked to rank, as mentioned above, the importance of plant site features that were categorized as follows:

- transportation accesses
- water supplies
- power supplies
- waste disposal facilities

#### Locational Objectives to be Achieved in New Site--

Firms were asked to identify the three most important locational objectives that the firm hoped to achieve with the new location/expansion. These included:

- market objectives
- raw materials objectives
- agglomeration objectives

b. Community Profiles:

The file of community profiles contains at this point the profile of communities designated by EDA criteria as "growth centers," areas of former military bases and Indian reservations. However, this file is open-ended in that it can be expanded to include any community for which pertinent data are available. Similarly, the file is designed to accept aggregated data for two or more communities, thus turning the analysis from a community to area-specific. In this case, industries are matched with areas (counties, multi-town areas, etc.) rather than with single communities.

The data required for a complete community profile is presented in Appendix C. The following is a summary of the major data categories that constitute a complete profile:

- general and demographic data
- market information
  - distance and size of nearest SMSA
- transportation information
  - various modes and highways
- community industrial base
  - employment by industry
- mineral and agricultural resources
- general resources
  - industrial parks
  - utilities

(--general resources)  
    power  
    water  
-- labor data  
    labor availability  
    wage rates  
    vocational training  
-- community services  
-- financial incentives

### 5.3 Application of the ILS Model

The entire ILS system consists of industries' locational requirements file, a file in which community profiles are entered and a computer program--a match generator--designed to match industries requirements with communities' resources.

Since the main objective of the model is to determine the community's comparative advantage for the operations of specific industries, the model is designed to isolate those locational requirements that characterize an industry's locational needs. Thus, before the industry's locational needs are matched with a community profile, its set of location requirements is reduced to include only those factors that meet the following criteria:

- (1) at least 50 percent of the firm in that industry's sample listed the factor as a requirement, or,
- (2) that the percent of firms in that industry's sample listing a factor is at least two times greater than the percent of firms in all industries surveyed that listed that factor as a requirement.

In this manner, the model reduces the number of locational requirements of each industry to a set of factors that distinguishes that industry's locational preferences from all other industries.

Now that an industry's most distinguishable set of locational requirements has been determined, the next step is to determine the relative importance of each locational requirement within that set. For this purpose a system of weights for each locational factor was developed. Two variables determine the weight assigned to a particular location requirement:

- (1) Its importance rating, whether rated critical, significant or average value; in those cases where no importance rating was assigned to a requirement, it was considered as average in importance
- (2) The percentage of firms in that industry's sample that listed that requirement

Table 7 lists this weighting system. Column 1 classifies the percentage of firms listing a requirement and Column 2 shows the point score on the basis of the relative importance assigned to the requirement by the firms in the sample.

TABLE 7  
Scoring System for Location Requirements

Percent of Firms Listing the Requirement %	Importance Rating Score			
	1	2	3	4
90 - 100	100	70	58	58
80 - 89	97	67	55	55
70 - 79	94	64	52	52
60 - 69	91	61	49	49
50 - 59	88	58	46	46
40 - 49	85	55	43	43
30 - 39	82	52	40	40
20 - 29	79	49	37	37
10 - 19	76	46	34	34
0 - 9	73	43	31	31

On the basis of this scoring system, a total score for each industry is determined where the total score is the sum of the weights (point scores) of the set of locational requirements of that industry.

The last step matches the community profile with the industry's locational profile. When a resource available in the community fulfills an industry requirement, it is given the point score assigned to that requirement. The sum of the points received by the community for those requirements it fulfills is the community's point score for that particular industry. This total point score obtained for the community is then calculated as a percentage of total possible point score for the industry. It should be noted that if, for example, a community receives a score of 90 percent, it does not mean that the community fulfills 90 percent of the industry's requirements. Rather, it means that the community obtained this percentage of total possible point score of that industry. In this sense, the score obtained by the community is an indication of the community's relative advantages (over other communities) in fulfilling the locational requirements of an industry.

#### 5.4 Model Output and Interpretation

Appendices "D" and "E" demonstrate the output generated by the ILS Model. Appendix D shows the output obtained for Muskogee, Oklahoma. For practical purposes, the model lists only those industrial classifications for which Muskogee's locational resources fulfilled at least 70 percent of total score points of the industries listed.

A breakdown of this distribution of industries, aggregated into two digit SIC classification, by point scores obtained, is the following:

TABLE 8

Distribution of Industries by Point Scores

SIC	Description (Industries Classified as Producers of:)	Number of Industries in Score Range			Total*
		90-100	80-89	70-79	
27	Publishing and printing	5	5	5	15
28	Chemicals and allied Prod.	4	6	-	10
33	Primary metals processors	9	5	2	16
34	Fabricated metal products	11	6	2	19
35	Machinery (except electrical)	19	20	11	50
36	Electrical machinery	7	10	6	23
38	Various instruments	4	6	1	11

\* Those industries that appear less than six times are omitted.

How should this data be interpreted? For illustrative purposes let's isolate and examine SIC 35. This industrial classification consists of 65 sub-classifications at the 5 digit code. Firms classified in this category manufacture a range of products from engines to farm machinery to machine tools. Although the range of products is quite substantial, firms in these industries share some common requirements relative to their choice of location. These locational requirements include trained workers, vocational training, transportation facilities and a certain community size. Apparently, all these major requirements were available in Muskogee thus rendering it a good location for these industries to operate in.

A simple, yet effective, way to test whether the city's "expected" attractiveness to these industries is matched by actual firms' preferences is to compare the model's "prediction" to actual employment in these industries. For this purpose we propose to compare industries as they were ranked by score points to the rank of actual employment in these industries in Muskogee.

We should mention that the largest manufacturing employers in Muskogee in 1977, as estimated by the Bureau of the Census-County



Business Pattern, were the stone and clay industries and the food industries. Since these industrial classifications are excluded from the ILS model, we shall not include them in our comparison. The relevant industries, as they are ranked by the ILS model and their rank by actual employment size are the following:

TABLE 9  
Model Ranking and Actual Employment Ranking  
for 7 SIC Groups in Muskogee, Oklahoma

SIC	Industry	Number of Classifications Scoring Between 70 to 100 Percent	Rank	Actual Employment Rank *
35	Machinery (except electrical)	50	1	1
36	Electrical machinery	23	2	5
34	Fabricated Metal Prod.	19	3	2
33	Primary Metals	16	4	3
27	Publishing and printing	11	5	4
38	Instruments	11	5	6
28	Chemical, Allied Prod.	10	6	7

\* Rank is by size of employment among manufacturing industries. Employment in stone and clay and food industries, first and second in manufacturing employment in Muskogee, are excluded.

As can be seen in Table 9, with the exception of the electrical machinery industries, "expected" attractiveness of Muskogee to the five other industrial classifications closely matches the rank of actual employment in these industries in that city. For these industries, the hypothesis that statement by firms as to their locational preference is expected to be followed by action is confirmed. And that actual locations selected by these firms do possess the locational requirements stated as important. Similarly, this simple, yet effective, test confirms the model's ability to predict the adaptability of industries to specific

locations thus rendering it an effective tool in determining areas' comparative advantage for the operation of specific industries.\*

## 5.5 Suggested Applications of the ILS Model to Corps of Engineers Projects' Evaluation

As has been stated in the introduction to this study, the determination of water navigation projects' benefits is dependent upon the ability to predict future industrial activities in projects' areas. This, in turn implies an ability to accurately predict the future spatial distribution of manufacturing. Obviously, such predictions are, at best, guesses subject to a wide margin of error, especially when they are made for relatively small geographical areas. However, since these projections are critical in evaluating the benefits, and then, the feasibility of projects, it is the analyst's task to reduce as much as possible the margin of error associated with such predictions.

One way to accomplish this is the provision of analytical tools that will aid in analyzing areas' potential for industrial development. The determination of such potential, or locational advantages, are not by themselves projections of future industrial activities. Rather, they serve as a screening mechanism upon which quantitative projections can be based. More specifically, such tools should offer clues as to which industries might locate in the project area. The quantitative projection methods should supplement it by providing the how much and when information.

The ILS model described above is one such tool that is readily available to be used in the evaluation and determination of water navigation project benefits.

In the following we shall describe the manner by which the ILS

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\* For a more rigorous statistical test of a similar nature, see Dorf [1].

model can be incorporated in projects' evaluation procedures. This description will include: (1) suggested guidelines for the identification of the appropriate geographical areas that should be analyzed; (2) identification of the type of data needed and its data sources and (3) suggested applications of model output.

a. Area Delineation

(1) General Impact Area

We define the general impact area as the geographical area that captures the full spatial impact of the project and the ensuing economic activities prompted by it.

Bearing in mind that our analysis is geared to the determination of the project's effect on industrial activities and that such activities are usually conducted within or around established population centers, the determination of the general impact area is significant only in that it provides the general boundaries for the set of cities and towns upon which the analysis should focus.

To determine these boundaries, the following questions should be asked: what is the farthest distance from the waterway that a manufacturing activity can be established and yet enjoy the economies afforded by it? Obviously, those manufacturing entities that desire to maximize the economies provided by the waterway will attempt to locate in the immediate vicinity of the channel, thus minimizing transfer and handling costs. These locations along or in close proximity to the waterway form the first-order tier of sites within the general impact area.

The second question is: what are the most likely locations from which firms located in the first-order tier will draw services and supplies and whose distribution centers will be used as points of departure for regional and national market? As with the first question, no exact answers

can be provided, however, it was previously established that various services, supply centers and distribution facilities usually converge on industrial areas which in turn, are associated with established population centers, usually central cities and standard metropolitan areas. Thus, we propose that the locations of SMSAs nearest the project area will serve as the boundary line for the general impact area.

## (2) Specific Impact Area

We define specific impact areas as those cities and towns in which physical facilities will be established or expanded. The reasons for the need to define specific cities and towns are threefold: first, manufacturing facilities are usually established within city limits in order to enjoy city services. Second, defining a point in space should help to determine the area from which local resources can be drawn. For example, the effective labor force supply curve is usually considered to be within a commuting distance--about a 25-mile radius. Similarly, the effective personal and retail services area is that which is covered by local newspapers and radio stations. And finally, we chose to define specific cities and towns because the ILS model is community oriented and most of the data required are community-specific data, the details of which will be discussed presently.

Given these considerations, we propose that the analysis will be confined to a general area surrounding the water navigation project and bounded by nearest SMSAs. And within this general area, the ILS model should be applied to a set of cities and towns that meet the following criteria:

- they should have a population of at least 5000;
- they should be focal towns in that they provide services to a larger surrounding area;

-- they should not have a population exceeding 125,000 since the ILS model becomes less discriminating as the city size and its industrial base increases.

b. Data and Data Sources

Data requirements for community profiles are presented in Appendix C. In essence, a community profile is an inventory list of the community's resources: its infrastructure, services provided, labor force and labor force characteristics. This inventory of resources extends, in some instances beyond the community's boundaries. This happens when certain resources are unavailable in the community and, therefore, the distance to the nearest point where such resources are available needs to be known, for example the distance to the nearest rail terminal. Most of the data required can be obtained from the following sources:

- city administrators
- local planning agencies
- local Chambers of Commerce
- state planning agencies
- state industrial development departments
- state employment security commissions
- U.S. Census publications

c. Model Output Utilization

The output generated by the model is demonstrated in Appendices D and E. Appendix D shows the output obtained by matching the entire industrial file with one community to yield a list of industries that are most compatible with that community's resources. Appendix E demonstrates the output generated by checking the adaptability of a specific industry to a list of communities in the communities' file to yield a list of communities

that are compatible with that industry's location requirements.

Given these capabilities of the model, the output generated by it can be utilized in projects' evaluation in the following ways:

(1) Determination of project area location advantages for the operation of industry:

To provide an overview of the type of industries that can operate in the study area, given resources availability, area community profiles should be matched with the industrial file to yield the list of industries most conducive to operate in the region.

(2) Determination of "with" and "without" project area locational advantages:

For water navigation projects, "with" and "without" project industrial activities can be evaluated for the project area by first generating a list of industries that are likely to locate in the area without the benefits of a navigable waterway. The second step should be the modification of area's community profiles to include the availability of water transportation. A second run of the computer model should reveal which new industries are now attracted to the area under "with" project conditions. The incremental list of industries should be credited to project benefits.

(3) Determination of project area locational advantages after resource modification:

To evaluate the project area's increased competitive advantages after the area's resources availability has been modified to include all the project's output--water transportation, new industrial parks in port areas, increased industrial water supply, etc.--a "synthetic" area community profile can be prepared to include the area's new inventory of location factors. The increment in industries that can

potentially locate in the area, when compared to existing industries in the area, should be credited to project's benefits.

(4) Using the model's output as a planning tool to enhance the project area's locational advantages:

Working in concert with local planning agencies, the model can be used as a planning tool to evaluate how the project complements local planning efforts such that project benefits and communities' objectives are maximized. For example, through the use of industry characteristics profile, a list of industries for which water transportation is an important locational factor can be identified. Through the use of the model, the probable adaptability of such industries to the project area can be evaluated. Should some industries be excluded by the model for lack of some location factors, such factors can be identified and if possible, such deficiencies corrected through joint efforts of local entities and project administrators.

## 6.0 Concluding Remarks and Recommendations

The objective of this study was to select a methodology with which water navigation project areas can be evaluated as to their comparative advantages to attract manufacturing activities, data that are essential in estimating projects' industrial development benefits.

To accomplish this task, the study focused on a number of analytical tools that are used in the analysis of industrial location. Of the various tools discussed, one, the ILS model, was designed with this study's very purpose in mind: it allows investigators to determine what kind of manufacturing operation can successfully operate in an area, given industry's locational requirements and given areas' resources availability.

While the other techniques discussed are equally effective in determining the adaptability of industry to specific locations, it is felt that the ILS model should merit special consideration for probable adaptability as a tool in analyzing Corps of Engineers projects for the following reasons:

Economy: the ILS model, developed by the Economic Development Administration, is an operational model that is readily available thus eliminating extra model construction costs. Similarly, because of the existence of a wide data base, area analysis, for which data is available can be performed at a minimal cost.

Future Expansion: the only constraint to increasing the scope of the model's applicability is the existence of communities' profiles data. Thus, the model can be expanded to include additional locations through the addition and updating of community profiles, a fairly simple and inexpensive data gathering process.



Recognizing Resource Limitations: perhaps the most important feature of the ILS model is its ability to recognize areas' resources limitations. Unlike most other techniques, where such limitations are ignored, the ILS model is designed to evaluate each area (community) in terms of its inventory of productive factors, matching it against each industry's needs. This matching process yields, for each location, a list of industries for which local resources fulfill their locational requirements. This insures that industries which cannot successfully operate in the area, because of resources' deficiencies, are excluded from the list, thus providing for a more realistic assessment of probable project industrial development benefits.

Having noted the model's major advantages we should also point out some key limitations and problem areas that merit further investigation. These include:

Model Status: as has been mentioned before, the ILS model was developed by the Economic Development Administration which owns and operates the model. Because of the uncertain status of this agency, some problem might arise in transferring the complete program to the Corps of Engineers facilities.

Computer Transferability: preliminary investigations point to some difficulties that might be incurred in attempting to move the computer program from EDA computers to Corps' facilities. It is suspected that the incompatibility of the two computers might require some programming changes.

Data Limitations: the ILS model is based upon two sets of data: community profiles and industrys' locational requirements profile. For the model to yield valid results, both data bases need to be

periodically updated. Specifically, further investigation is needed to ascertain whether industries' locational requirements at present are similar to those expressed in the early 1970s when the original survey was conducted. Similarly, existing community profiles should be checked as to the accuracy of data.

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APPENDIX A

Survey of Manufacturing Plant Characteristics- 1970

<p>FORM ED-707A (4-27-71)</p> <p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS COLLECTING AND COMPILING AGENT FOR ECONOMIC DEVELOPMENT ADMINISTRATION</p> <p style="text-align: center;"><b>SURVEY OF MANUFACTURING PLANT CHARACTERISTICS</b></p> <p style="text-align: center;">1970</p>	<p><b>NOTICE</b> - The information supplied on this form will be used only in statistical compilations, and will not be released in any way that will reveal the operations of individual companies</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;"></td> <td style="width: 10%; text-align: center;">Group</td> <td style="width: 10%; text-align: center;">Survey</td> </tr> </table>		Group	Survey									
	Group	Survey											
<p><b>RETURN THIS COPY TO:</b></p> <p style="text-align: center;">Bureau of the Census Jeffersonville Census Operations Office Jeffersonville, Indiana 47130</p>	<p style="text-align: right;"><i>(Please correct any error in name and address including ZIP code)</i></p>												
<p><b>CLASS OF PRODUCTS COVERED BY THIS REPORT:</b> (See CODE in address box above; refer to description in Reference Manual)</p>													
<p><b>GENERAL INSTRUCTIONS</b></p>													
<p>Please complete this form for the establishment identified above. The information requested refers to the locational and operational characteristics of this establishment during 1970. Note that no actual data totals are requested on this form. All that is necessary to complete each inquiry is to provide an estimate or rating that most appropriately describes the element or characteristic being studied.</p>													
<p><b>Part A - PLANT LOCATION AND CHARACTERISTICS</b></p>													
<p>▶ <b>Item 1 - Date Plant Constructed</b></p> <p>Indicate when this plant was constructed (or underwent MAJOR addition, expansion, or renovation) (Mark ONE box only)</p> <p>0101 <input type="checkbox"/> 1960 - 1967</p> <p>0102 <input type="checkbox"/> 1950 - 1959</p> <p>0103 <input type="checkbox"/> Prior to 1950</p> <p>0109 <input type="checkbox"/> CENSUS USE ONLY</p>													
<p>▶ <b>Item 2 - Population of City or Place in which Plant is Located (Mark ONE box only)</b></p> <p>0201 <input type="checkbox"/> 50,000 or more - Skip to Item 4</p> <p>0202 <input type="checkbox"/> Less than 50,000 - Go to Item 3</p>													
<p>▶ <b>Item 3 - Distance of Plant from city or place with 50,000 or more population (Mark ONE box only)</b></p> <p>0203 <input type="checkbox"/> Less than 50 miles</p> <p>0204 <input type="checkbox"/> 50 miles or more</p> <p>0209 <input type="checkbox"/> CENSUS USE ONLY</p>													
<p>▶ <b>Item 4 - Site Characteristics</b></p> <p><b>a. Is this plant located in an industrial park?</b></p> <p>0301 <input type="checkbox"/> Yes</p> <p>0302 <input type="checkbox"/> No</p> <p>0309 <input type="checkbox"/> CENSUS USE ONLY</p>													
<p><b>b. What is the approximate size of the site (total land area, including physical facilities, parking, outside storage, etc.) occupied by this plant? (Mark ONE box only)</b></p> <table style="width: 100%;"> <tr> <td style="width: 50%;">0311 <input type="checkbox"/> Less than one acre</td> <td style="width: 50%;">0315 <input type="checkbox"/> 51 - 100 acres</td> </tr> <tr> <td>0312 <input type="checkbox"/> 1 - 4 acres</td> <td>0316 <input type="checkbox"/> Over 100 acres</td> </tr> <tr> <td>0313 <input type="checkbox"/> 5 - 20 acres</td> <td>0319 <input type="checkbox"/> CENSUS USE ONLY</td> </tr> <tr> <td>0314 <input type="checkbox"/> 21 - 50 acres</td> <td></td> </tr> </table>		0311 <input type="checkbox"/> Less than one acre	0315 <input type="checkbox"/> 51 - 100 acres	0312 <input type="checkbox"/> 1 - 4 acres	0316 <input type="checkbox"/> Over 100 acres	0313 <input type="checkbox"/> 5 - 20 acres	0319 <input type="checkbox"/> CENSUS USE ONLY	0314 <input type="checkbox"/> 21 - 50 acres					
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<p><b>c. What is the approximate size, in square feet, of occupiable floor space (under roof) of this plant? (Mark ONE box only)</b></p> <table style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Square feet</td> <td style="width: 50%; text-align: center;">Square feet</td> </tr> <tr> <td>0321 <input type="checkbox"/> Less than 10,000</td> <td>0325 <input type="checkbox"/> 300,000 - 399,999</td> </tr> <tr> <td>0322 <input type="checkbox"/> 10,000 - 49,999</td> <td>0327 <input type="checkbox"/> 400,000 - 499,999</td> </tr> <tr> <td>0323 <input type="checkbox"/> 50,000 - 99,999</td> <td>0328 <input type="checkbox"/> 500,000 or more</td> </tr> <tr> <td>0324 <input type="checkbox"/> 100,000 - 199,999</td> <td>0329 <input type="checkbox"/> CENSUS USE ONLY</td> </tr> <tr> <td>0325 <input type="checkbox"/> 200,000 - 299,999</td> <td></td> </tr> </table>		Square feet	Square feet	0321 <input type="checkbox"/> Less than 10,000	0325 <input type="checkbox"/> 300,000 - 399,999	0322 <input type="checkbox"/> 10,000 - 49,999	0327 <input type="checkbox"/> 400,000 - 499,999	0323 <input type="checkbox"/> 50,000 - 99,999	0328 <input type="checkbox"/> 500,000 or more	0324 <input type="checkbox"/> 100,000 - 199,999	0329 <input type="checkbox"/> CENSUS USE ONLY	0325 <input type="checkbox"/> 200,000 - 299,999	
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0325 <input type="checkbox"/> 200,000 - 299,999													
<p><b>PLEASE CONTINUE ON REVERSE SIDE</b></p>													

**Part B - PRODUCT AND MATERIAL DELIVERIES; WATER USE; HOURLY WAGE RATES DURING 1970**

**Item 5 - Principal Types of Materials Used**

How would you classify the materials consumed in the manufacturing operation of this plant?  
(Mark ONE box only)

- 0401  Principally raw materials, including first stage processing (e.g., debarked logs, graded vegetables, etc.)
- 0402  Principally processed materials, including semi-finished and finished products, parts and components (e.g., machinery, semiconductors, furniture core stock, etc.)
- 0403  Approximately equal proportions of raw and processed materials.
- 0409  CENSUS USE ONLY

**Item 6 - Delivery Schedules and Methods of Transportation**

**INSTRUCTIONS**

There are listed below five categories of time schedules and four methods of transportation generally used in shipping manufactured products and in receiving materials from suppliers. Please select and "rate" the three time schedules and the three transportation methods which, in your judgment, accounted for the

largest tonnage of products shipped from this plant during 1970. Similarly rate the three time schedules and the three transportation methods which, in your judgment, accounted for the largest tonnage of materials received at the plant during 1970.

Codes for rating items 6a and 6b below:

- 1 - Largest tonnage                      2 - Second largest tonnage                      3 - Third largest tonnage

Note: If fewer than three modes of transportation are used or if fewer than three of the specified delivery time schedules apply, use rating codes 1 and/or 2, as appropriate.

		(Enter appropriate code(s) 1, 2, and 3 from above)					
		Same day delivery	Overnight delivery	Next day delivery	Two-days delivery	More than two-days delivery	CENSUS USE ONLY
<b>6a. Delivery schedule for -</b>	(1) Products shipped by your plant . . . . .	0411	0412	0413	0414	0415	0419
	(2) Materials received at your plant from suppliers . . . . .	0431	0432	0433	0434	0435	0439
		(Enter appropriate code(s) 1, 2, and 3 from above)					
		Air	Water	Rail	Truck*	CENSUS USE ONLY	
<b>6b. Method of transportation used for -</b>	(1) Products shipped by your plant . . . . .	0421	0422	0423	0424	0429	
	(2) Materials received at your plant from suppliers . . . . .	0441	0442	0443	0444	0449	

\* Exclude short haul deliveries to or from other means of transport.

**Item 7 - Water Used During 1970**

a. What was the approximate total quantity of water intake during 1970 by this establishment?  
(Mark appropriate water-intake size class (millions of gallons per year))

- 0501  Under 20 million gallons
- 0502  20 - 99 million gallons
- 0503  100 million gallons or more

b. Does this establishment utilize a public water system for most of its industrial water intake?

- 0504  Yes
- 0505  No
- 0509  CENSUS USE ONLY

**Item 8 - Hourly wage rates of production and related workers**

Listed to the right is a range of hourly wage rates. Please enter the approximate percentage, rounded to the nearest ten (10) percent, which best describes the proportion of production and related workers in each wage rate range. For example: If 60 percent of the plant's production workers earn between \$2.75 and \$3.25 per hour and the balance of these workers earn over \$4.50 per hour, enter "60" in code box 0602 and "40" in code box 0604.

This category includes workers (up through the working foreman level) engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and watchman services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Supervisory employees above the working foreman level are excluded from this category.

Hourly wage	Percent of production and related workers	
a. Under \$2.50 per hour	0601	%
b. \$2.50 - \$3.49 per hour	0602	%
c. \$3.50 - \$4.49 per hour	0603	%
d. \$4.50 or over per hour	0604	%
e. TOTAL (Should equal 100%) →		100 %
CENSUS USE ONLY	0609	
	0619	

**Item 9 -**

**PERSON TO BE CONTACTED**

Name of person to contact regarding this report			
Address (Number and street, city, State)		ZIP code	Telephone
		Area code	Number      Extension
Signature of authorized person		Title	Date

APPENDIX B

Survey of Industrial Location Determinants - 1970-1975

<p><b>FORM ED-707B</b> (4-29-71)</p> <p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS COLLECTING AND COMPILING AGENT FOR ECONOMIC DEVELOPMENT ADMINISTRATION</p> <p style="text-align: center;"><b>SURVEY OF INDUSTRIAL LOCATION DETERMINANTS</b></p> <p style="text-align: center;">1971 - 1975</p>	<p><b>NOTICE</b> - The information supplied on this form will be used only in statistical compilations, and will not be released in any way that will reveal the operations of individual companies</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;"></td> <td style="width: 10%; text-align: center;">Group</td> <td style="width: 10%; text-align: center;">Survey</td> </tr> </table>		Group	Survey																	
	Group	Survey																			
<p><b>RETURN THIS COPY TO:</b></p> <p style="text-align: center;">Bureau of the Census Jeffersonville Census Operations Office Jeffersonville, Indiana 47130</p>	<p style="text-align: right;"><i>(Please correct any error in name and address including ZIP code)</i></p>																				
<p><b>CLASS OF PRODUCTS COVERED BY THIS REPORT:</b> (See CODE in address box above; refer to description in Reference Manual)</p>																					
<p><b>GENERAL INSTRUCTIONS</b></p>																					
<p>This form is designed to obtain information on various locational requirements which your company would probably consider in arriving at any decision to construct new facilities to manufacture the class of products referred to above. Since your company has been an important manufacturer of these products, we wish to obtain your best evaluation of the locational requirements for the construction of a plant to manufacture this class of products,</p> <p style="text-align: right;">whether or not you actually plan to construct additional facilities in the foreseeable future.</p> <p style="text-align: right;">Please note that no actual data totals are requested on this form, all that is necessary is to provide an estimate or rating that most appropriately describes the locational factor being studied</p>																					
<p><b>Item 1 - New or Expanded Manufacturing Plants</b></p> <p>For the period 1971-1975, does your company have any tentative plans to establish a plant at a new location, or to expand significantly an existing facility, at which the primary manufactured products would likely be classified in the PRODUCT CLASS covered by this report?</p> <p>1101 <input type="checkbox"/> Yes - Answer the following questions, Items 2 through 8, on the basis of the locational considerations associated with these tentative plans for new or expanded facilities.</p> <p>1102 <input type="checkbox"/> No - Answer the following questions, Items 2 through 8, as if you actually were planning new or expanded facilities on the basis of your general knowledge of current trends and developments influencing location requirements in the manufacture of this product class</p> <p>1109 <input type="checkbox"/> CENSUS USE ONLY</p>																					
<p><b>Item 2 - Location of New or Expanded Establishment</b></p> <p>Would you prefer to locate: (Mark each location "Yes" or "No")</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 10%; text-align: center;">Yes</th> <th style="width: 10%; text-align: center;">No</th> <th style="width: 20%; text-align: center;">CENSUS USE ONLY</th> </tr> </thead> <tbody> <tr> <td>a. In an industrial park? . . . . .</td> <td style="text-align: center;">2101 <input type="checkbox"/></td> <td style="text-align: center;">2102 <input type="checkbox"/></td> <td style="text-align: center;">2109 <input type="checkbox"/></td> </tr> <tr> <td>b. In the central city of a metropolitan area? . . . . .</td> <td style="text-align: center;">2111 <input type="checkbox"/></td> <td style="text-align: center;">2112 <input type="checkbox"/></td> <td style="text-align: center;">2119 <input type="checkbox"/></td> </tr> <tr> <td>c. In a metropolitan suburban area? . . . . .</td> <td style="text-align: center;">2121 <input type="checkbox"/></td> <td style="text-align: center;">2122 <input type="checkbox"/></td> <td style="text-align: center;">2129 <input type="checkbox"/></td> </tr> <tr> <td>d. In a non-metropolitan area? . . . . .</td> <td style="text-align: center;">2131 <input type="checkbox"/></td> <td style="text-align: center;">2132 <input type="checkbox"/></td> <td style="text-align: center;">2139 <input type="checkbox"/></td> </tr> </tbody> </table>			Yes	No	CENSUS USE ONLY	a. In an industrial park? . . . . .	2101 <input type="checkbox"/>	2102 <input type="checkbox"/>	2109 <input type="checkbox"/>	b. In the central city of a metropolitan area? . . . . .	2111 <input type="checkbox"/>	2112 <input type="checkbox"/>	2119 <input type="checkbox"/>	c. In a metropolitan suburban area? . . . . .	2121 <input type="checkbox"/>	2122 <input type="checkbox"/>	2129 <input type="checkbox"/>	d. In a non-metropolitan area? . . . . .	2131 <input type="checkbox"/>	2132 <input type="checkbox"/>	2139 <input type="checkbox"/>
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<p><b>Item 3 - Size of Community</b></p> <p>What size community would probably be most preferable? (Community ordinarily includes the city and the surrounding areas) (Mark ONE box only)</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 50%;">3101 <input type="checkbox"/> Under 25,000 population</td> <td style="width: 50%;">3105 <input type="checkbox"/> 250,000 - 499,999</td> </tr> <tr> <td>3102 <input type="checkbox"/> 25,000 - 49,999</td> <td>3106 <input type="checkbox"/> 500,000 - 999,999</td> </tr> <tr> <td>3103 <input type="checkbox"/> 50,000 - 99,999</td> <td>3107 <input type="checkbox"/> 1,000,000 or more population</td> </tr> <tr> <td>3104 <input type="checkbox"/> 100,000 - 249,999</td> <td>3109 <input type="checkbox"/> CENSUS USE ONLY</td> </tr> </tbody> </table>		3101 <input type="checkbox"/> Under 25,000 population	3105 <input type="checkbox"/> 250,000 - 499,999	3102 <input type="checkbox"/> 25,000 - 49,999	3106 <input type="checkbox"/> 500,000 - 999,999	3103 <input type="checkbox"/> 50,000 - 99,999	3107 <input type="checkbox"/> 1,000,000 or more population	3104 <input type="checkbox"/> 100,000 - 249,999	3109 <input type="checkbox"/> CENSUS USE ONLY												
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<p><b>Item 4 - Size of Plant Site</b></p> <p>What size plant site (total land area, including physical facilities, parking, outside storage, etc.) would probably be most preferable? (Mark ONE box only)</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 50%;">4101 <input type="checkbox"/> Less than one acre</td> <td style="width: 50%;">4105 <input type="checkbox"/> 51 - 100 acres</td> </tr> <tr> <td>4102 <input type="checkbox"/> 1 - 4 acres</td> <td>4106 <input type="checkbox"/> over 100 acres</td> </tr> <tr> <td>4103 <input type="checkbox"/> 5 - 20 acres</td> <td>4109 <input type="checkbox"/> CENSUS USE ONLY</td> </tr> <tr> <td>4104 <input type="checkbox"/> 21 - 50 acres</td> <td></td> </tr> </tbody> </table>		4101 <input type="checkbox"/> Less than one acre	4105 <input type="checkbox"/> 51 - 100 acres	4102 <input type="checkbox"/> 1 - 4 acres	4106 <input type="checkbox"/> over 100 acres	4103 <input type="checkbox"/> 5 - 20 acres	4109 <input type="checkbox"/> CENSUS USE ONLY	4104 <input type="checkbox"/> 21 - 50 acres													
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<p><b>Item 5 - Approximate Number of Employees at New or Expanded Plant</b></p> <p>Which employment size class probably best describes the approximate number of employees at a new plant when fully operational (in the preferred location indicated in Items 3 and 4 above)? (Mark ONE box only)</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 50%;">4201 <input type="checkbox"/> 500 or more employees</td> <td style="width: 50%;">4204 <input type="checkbox"/> Under 100 employees</td> </tr> <tr> <td>4202 <input type="checkbox"/> 250 - 499 employees</td> <td>4209 <input type="checkbox"/> CENSUS USE ONLY</td> </tr> <tr> <td>4203 <input type="checkbox"/> 100 - 249 employees</td> <td></td> </tr> </tbody> </table>		4201 <input type="checkbox"/> 500 or more employees	4204 <input type="checkbox"/> Under 100 employees	4202 <input type="checkbox"/> 250 - 499 employees	4209 <input type="checkbox"/> CENSUS USE ONLY	4203 <input type="checkbox"/> 100 - 249 employees															
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4203 <input type="checkbox"/> 100 - 249 employees																					
<p><b>PLEASE CONTINUE ON REVERSE SIDE</b></p>																					



PLEASE READ . . .

INSTRUCTIONS FOR ITEMS 6 AND 7 BELOW

Use the scale below to rate each one of the community attributes and plant site features listed below. Use code numbers "1" through "5" to represent importance of value with "1" being critical (firm would not consider location if this item was missing), and "5" being minimal or of no significant value.

RATING SCALE

Of CRITICAL value	Of IMPORTANT value			Of MINIMAL value
1	2	3	4	5
Firm would not consider location if this critically significant factor was missing	Very significant	Average	Less significant	Minimal factor

Item 6 - Community Attributes to Consider in Plant Location

Please examine the list of community attributes shown below, rate each one according to your best judgment of its significance (in terms of availability and/or adequacy) for a plant primarily engaged in manufacturing the PRODUCT CLASS covered by this report. (Use the rating scale above to rate each item)

Item	Enter code	Item	Enter code
Air passenger service	5111	Pool of unskilled workers	5124
Local industrial bonds	5112	Lenient industrial zoning (i.e., few and simple industry categories, few restraints on external operations, and liberal availability of variances)	5125
Vocational training facilities	5113		
Higher educational facilities	5114	Strict industrial zoning (i.e., well-defined industry categories and restraints on external operations)	5126
Tax incentives or tax holidays	5115		
Fire protection	5116	Size (population) of community (as reported in Item 3)	5127
Contract trucking	5117	Other critical or important factors - Specify	
Public warehousing	5118		
Public refrigerated warehousing	5119		
Police protection	5121		
Local industrial development group	5122		
Pool of trained workers	5123		

Item 7 - Plant Site Features

Please examine the list of plant site features shown below, rate each one according to your judgment of its importance for a plant primarily engaged in manufacturing the PRODUCT CLASS covered by this report. (Use the rating scale above to rate each item)

Item	Enter code	Item	Enter code
Highway access (within 30 minutes of major highway interchange)	6111	Industrial sewage processing	6119
Scheduled air freight service	6112	Solid waste disposal	6121
Water transportation	6113	Soil load-bearing capabilities	6122
Scheduled rail service	6114	Plant site size (as reported in Item 4)	6123
Piggy back facilities (rail)	6115	Other critical or important factors - Specify	
Industrial water supply (processed)	6116		
Industrial water supply (raw)	6117		
Natural gas service	6118		

Item 8 - Locational Objectives

From the list below, mark only those three (3) items which would probably best reflect your consideration of the major objectives to be achieved by such a planned new and/or expanded facility for the PRODUCT CLASS covered by this report

- |   |   |
|---|---|
| 7111 <input type="checkbox"/> Improvement in transportation efficiency or economy           | 7117 <input type="checkbox"/> Ability to serve new and/or expanded markets  |
| 7112 <input type="checkbox"/> Availability of larger parcel of land                         | 7118 <input type="checkbox"/> Minimize competition from other plants for labor force  |
| 7113 <input type="checkbox"/> Closer proximity to resources and/or major suppliers          | 7119 <input type="checkbox"/> To secure factors of location unique to your industry (special energy requirements, waste disposal, etc.) |
| 7114 <input type="checkbox"/> Closer proximity to other plants of your company              | 7121 <input type="checkbox"/> Other - Specify _____   |
| 7115 <input type="checkbox"/> Closer proximity to your distributors and/or your customers   | 7121 <input type="checkbox"/> Other - Specify _____   |
| 7116 <input type="checkbox"/> Closer proximity to other firms in same or related industries | 7129 <input type="checkbox"/> CENSUS USE ONLY   |

Item 9 -

PERSON TO BE CONTACTED

Name of person to contact regarding this report \_\_\_\_\_

Address (Number and street, city, State) \_\_\_\_\_ ZIP code \_\_\_\_\_

Telephone \_\_\_\_\_

Area code	Number	Extension
-----------	--------	-----------

Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

APPENDIX C

Community Profile Questionnaire

U. S. DEPARTMENT OF COMMERCE  
ECONOMIC DEVELOPMENT ADMINISTRATION  
INDUSTRIAL DETERMINANTS QUESTIONNAIRE

FILL OUT AS COMPLETELY AND ACCURATELY AS POSSIBLE. THIS FORM WILL BE USED TO ASSIST FIRMS SEEKING SUITABLE PLANT LOCATION SITES. FAILURE TO SUPPLY ALL REQUESTED APPLICABLE INFORMATION MAY RESULT IN LOSS OF A POTENTIAL NEW EMPLOYER. PLEASE INCLUDE SOURCE(S) OF INFORMATION WHERE REQUESTED. DO NOT FILL OUT SECTIONS LABELED "FOR OFFICIAL USE ONLY."

GENERAL INSTRUCTIONS:

1. PLEASE PRINT ALL ANSWERS IN PENCIL
2. The numbers appearing directly after each item on the printed form are codes for the card-punch operator. Please ignore them when completing questionnaire.
3. Where abbreviations are used, omit periods.
4. Where state names are requested, use standard abbreviations.
5. Where District titles are requested, abbreviate directional names, i.e., Southeastern Massachusetts will become SEMASS, or use initials if they are normally used in reference to the EDD, i.e., Indian Development District of Arizona will become IDDA.
6. Where YES or NO (Y or N) answers are indicated, use initial letters, i.e., Y or N.
7. In filling out the blanks, place one figure or letter in each space. Start from the extreme right when using figures. Start from extreme left when using letters.

Example:

Growth Community Within Geographic Entity										
NAME	2-15	P	I	K	E	V	I	L	L	E
1960 Pop.	2-27			6	0	0	0			

8. When a particular answer is not available or not applicable, this precise form must be followed. If the question calls for an alphabetic answer (i.e., letters), write NONE in the blanks. If the question calls for a numeric answer (i.e., figures), write a -0 in the blanks.

Example:

Other Market Areas Within overnight trucking										
NAME	4-27	N	O	N	E					
1970 Pop. (est.)	4-39								-0	

9. Whenever requested information comes from a published document, please give date of the publication.

**QUESTIONNAIRE: SPECIFIC INSTRUCTIONS  
AND DEFINITIONS**

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STATE CODE	X-1								
AREA NUMBER	X-3								
DISTRICT CODE	X-7								

(✓)

NEW GEOGRAPHIC ENTITY	X-13								1
-----------------------	------	--	--	--	--	--	--	--	---

**SECTION I: GENERAL INFORMATION**

Geographic Entity (G.E.): The term Geographic Entity is used herein to mean the specific EDA designation, whether Redevelopment Area or Economic Development District, for which the information is being furnished.

Growth Community (G.C.): The Growth Community in a geographic entity is that town or city which, with its suburban fringe, has the largest population concentration and/or is generally considered to be the area of present and future growth. All other questions referring to the Growth Community should be answered in regard to the one identified in this section.

**A. INFORMATION FOR GEOGRAPHIC ENTITY**

TYPE (RA or EDD)	1-15																		
NAME	1-18																		
1960 POP.	1-30																		
1970 POP.	1-37																		
STATE ABBR. 1	1-44																		
STATE ABBR. 2	1-48																		
STATE ABBR. 3	1-52																		

**B. GROWTH COMMUNITY WITHIN GEOGRAPHIC ENTITY**

NAME	2-15																		
1960 POP.	2-27																		
1970 POP.	2-35																		
1970 POP. WITHIN 50 MI. (est)	2-43																		
1970 POP. WITHIN 100 MI. (est)	2-51																		
IS G.C. A DESIGNATED GROWTH CENTER (Y or N)	2-59																		

FOR OFFICIAL USE ONLY

SPECIAL AREA CODE 2-60

SOURCE(S) OF ALL SECTION I. INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FOR OFFICIAL USE ONLY

STATE CODE	X-1				
AREA NUMBER	X-3				
DISTRICT CODE	X-7				

SECTION II: MARKET INFORMATION

SMSA: The initials SMSA stand for Standard Metropolitan Statistical Area. An SMSA is a county or group of counties which contain at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In New England SMSAs consist of towns and cities, rather than counties.

Major Market: This term refers to a SMSA with population in excess of 250,000. Please give name of the nearest such Major Market, regardless of the state in which it may be located.

Where market identification includes more than one city as Minneapolis-St. Paul, Seattle-Tacoma, or San Francisco-Oakland, use only first city name.

A. NEAREST MAJOR MARKET (SMSA WITH 250,000 OR MORE POP.)

NAME	3-15																		
1970 POP.	3-27																		
SMSA CODE	3-35																		
STATE ABBR.	3-38																		
RD. MILES FROM G.C.	3-42																		

B. NEAREST SMALL MARKET (CITY OTHER THAN NAMED ABOVE WITH 50,000 to 250,000 POP.)

NAME	3-46																		
1970 POP.	3-58																		
RD. MILES FROM G.C.	3-64																		

SOURCE(S) OF ALL SECTION II. INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION III: TRANSPORTATION INFORMATION

Major Highway: This term refers to Interstate, U. S. or State highways over which high-speed commercial trucking can be carried.

Interstate Highway

Interchange: If nearest interstate highway interchange is located within the Growth Community indicate by 0 in the appropriate question in section (C) below.

Junction of Inter-

state Highways: Follow same instructions as above.

A. TRUCKING TIME OF MORNING SHIPMENT FROM G.C. TO NEAREST MAJOR MARKET.

CHECK (✓) ONE

4-15	S	A	M	E	D	A	Y			
4-15	N	E	X	T	M	O	R	N	I	N
4-15	N	E	X	T	D	A	Y			
4-15	2	N	D	M	O	R	N	I	N	G
4-15	O	V	E	R	2	D	A	Y	S	

B. OTHER MARKET AREAS WITHIN OVERNIGHT TRUCKING

NAME	4-27								
1970 POP.	4-39								
NAME	4-47								
1970 POP.	4-59								
NAME	5-15								
1970 POP.	5-27								
NAME	5-35								
1970 POP.	5-47								
NAME	5-55								
1970 POP.	5-67								

C. HIGHWAYS AND ROADS

ROAD MILES FROM G.C. TO MAJOR HIGHWAY ACCESS	6-15			
MAJOR HIGHWAY IMPROVEMENTS UNDERWAY IN G.E. (Y or N)	6-18			
ESTIMATED COMPLETION YEAR	6-19			
PAVED RD. FROM G.C. TO MAJOR HIGHWAY ACCESS (Y or N)	6-23			
IMPROVE. TO RD. TO MAJOR HWY. UNDERWAY IN G. C. (Y or N)	6-24			
ESTIMATED COMPLETION YEAR	6-25			
RD. MILES FROM G.C. TO NEAREST INTERST. HWY. INTERCHG	6-29			
RD. MILES FROM G.C. TO JUNCTION OF INTERSTATE HWY'S	6-32			

## FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

## D. TRUCKING AND WAREHOUSING

# TRUCK LINES WITH SCHEDULED SERVICE IN G.E.	6-35		
TRUCK TERMINAL IN G.C. (Y or N)	6-37		
IF (N), MILES TO TRUCK TERMINAL FROM G.C.	6-38		
# TRUCK TERMINALS IN G.E.	6-41		
PUBLIC WAREHOUSE IN G.C. (Y or N)	6-43		
IF (N), MILES TO WAREHOUSE FROM G. C.	6-44		
# PUBLIC WAREHOUSES IN G. E.	6-47		
REFRIG. WAREHOUSE IN G.C. (Y or N)	6-49		
IF (N) MILES TO REFRIG. WAREHOUSE FROM G.C.	6-50		
# REFRIG. WAREHOUSES IN G.E.	6-53		

## E. RAILWAYS IN GEOGRAPHIC ENTITY

# RAILROADS OPERATING IN G.E.	6-55		
RECIPROCAL SWITCHING AVAIL. IN G.E. (Y or N)	6-57		
RAIL FREIGHT TERMINAL IN G.E. (Y or N)	6-58		
IF (N), MILES TO FREIGHT TERMINAL FROM G.E.	6-59		
TEAM TRACK AVAIL. IN G.E. (Y or N)	6-61		
IF (N), MILES TO TEAM TRACK FROM G.E.	6-62		
PIGGY BACK RAMP AVAIL. IN G.E. (Y or N)	6-65		
IF (N), MILES TO PIGGY BACK RAMP FROM G.E.	6-66		
FREIGHT HOUSE AVAIL. IN G.E. (Y or N)	6-69		
IF (N), MILES TO FREIGHT HOUSE FROM G.E.	6-70		
RAIL YARD AVAIL. IN G.E. (Y or N)	6-73		
IF (N), MILES TO RAIL YARD FROM G. E.	6-74		

## F. RAILWAYS IN GROWTH COMMUNITY

# RAILROADS OPERATING IN G.C.	7-15		
IS RECIPROCAL SWITCHING AVAIL. IN G. C. (Y or N)	7-17		
RAIL FREIGHT TERMINAL IN G.C. (Y or N)	7-18		
TEAM TRACK AVAIL. IN G.C. (Y or N)	7-19		
PIGGY BACK RAMP AVAIL. IN G.C. (Y or N)	7-20		
FREIGHT HOUSE AVAIL. IN G. C. (Y or N)	7-21		
RAIL YARD AVAIL. IN G. C. (Y or N)	7-22		

## G. AIR TRANSPORTATION

GENERAL AVIATION AIRFIELD SERVING G. C. (Y or N)	7-23		
MAXIMUM RUNWAY LENGTH (FEET)	7-24		
AIR FREIGHT SERVICE AVAIL. TO G. C. (Y or N)	7-28		
IF (N), MI. TO GEN. AIRFIELD W/AIR FREIGHT SERV.	7-29		
# SCHEDULED COMMERCIAL FLIGHTS TO G.E.	7-32		
IF NONE, MI. TO COMMERCIAL AIRFIELD	7-35		

FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

H. WATER TRANSPORTATION

WATER TRANSPORTATION AT G. C. (Y or N)	7-38	
IF (Y), CONTROLLING DEPTH OF WATER IN FT.	7-39	
IF (N), IS THERE POTEN. FOR DEVEL. OF PORT FACIL. IN G.C. (Y or N)	7-41	
IF (N), MILES FROM G.C. TO PORT FACILITIES	7-42	
TYPE VESSELS SERVED AT NEAREST PORT FACILITIES		
BARGES (Y or N)	7-45	
TANKERS (Y or N)	7-46	
BULK CARRIERS (Y or N)	7-47	
GENERAL CARGO (Y or N)	7-48	
CONTAINERIZED (Y or N)	7-49	

SOURCE(S) OF ALL SECTION III. INFORMATION: \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION IV: INDUSTRY CHARACTERISTICS

Employment by Industry:

1. Employment data for industries in geographic entity may be given as estimates -- use most recent data available.
2. Rank those industries, as called for in Sections IV B., C. and D., in order of estimated importance as employers. A recent issue of County Business Patterns should indicate employment size of major industries. Use two-digit and four-digit Standard Industrial Classification (SIC) Codes.

A. TOTAL NUMBER OF EMPLOYEES BY INDUSTRY FOR GEO. ENTITY

AGRICULTURE	7-50				
FORESTRY	7-56				
FISHERIES	7-62				
MINING	7-68				
MANUFACTURING	7-74				
TRADE	8-15				
SERVICE - INCL TOURISM	8-21				
GOVERNMENT (Fed., State, Local - incl. Military)	8-27				
TRANS. AND UTILITIES	8-33				
CONSTRUCTION	8-39				

B. LIST TOP 5 INDUSTRIES, BY FOUR-DIGIT SIC CODE, FOR GEOGRAPHIC ENTITY

8-45				
8-49				
8-53				
8-57				
8-61				

C. LIST TOP 15 INDUSTRIES, BY TWO-DIGIT SIC CODE, FOR MAJOR MARKET (SMSA) AS IDENTIFIED IN II. A.

9-15		
9-17		
9-19		
9-21		
9-23		

9-25		
9-27		
9-29		
9-31		
9-33		

9-35		
9-37		
9-39		
9-41		
9-43		

FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

D. LIST TOP 5 INDUSTRIES, BY FOUR-DIGIT SIC CODE, FOR MAJOR MARKET (SMSA)  
AS IDENTIFIED IN II. A.

9-45				
9-49				
9-53				
9-57				
9-61				

SOURCE(S) OF ALL SECTION IV. INFORMATION \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION V: RESOURCE AVAILABILITY IN COMMERCIAL QUANTITY IN GEOGRAPHIC ENTITY AND CONTIGUOUS AREAS

Commercial Quantity:

Information on resource availability is requested for those products available in quantities sufficient to supply the needs of a new moderate size manufacturing or processing facility, or resources for which known, but undeveloped, potential exists. If resources exist but are not in fact available for a new firm to utilize, they should not be included. Common examples of existing but unavailable resources are forest lands owned by individuals or firms unwilling to sell to outside commercial enterprises, or surveyed mineral deposits held in reserve by owners who do not intend to exploit them in the immediate future.

Other:

Where "other" appears on the questionnaire, please name all similar products not specifically included in the preceding section. If no entry, write NONE

A. AGRICULTURAL PRODUCTS PRODUCED FOR SALE (Y or N)

FIBERS	10-15	
GRAINS	10-16	
VEGETABLES	10-17	
FIELD CROPS	10-18	
FRUITS	10-19	
OTHER HORTICULTURE	10-20	
CATTLE	10-21	
HOGS	10-22	
SHEEP	10-23	
POULTRY	10-24	

## FOR OFFICIAL USE ONLY

STATE CODE	X-1				
AREA NUMBER	X-3				
DISTRICT CODE	X-7				

## B. FOREST PRODUCTS

HARDWOOD - FIRST GRADE (Y or N)	10-25								
ALLOWABLE ANNUAL CUT (Mil Bd. ft.)	10-26								
HARDWOOD - SECOND GRADE (Y or N)	10-32								
ALLOWABLE ANNUAL CUT (Mil Bd. ft.)	10-33								
HARDWOOD - PULPWOOD (Y or N)	10-39								
ALLOW. ANNUAL CUT (cords in thous.)	10-40								
SOFTWOOD - FIRST GRADE (Y or N)	10-46								
ALLOWABLE ANNUAL CUT (Mil Bd. ft.)	10-47								
SOFTWOOD - SECOND GRADE (Y or N)	10-53								
ALLOWABLE ANNUAL CUT (Mil Bd. ft.)	10-54								
SOFTWOOD - PULPWOOD (Y or N)	10-60								
ALLOW. ANNUAL CUT (cords in thous.)	10-61								
OTHER	10-67								

## C. FISHERY RESOURCES (Y or N)

MAJOR COMMERCIAL FISH	14-15	
SHELL FISH	14-16	
TRASH FISH	14-17	

## D. EXPLOITED MINERAL RESOURCES (Y or N)

COAL	14-18								
OIL	14-19								
NAT. GAS	14-20								
IRON	14-21								
COPPER	14-22								
ZINC	14-23								
CLAY	14-24								
SAND	14-25								
STONE	14-26								
GRAVEL	14-27								
OTHER	14-28								
OTHER	14-40								
OTHER	14-52								

FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

E. MINERAL RESOURCES OF COMMERCIAL VALUE SURVEYED BUT UNDEVELOPED (Y orN)

COAL	15-15																		
OIL	15-16																		
NAT. GAS	15-17																		
IRON	15-18																		
COPPER	15-19																		
ZINC	15-20																		
CLAY	15-21																		
SAND	15-22																		
STONE	15-23																		
GRAVEL	15-24																		
OTHER	15-25																		
OTHER	15-37																		
OTHER	15-49																		

SOURCES(S) OF ALL SECTION V. INFORMATION: \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION VI: INDUSTRIAL PARKS AND SITES SERVING GROWTH COMMUNITY

Industrial

Parks and Plant Sites: Industrial Parks are those land sections suitable for multi-plant sites which have been approved by responsible authorities for industrial uses. A Plant Site is an industrially zoned area suitable for a single establishment.

Are there existing or planned Industrial Parks to serve the Growth Community? If yes, complete the questions on Industrial Parks.

Are there available Plant Sites not in Industrial Parks? If yes, complete the questions on Plant Sites.

A. INDUSTRIAL PARKS	Size (in No. of Acres)	All Utilities	Transp. Air	Transp. Rail	Transp. Water	Completion Status <sup>2</sup>	B. PLANT SITES (Not in Indus. Parks)	Size (in No. of Acres)	All Utilities	Transp. Air	Transp. Rail	Transp. Water			
		(Y or N)							(Y or N)						
Industrial Park #1	16-15						Plant Site #1	17-15							
Industrial Park #2	16-24						Plant Site #2	17-24							
Industrial Park #3	16-33						Plant Site #3	17-33							
Industrial Park #4	16-42						Plant Site #4	17-42							
Industrial Park #5	16-51						Plant Site #5	17-51							

<sup>1</sup>All Utilities: This term refers to the availability of water, sewer, and sewerage systems, commercial power (gas and/or electricity), and highway access (paved road to industrial park and/or plant site).

<sup>2</sup>Enter the appropriate number, as follows:

- 1 - If Industrial Park or Plant Site is available for occupancy
- 2 - If under construction (to be completed within 1 year)
- 3 - If planned (construction to begin with 1 year)
- 4 - If planned (no date set for beginning construction)

FOR OFFICIAL USE ONLY

STATE CODE	X-1						
AREA NUMBER	X-3						
DISTRICT CODE	K-7						

SECTION VII. UTILITY AND ENERGY AVAILABILITY IN GROWTH COMMUNITY

Give availability data for Growth Community and for Industrial Parks/Sites listed in Section VI above.

- NOTES: GPD = Gallons per day  
M/W = 1 million watts or 1,000 kilowatts  
 = Decimal point

A. MUNICIPAL WATER AVAILABILITY

EXCESS CAPACITY OVER PEAK DEMAND (in Thousand GPD)	19-15						
IS IT AVAILABLE OUTSIDE OF CITY AREA AT YOUR INDUSTRIAL PARKS AND INDUSTRIAL SITES? ENTER Y or N.	19-21						

B. RAW WATER AVAILABILITY

IS WELL WATER AVAILABLE (Y or N)	19-22	
IS RIVER OR LAKE WATER AVAIL. (Y or N)	19-23	

C. SANITARY SEWAGE SYSTEM AVAILABILITY

SEWAGE DISPOSAL PLANT (Y or N)	19-24		
OR LAGOON (Y or N)	19-25		
SEWAGE TREATMENT PLANT CAPACITY (MILLION GPD)	19-26		•
EXCESS CAPACITY OF SEWAGE TREATMENT PLANT (MILLION GPD)	19-31		•

D. ELECTRIC POWER AVAILABILITY

NAME OF UTILITY COMPANY	19-37																
CAN ACCEPT NEW INDUSTRIAL CUSTOMERS REQUIRING:																	
OVER 30 MW/YEAR (VERY LARGE PLANT) (Y OR N)	19-54																
MAXIMUM LENGTH OF CONTRACT (IN NUMBER OF YEARS)	19-55																
10-30 MW/YEAR (LARGE TO MEDIUM PLANT) (Y OR N)	19-57																
MAXIMUM LENGTH OF CONTRACT (IN NUMBER OF YEARS)	19-58																
1-10 MW/YEAR (SMALL PLANT) (Y OR N)	19-60																
MAXIMUM LENGTH OF CONTRACT (IN NUMBER OF YEARS)	19-61																

FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	K-7			

E. NATURAL GAS AVAILABILITY

NAME OF GAS COMPANY	19-63													
CAN ACCEPT NEW INDUSTRIAL CUSTOMERS AT A FIRM RATE (Y OR N)												20-15		
MAXIMUM LENGTH OF CONTRACT (IN NUMBER OF YEARS)												20-16		
CAN ACCEPT NEW INDUSTRIAL CUSTOMERS ONLY AT AN INTERRUPTIBLE RATE (Y OR N)												20-18		
MAXIMUM LENGTH OF CONTRACT (IN NUMBER OF YEARS)												20-19		
MAXIMUM AMOUNT OF GAS AVAILABLE TO SERVE A NEW SINGLE INDUSTRIAL CUSTOMER IN 1,000 cu. ft. per day:												20-21		

F. SOURCES OF ENERGY

WHAT ARE THE PRINCIPAL SOURCES OF INDUSTRIAL ENERGY USED  
IN AND AROUND YOUR GROWTH COMMUNITY? (ENTER Y OR N)

COAL [20-25]      ELECTRICITY [20-26]      NATURAL GAS [20-27]  
OIL [20-28]

G. AVAILABILITY OF INDUSTRIAL FUELS.

ARE THE FOLLOWING INDUSTRIAL FUELS AVAILABLE IN YOUR COMMUNITY?  
(Y OR N) COAL [20-29], No. 5 OR No. 6, RESIDUAL FUEL OIL [20-30]  
DISTILLATE FUEL [20-31], LPG [20-32]

SOURCE(S) OF ALL SECTION VII. INFORMATION: \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION VIII: HUMAN RESOURCES IN LABOR AREA

NOTE: Utilize the State Training and Employment Service as primary source for all labor area and labor force information.

Labor Area: "Labor Area" means a geographical area consisting of a central city or cities and surrounding territory within commuting distance in which there is a concentration of economic activity or labor demand, and workers can generally change jobs without changing their residences. Use the labor area most commonly associated with the Growth Community.

Labor Force Data: Information on the current characteristics of the labor area's labor force should be available from the local employment security office, that is, the local offices of the State Training and Employment Service. If official figures are unavailable, use the local Employment Security Office or state estimates.

A. LABOR FORCE - CURRENT DATA (OFFICIAL DATA OR ESTIMATES)

NAME OF LABOR AREA	20-41																			
TOTAL NUMBER IN LABOR FORCE	20-56																			
NUMBER UNEMPLOYED	20-62																			
NUMBER UNDEREMPLOYED	20-67																			
TOTAL NUMBER SKILLED	20-72																			
NUMBER SKILLED (MALE)	21-15																			
NUMBER SKILLED (FEMALE)	21-21																			
NUMBER SKILLED UNEMPLOYED	21-26																			
TOTAL NUMBER SEMI-SKILLED	21-30																			
NUMBER SEMI-SKILLED (MALE)	21-36																			
NUMBER SEMI-SKILLED (FEMALE)	21-42																			
NUMBER SEMI-SKILLED UNEMPLOYED	21-47																			
TOTAL PROF. AND TECH. IN MANUF.	21-52																			
PROF. AND TECH. IN MANUF. (MALE)	21-57																			
PROF. AND TECH. IN MANUF. (FEMALE)	21-62																			

**FOR OFFICIAL USE ONLY**

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

**B. WAGE RATES \* (PER HOUR AVG.)**

COMMON LABOR	21-67	•		
LIGHT ASSEMBLY	21-71	•		
HEAVY ASSEMBLY	21-75	•		
MACHINIST CLASS C	22-15	•		
MACHINIST CLASS A	22-19	•		
SET-UP MAN	22-23	•		
MAINTENANCE HELPER	22-27	•		
MAINTENANCE MECH.	22-31	•		
WELDER ARC/GAS	22-35	•		
INSPECTOR SIMPLE	22-39	•		
INSPECTOR PRECISION	22-43	•		
TOOL AND DIE MAKER	22-47	•		

\* FILL IN ONLY THOSE SKILLS OR THE EQUIVALENT IN TERMS OF SKILL THAT ARE AVAILABLE IN LABOR AREA.

**C. TRAINING FACILITIES AND ASSISTANCE**

**1. VOCATIONAL AND TECHNICAL EDUCATION**

LOCATED WITHIN COMMUTING DISTANCE OF G.C. (Y or N)	22-51	
AVAILABLE TO HIGH SCHOOL STUDENTS (Y or N)	22-52	
AVAILABLE TO ADULTS (Y or N)	22-53	

**2. STATE AND FEDERAL MANPOWER TRAINING PROGRAMS**

ANY CONDUCTED IN G.E. SINCE 1962 (Y or N)	22-54	
AVAILABLE IN G.E. LAST YEAR (Y or N)	22-55	

**D. EDUCATIONAL INSTITUTIONS**

**1. AVAILABLE WITHIN GEOGRAPHIC ENTITY**

JR. COLLEGE (Y or N)	22-56	
4-YR COLLEGE (Y or N)	22-57	
GRAD. INSTITUTION (Y or N)	22-58	

**2. AVAILABLE WITHIN COMMUTING DISTANCE OF THE GROWTH COMMUNITY**

JR. COLLEGE (Y or N)	22-59	
4-YR COLLEGE (Y or N)	22-60	
GRAD. INSTITUTION (Y or N)	22-61	

SOURCE(S) OF ALL SECTION VIII. INFORMATION: \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1			
AREA NUMBER	X-3			
DISTRICT CODE	X-7			

SECTION IX: COMMUNITY SERVICES AND ASSISTANCE

Police Force: Include only full-time employees in Growth Community. If community is served by state or county police force, give number assigned full-time to community.

Fire Insurance: Fire insurance rating refers to local rates currently in effect. These rates, which should be entered as numeric figures, can be obtained from local insurance company agents.

Industrial Zoning

Ordinances: By lenient is meant here a few simple industry categories; few restraints on external operations; and liberal availability of variances.

By strict is meant here well-defined industry categories and restraints on external operations.

A. COMMUNITY SERVICES IN GROWTH COMMUNITY

SIZE OF POLICE FORCE	22-62			
COMMUNITY FIRE INS. RATING	22-66			
INDUSTRIAL BLDG. FIRE INS. RATING	22-68	-	0	

B. ASSISTANCE TO NEW INDUSTRY

TAX INCENTIVES AVAILABLE IN G.C. (Y or N)	22-70	Y
TAX INCENTIVES AVAIL. IN GEO. ENTITY (Y or N)	22-71	Y
INDUSTRIAL BONDS PERMITTED IN G.C. (Y or N)	22-72	
INDUSTRIAL BONDS PERMITTED IN GEO. ENTITY (Y or N)	22-73	
INDUST'L BONDS APPROVED IN G.C. IN LAST 5 YRS (Y or N)	22-74	
INDUST'L BONDS APPROVED IN GEO. ENTITY IN LAST 5 YRS (Y or N)	22-75	
LENIENT INDUST'L ZONING ORDINANCES IN EFFECT IN G.C. (Y or N)	22-76	
STRICT INDUST'L ORDINANCES IN EFFECT IN G.C. (Y or N)	22-77	

(Jrac)

SOURCE(S) OF ALL SECTION IX. INFORMATION: \_\_\_\_\_  
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FOR OFFICIAL USE ONLY

STATE CODE	X-1		
AREA NUMBER	X-3		
DISTRICT CODE	X-7		

SECTION X: PUBLIC AND PRIVATE LOCAL DEVELOPMENT ORGANIZATIONS

A. PUBLICLY SUPPORTED PLANNING COMMISSION

NAME	23-15																			
ADDRESS (STREET)	23-42																			
ADDRESS (CITY, STATE, ZIP)	23-60																			
TELEPHONE NO.	24-15			-		-														
CHIEF OFFICER (NAME)	24-27																			
CHIEF OFFICER (TITLE)	24-45																			
YEAR ESTABLISHED	24-63																			

B. LOCAL DEVELOPMENT CORPORATION

NAME	25-15																			
ADDRESS (STREET)	25-42																			
ADDRESS (CITY, STATE, ZIP)	25-60																			
TELEPHONE NO.	26-15			-		-														
CHIEF OFFICER (NAME)	26-27																			
CHIEF OFFICER (TITLE)	26-45																			
YEAR ESTABLISHED	26-63																			

C. HOUSING AUTHORITY

NAME	27-15																			
ADDRESS (STREET)	27-42																			
ADDRESS (CITY, STATE, ZIP)	27-60																			
TELEPHONE NO.	28-15			-		-														
CHIEF OFFICER (NAME)	28-27																			
CHIEF OFFICER (TITLE)	28-45																			
YEAR ESTABLISHED	28-63																			

FOR OFFICIAL USE ONLY

STATE CODE	X-1				
AREA NUMBER	X-3				
DISTRICT CODE	X-7				

D. PRIVATE SERVICE ORGANIZATION

NAME	29-15																																					
ADDRESS (STREET)	29-42																																					
ADDRESS (CITY, STATE, ZIP)	29-60																																					
TELEPHONE NO.	30-15					-																																
CHIEF OFFICER (NAME)	30-27																																					
CHIEF OFFICER (TITLE)	30-45																																					
YEAR ESTABLISHED	30-63																																					

E. OTHER

NAME	31-15																																					
ADDRESS (STREET)	31-42																																					
ADDRESS (CITY, STATE, ZIP)	31-60																																					
TELEPHONE NO.	32-15					-																																
CHIEF OFFICER (NAME)	32-27																																					
CHIEF OFFICER (TITLE)	32-45																																					
YEAR ESTABLISHED	32-63																																					

SOURCE(S) OF ALL SECTION X. INFORMATION: \_\_\_\_\_

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FOR OFFICIAL USE ONLY

STATE CODE	X-1													
AREA NUMBER	X-3													
DISTRICT CODE	K-7													

SECTION XI. INDUSTRIAL DEVELOPMENT ACTIVITY

1. IS YOUR STAFF ACTIVELY ENGAGED IN THE PROMOTION OF INDUSTRIAL DEVELOPMENT IN YOUR AREA (Y OR N) 37-15
2. IF NOT, DOES YOUR STATE'S INDUSTRIAL DEVELOPMENT OFFICE PROMOTE YOUR AREA'S INDUSTRIAL DEVELOPMENT (Y OR N) 37-16
3. IN CASE BOTH ABOVE ANSWERS ARE NEGATIVE, ENTER BELOW THE ORGANIZATION PROMOTING YOUR INDUSTRIAL DEVELOPMENT

NAME	37-17																		
ADDRESS (STREET)				37-44															
ADDRESS (CITY, STATE, ZIP)				37-61															
TELEPHONE NO.				38-15															
CHIEF OFFICER (NAME)				38-27															
CHIEF OFFICER (TITLE)				38-44															
YEAR ESTABLISHED				38-61															

SECTION XII.

PLEASE INDICATE BELOW NAME, ADDRESS, AND TELEPHONE NUMBER OF THE PERSON TO WHOM INQUIRIES CONCERNING THIS QUESTIONNAIRE CAN BE MADE.

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

ORGANIZATION: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

TELEPHONE NO. Area Code (\_\_\_\_) \_\_\_\_\_

APPENDIX D

ILS Output: Industry Ranking for Muskogee, Oklahoma

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE A INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 90.0  
----- AND 100.0 % OF THE TOTAL POSSIBLE SCORE)

SIC - 22562  
NAME- CIRCULAR KNIT FABRICS  
PCT OF TOTAL- 100.0

SIC - 22720  
NAME- TUFTED CARPETS AND RUGS  
PCT OF TOTAL- 100.0

SIC - 27321  
NAME- BOOK AND PAMPHLET PRINTING LITHOGRAPHIC PROCESS  
PCT OF TOTAL- 100.0

SIC - 27611  
NAME- MANIFOLD BUSINESS FORMS CONTINUOUS  
PCT OF TOTAL- 100.0

SIC - 28182  
NAME- MISCELLANEOUS ACYCLIC CHEMICALS AND CHEMICAL PR  
PCT OF TOTAL- 100.0

SIC - 30792  
NAME- FOAMED PLASTICS PRODUCTS  
PCT OF TOTAL- 100.0

SIC - 30795  
NAME- INDUSTRIAL PLASTICS PRODUCTS  
PCT OF TOTAL- 100.0

SIC - 32210  
NAME- GLASS CONTAINERS  
PCT OF TOTAL- 100.0

SIC - 33214  
NAME- MISCELLANEOUS GRAY IRON CASTINGS  
PCT OF TOTAL- 100.0

SIC - 33220  
NAME- MALLEABLE IRON CASTINGS  
PCT OF TOTAL- 100.0

SIC - 33232  
NAME- MISCELLANEOUS CARBON STEEL CASTINGS  
PCT OF TOTAL- 100.0

SIC - 33233  
NAME- MISCELLANEOUS ALLOY STEEL CASTINGS  
PCT OF TOTAL- 100.0

SIC - 33574  
NAME- COMMUNICATION WIRE AND CABLE  
PCT OF TOTAL- 100.0

SIC - 34211  
NAME- CUTLERY SCISSORS SHEARS TRIMMERS AND SNIPS  
PCT OF TOTAL- 100.0

SIC - 34411  
NAME- FABRICATED STRUCTURAL IRON AND STEEL FOR BUILDI  
PCT OF TOTAL- 100.0

SIC - 34413  
NAME- MISCELLANEOUS FABRICATED STRUCTURAL IRON AND ST  
PCT OF TOTAL- 100.0



INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE A INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 90.0  
----- AND 100.0 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 35223  
NAME- PLANTING SEEDING AND FERTILIZING MACHINERY  
PCT OF TOTAL- 100.0

SIC - 35319  
NAME- MISCELLANEOUS CONSTRUCTION MACHINERY  
PCT OF TOTAL- 100.0

SIC - 35451  
NAME- SMALL CUTTING TOOLS FOR MACHINE TOOLS  
PCT OF TOTAL- 100.0

SIC - 35621  
NAME- BALL BEARINGS(COMPLETE)  
PCT OF TOTAL- 100.0

SIC - 36211  
NAME- FRACTIONAL HORSEPOWER MOTORS  
PCT OF TOTAL- 100.0

SIC - 36343  
NAME- MISCELLANEOUS SMALL HOUSEHOLD ELECTRIC APPLIANC  
PCT OF TOTAL- 100.0

SIC - 36794  
NAME- COILS TRANSFORMERS REACTORS AND CHOKES FOR ELEC  
PCT OF TOTAL- 100.0

SIC - 39410  
NAME- GAMES AND TOYS  
PCT OF TOTAL- 100.0

SIC - 27521  
NAME- MAGAZINE AND PERIODICAL LITHOGRAPHIC PRINTING O  
PCT OF TOTAL- 96.9

SIC - 26213  
NAME- COATED PRINTING AND CONVERTING PAPER  
PCT OF TOTAL- 96.7

SIC - 38312  
NAME- SIGHTING AND FIRE CONTROL EQUIPMENT MADE FROM L  
PCT OF TOTAL- 96.2

SIC - 28790  
NAME- INSECTICIDAL AND FUNGICIDAL PREPARATIONS  
PCT OF TOTAL- 96.1

SIC - 38711  
NAME- CLOCKS CLOCK MOVEMENTS AND TIMING MECHANISMS  
PCT OF TOTAL- 96.0

SIC - 36426  
NAME- OTHER NONRESIDENTIAL ELECTRIC AND NONELECTRIC L  
PCT OF TOTAL- 96.0

SIC - 35481  
NAME- ROLLING MILL MACHINERY AND EQUIPMENT  
PCT OF TOTAL- 95.9

SIC - 37991  
NAME- AUTOMOBILE TRAILERS  
PCT OF TOTAL- 95.6

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE A INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 90.0  
----- AND 100.0 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 35482  
NAME- POWER DRIVEN HAND TOOLS  
PCT OF TOTAL- 95.5

SIC - 35592  
NAME- FOUNDRY MACHINERY AND EQUIPMENT  
PCT OF TOTAL- 95.3

SIC - 26472  
NAME- SANITARY TISSUE HEALTH PRODUCTS  
PCT OF TOTAL- 94.7

SIC - 38513  
NAME- MISCELLANEOUS OPHTHALMIC GOODS  
PCT OF TOTAL- 94.5

SIC - 34790  
NAME- COATING ENGRAVING AND ALLIED SERVICES  
PCT OF TOTAL- 94.4

SIC - 34432  
NAME- FABRICATED STEEL PLATE  
PCT OF TOTAL- 94.1

SIC - 26530  
NAME- CORRUGATED AND SOLID FIBER BOXES  
PCT OF TOTAL- 94.0

SIC - 35422  
NAME- PRESSES INCLUDING FORGING PRESSES  
PCT OF TOTAL- 94.0

SIC - 27612  
NAME- MANIFOLD BUSINESS FORMS UNIT SET  
PCT OF TOTAL- 93.9

SIC - 36220  
NAME- GENERAL INDUSTRY POWER CIRCUIT DEVICES AND CONT  
PCT OF TOTAL- 93.7

SIC - 33572  
NAME- COPPER AND COPPER BASE ALLOY WIRE  
PCT OF TOTAL- 93.5

SIC - 36792  
NAME- CAPACITORS FOR ELECTRONIC APPLICATIONS  
PCT OF TOTAL- 93.5

SIC - 27524  
NAME- FINANCIAL AND LEGAL PRINTING LITHOGRAPHIC  
PCT OF TOTAL- 93.5

SIC - 33996  
NAME- HEAT TREATING OF METAL FOR THE TRADE  
PCT OF TOTAL- 93.2

SIC - 35362  
NAME- OVERHEAD TRAVELING CRANES AND MONORAIL SYSTEMS  
PCT OF TOTAL- 93.2

SIC - 35227  
NAME- LAWNMOWERS AND SNOW BLOWERS  
PCT OF TOTAL- 93.2

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE A INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 90.0  
----- AND 100.0 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 30794  
NAME- PACKAGING AND SHIPPING CONTAINERS  
PCT OF TOTAL- 93.0

SIC - 34945  
NAME- METAL FITTINGS FLANGES AND UNIONS FOR PIPING SY  
PCT OF TOTAL- 92.9

SIC - 38511  
NAME- OPHTHALMIC FRONTS AND TEMPLES  
PCT OF TOTAL- 92.9

SIC - 28993  
NAME- MISCELLANEOUS CHEMICALS AND CHEMICAL PREPARATIO  
PCT OF TOTAL- 92.5

SIC - 25420  
NAME- METAL PARTITIONS ETC AND OFFICE AND STORE FIXTU  
PCT OF TOTAL- 92.4

SIC - 35351  
NAME- CONVEYORS AND CONVEYING EQUIPMENT  
PCT OF TOTAL- 92.4

SIC - 34618  
NAME- MISCELLANEOUS STAMPED AND PRESSED METAL END PRO  
PCT OF TOTAL- 92.3

SIC - 35662  
NAME- SPEED CHANGERS INDUSTRIAL HIGH SPEED DRIVES AND  
PCT OF TOTAL- 92.1

SIC - 35314  
NAME- POWER CRANES DRAGLINES SHOVELS AND PARTS AND AT  
PCT OF TOTAL- 92.1

SIC - 34231  
NAME- MECHANICS HAND SERVICE TOOLS  
PCT OF TOTAL- 92.0

SIC - 25221  
NAME- METAL OFFICE SEATING ETC  
PCT OF TOTAL- 91.8

SIC - 35811  
NAME- AUTOMATIC MERCHANDISING MACHINES  
PCT OF TOTAL- 91.7

SIC - 35595  
NAME- OTHER SPECIAL INDUSTRY MACHINERY AND EQUIPMENT  
PCT OF TOTAL- 91.6

SIC - 33610  
NAME- ALUMINUM AND ALUMINUM BASE ALLOY CASTINGS  
PCT OF TOTAL- 91.3

SIC - 34970  
NAME- METAL FOIL AND LEAF  
PCT OF TOTAL- 91.3

SIC - 26431  
NAME- PAPER GROCERS AND VARIETY BAGS  
PCT OF TOTAL- 91.2

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE A INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 90.0  
----- AND 100.0 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 34943  
NAME- OTHER METAL VALVES FOR PIPING SYSTEMS AND EQUIP  
PCT OF TOTAL- 91.1

SIC - 26217  
NAME- UNBLEACHED KRAFT PACKAGING  
PCT OF TOTAL- 91.1

SIC - 35672  
NAME- FUEL FIRED INDUSTRIAL FURNACES AND OVENS  
PCT OF TOTAL- 90.8

SIC - 28213  
NAME- THERMOPLASTIC RESINS  
PCT OF TOTAL- 90.8

SIC - 24326  
NAME- SOFTWOOD VENEER  
PCT OF TOTAL- 90.7

SIC - 35857  
NAME- OTHER REFRIGERATION AND AIR CONDITIONING EQUIPM  
PCT OF TOTAL- 90.7

SIC - 24323  
NAME- SOFTWOOD PLYWOOD  
PCT OF TOTAL- 90.5

SIC - 36621  
NAME- COMMERCIAL INDUSTRIAL AND MILITARY ELECTRONIC C  
PCT OF TOTAL- 90.4

SIC - 34431  
NAME- HEAT EXCHANGERS AND STEAM CONDENSERS  
PCT OF TOTAL- 90.3

SIC - 35485  
NAME- OTHER METALWORKING MACHINERY  
PCT OF TOTAL- 90.3

SIC - 34233  
NAME- FILES RASPS AND FILE ACCESSORIES AND OTHER HAND  
PCT OF TOTAL- 90.2

SIC - 35853  
NAME- COMMERCIAL REFRIGERATION EQUIPMENT  
PCT OF TOTAL- 90.2

SIC - 36113  
NAME- OTHER ELECTRICAL MEASURING INSTRUMENTS  
PCT OF TOTAL- 90.0

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE B INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 80.0  
----- AND 89.9 % OF THE TOTAL POSSIBLE SCORE)

SIC - 36424

NAME- VEHICULAR LIGHTING EQUIPMENT  
PCT OF TOTAL- 89.9

SIC - 35414

NAME- GRINDING AND POLISHING MACHINES  
PCT OF TOTAL- 89.9

SIC - 35224

NAME- PLOWS LISTERS HARROWS ROLLERS PULVERIZERS AND S  
PCT OF TOTAL- 89.8

SIC - 26432

NAME- SPECIALTY BAGS AND LINERS  
PCT OF TOTAL- 89.7

SIC - 37321

NAME- INBOARD MOTOR BOATS  
PCT OF TOTAL- 89.6

SIC - 36793

NAME- RESISTORS FOR ELECTRONIC APPLICATIONS  
PCT OF TOTAL- 89.6

SIC - 34460

NAME- ARCHITECTURAL AND ORNAMENTAL METAL WORK  
PCT OF TOTAL- 89.5

SIC - 35316

NAME- MIXERS PAVERS AND RELATED EQUIPMENT  
PCT OF TOTAL- 89.4

SIC - 36442

NAME- ELECTRIC CONDUIT AND CONDUIT FITTINGS  
PCT OF TOTAL- 89.2

SIC - 33525

NAME- EXTRUDED ALUMINUM ROD BAR AND OTHER EXTRUDED SH  
PCT OF TOTAL- 89.1

SIC - 29116

NAME- LIQUEFIED REFINERY GASES  
PCT OF TOTAL- 89.0

SIC - 34616

NAME- METAL COMMERCIAL AND HOME CANNING CLOSURES  
PCT OF TOTAL- 89.0

SIC - 35423

NAME- MISCELLANEOUS METAL FORMING MACHINE TOOLS  
PCT OF TOTAL- 89.0

SIC - 35370

NAME- INDUSTRIAL TRUCKS TRACTORS TRAILERS STACKERS AN  
PCT OF TOTAL- 88.8

SIC - 35418

NAME- MISCELLANEOUS METAL CUTTING TYPE MACHINE TOOLS  
PCT OF TOTAL- 88.4

SIC - 33911

NAME- DROP UPSET AND PRESS STEEL FORGINGS  
PCT OF TOTAL- 88.4

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE B INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 80.0  
----- AND 89.9 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 35521  
NAME- TEXTILE MACHINERY  
PCT OF TOTAL- 88.2

SIC - 35221  
NAME- WHEEL TRACTORS AND ATTACHMENTS  
PCT OF TOTAL- 88.1

SIC - 35591  
NAME- CHEMICAL MANUFACTURING INDUSTRIES MACHINERY  
PCT OF TOTAL- 88.0

SIC - 28191  
NAME- SYNTHETIC AMMONIA NITRIC ACID AND AMMONIUM COMP  
PCT OF TOTAL- 87.7

SIC - 27526  
NAME- OTHER COMMERCIAL LITHOGRAPHIC PRINTING  
PCT OF TOTAL- 87.6

SIC - 36410  
NAME- ELECTRIC LAMPS BULBS ONLY  
PCT OF TOTAL- 87.5

SIC - 37510  
NAME- BICYCLES MOTORCYCLES MOTORBIKES SCOOTERS AND PA  
PCT OF TOTAL- 87.3

SIC - 30796  
NAME- CONSTRUCTION PLASTICS PRODUCTS  
PCT OF TOTAL- 87.1

SIC - 27525  
NAME- ADVERTISING PRINTING. LITHOGRAPHIC  
PCT OF TOTAL- 87.0

SIC - 35613  
NAME- DOMESTIC WATER SYSTEMS AND PUMPS  
PCT OF TOTAL- 86.9

SIC - 36511  
NAME- HOUSEHOLD AND AUTOMOBILE RADIOS AND RADIO/PHONO  
PCT OF TOTAL- 86.8

SIC - 33212  
NAME- CAST IRON PRESSURE PIPE AND FITTINGS  
PCT OF TOTAL- 86.6

SIC - 34710  
NAME- ELECTROPLATING PLATING AND POLISHING  
PCT OF TOTAL- 86.3

SIC - 35623  
NAME- OTHER ROLLER BEARINGS COMPLETE  
PCT OF TOTAL- 85.9

SIC - 28345  
NAME- PHARMACEUTICAL PREPARATIONS ACTING ON DIGESTIVE  
PCT OF TOTAL- 85.8

SIC - 38213  
NAME- INDUSTRIAL PROCESS INSTRUMENTS  
PCT OF TOTAL- 85.6

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE B INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 80.0  
----- AND 89.9 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 27910

NAME- TYPESETTING AND TYPOGRAPHIC WORK

PCT OF TOTAL- 85.4

SIC - 3357B

NAME- POWER WIRE AND CABLE

PCT OF TOTAL- 85.3

SIC - 27522

NAME- LABEL EXCLUDING CLOTH AND WRAPPER PRINTING

PCT OF TOTAL- 85.1

SIC - 28151

NAME- CYCLIC INTERMEDIATES

PCT OF TOTAL- 85.1

SIC - 36341

NAME- ELECTRIC FANS

PCT OF TOTAL- 85.0

SIC - 34612

NAME- JOB STAMPINGS

PCT OF TOTAL- 84.8

SIC - 35551

NAME- PRINTING PRESSES

PCT OF TOTAL- 84.7

SIC - 38311

NAME- OPTICAL INSTRUMENTS AND LENSES

PCT OF TOTAL- 84.6

SIC - 35442

NAME- INDUSTRIAL MOLDS

PCT OF TOTAL- 84.6

SIC - 35225

NAME- HARVESTING MACHINERY

PCT OF TOTAL- 84.2

SIC - 32291

NAME- TABLE KITCHEN ART AND NOVELTY GLASSWARE

PCT OF TOTAL- 84.0

SIC - 33577

NAME- MAGNET WIRE

PCT OF TOTAL- 83.9

SIC - 36422

NAME- COMMERCIAL AND INSTITUTIONAL TYPE ELECTRIC FIXT

PCT OF TOTAL- 83.7

SIC - 36742

NAME- TRANSISTORS

PCT OF TOTAL- 83.7

SIC - 20860

NAME- BOTTLED AND CANNED SOFT DRINKS

PCT OF TOTAL- 83.6

SIC - 22561

NAME- WARP KNIT FABRICS

PCT OF TOTAL- 83.5

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

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THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE B INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 80.0  
----- AND 89.9 % OF THE TOTAL POSSIBLE SCORE. CONT.)

SIC - 28342  
NAME- PHARMACEUTICAL PREPARATIONS ACTING ON CENTRAL N  
PCT OF TOTAL- 83.5

SIC - 28445  
NAME- MISCELLANEOUS COSMETICS AND TOILET PREPARATIONS  
PCT OF TOTAL- 83.3

SIC - 36425  
NAME- FLOODLIGHTING AND OTHER OUTDOOR LIGHTING EQUIPM  
PCT OF TOTAL- 83.3

SIC - 37992  
NAME- FARM WAGONS PUSH CARTS BOAT TRAILERS ETC  
PCT OF TOTAL- 83.3

SIC - 28152  
NAME- SYNTHETIC ORGANIC DYES  
PCT OF TOTAL- 82.7

SIC - 27322  
NAME- BOOK AND PAMPHLET PRINTING OTHER PROCESSES  
PCT OF TOTAL- 82.5

SIC - 37910  
NAME- TRAILER COACHES  
PCT OF TOTAL- 82.5

SIC - 35663  
NAME- OTHER MECHANICAL POWER TRANSMISSION EQUIPMENT  
PCT OF TOTAL- 82.5

SIC - 35199  
NAME- PARTS AND ACCESSORIES FOR INTERNAL COMBUSTION E  
PCT OF TOTAL- 82.2

SIC - 36741  
NAME- INTEGRATED MICROCIRCUITS  
PCT OF TOTAL- 82.2

SIC - 25223  
NAME- METAL OFFICE CABINETS AND CASES  
PCT OF TOTAL- 82.1

SIC - 34942  
NAME- VALVES FOR POWER TRANSFER  
PCT OF TOTAL- 81.9

SIC - 35991  
NAME- CARBURETORS PISTONS AND PISTON RINGS AND VALVES  
PCT OF TOTAL- 81.1

SIC - 24324  
NAME- NONWOOD FACE PLYWOOD  
PCT OF TOTAL- 81.0

SIC - 35483  
NAME- ACETYLENE WELDING AND CUTTING APPARATUS  
PCT OF TOTAL- 80.9

SIC - 35593  
NAME- PLASTIC-WORKING MACH AND WQUIP AND PARTS  
PCT OF TOTAL- 80.8



GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE B INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 80.0  
 ----- AND 89.9 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 35318  
 NAME- SCRAPERS GRADERS ROLLERS AND OFF HIGHWAY TRUCKS  
 PCT OF TOTAL- 80.6

SIC - 38410  
 NAME- SURGICAL AND MEDICAL INSTRUMENTS APPARATUS AND  
 PCT OF TOTAL- 80.6

SIC - 38421  
 NAME- SURGICAL ORTHOPEDIC AND PROSTHETIC APPLIANCES A  
 PCT OF TOTAL- 80.6

SIC - 38111  
 NAME- AERONAUTICAL NAUTICAL AND NAVIGATIONAL INSTRUME  
 PCT OF TOTAL- 80.5

SIC - 38611  
 NAME- STILL PICTURE EQUIPMENT  
 PCT OF TOTAL- 80.4

SIC - 34492  
 NAME- PREFABRICATED AND PORTABLE METAL BUILDINGS AND  
 PCT OF TOTAL- 80.2

GRADE C INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 70.0  
 ----- AND 79.9 % OF THE TOTAL POSSIBLE SCORE)

SIC - 36622  
 NAME- RADIO AND TELEVISION BROADCAST EQUIPMENT  
 PCT OF TOTAL- 79.7

SIC - 35671  
 NAME- ELECTRIC INDUSTRIAL FURNACES AND OVENS  
 PCT OF TOTAL- 79.4

SIC - 35412  
 NAME- DRILLING MACHINES  
 PCT OF TOTAL- 79.4

SIC - 36743  
 NAME- DIODES AND RECTIFIERS  
 PCT OF TOTAL- 79.3

SIC - 27891  
 NAME- EDITION LIBRARY AND OTHER HARD COVER BOOK BINDI  
 PCT OF TOTAL- 79.2

SIC - 35650  
 NAME- INDUSTRIAL PATTERNS OF WOOD METAL ETC  
 PCT OF TOTAL- 79.0

SIC - 39112  
 NAME- JEWELRY MADE OF PRECIOUS METALS EXCEPT PLATINUM  
 PCT OF TOTAL- 78.9

SIC - 33512  
 NAME- ROLLED DRAWN AND EXTRUDED COPPER AND COPPER BAS  
 PCT OF TOTAL- 78.9

SIC - 33231  
 NAME- STEEL INVESTMENT CASTINGS ALL GRADES  
 PCT OF TOTAL- 78.7

SIC - 35690  
 NAME- OTHER GENERAL INDUSTRIAL MACHINERY  
 PCT OF TOTAL- 78.5

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE C INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 70.0  
----- AND 79.9 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 38512  
NAME- OPTHALMIC FOCUS LENSES INCLUDING CONTACT LENSE  
PCT OF TOTAL- 78.3

SIC - 35540  
NAME- PAPER INDUSTRIES MACHINERY AND PARTS AND ATTACH  
PCT OF TOTAL- 77.8

SIC - 36512  
NAME- HOUSEHOLD TELEVISION RECEIVERS  
PCT OF TOTAL- 77.7

SIC - 35612  
NAME- HYDRAULIC FLUID POWER PUMPS AND MOTORS AND VACU  
PCT OF TOTAL- 77.3

SIC - 35661  
NAME- PLAIN BEARINGS AND BUSHINGS  
PCT OF TOTAL- 77.2

SIC - 26543  
NAME- MISCELLANEOUS SANITARY FOOD CONTAINERS  
PCT OF TOTAL- 77.1

SIC - 37423  
NAME- STREET CARS PARTS AND ACCESSORIES FOR RAILROAD  
PCT OF TOTAL- 77.0

SIC - 36112  
NAME- TEST EQUIPMENT FOR TESTING ELECTRICAL RADIO AND  
PCT OF TOTAL- 77.0

SIC - 35361  
NAME- HOISTS  
PCT OF TOTAL- 76.4

SIC - 34980  
NAME- FABRICATED PIPE AND FITTINGS  
PCT OF TOTAL- 76.3

SIC - 36111  
NAME- INTEGRATING INSTRUMENTS ELECTRICAL  
PCT OF TOTAL- 76.2

SIC - 35731  
NAME- ELECTRONIC DATA PROCESSING MACHINES  
PCT OF TOTAL- 75.1

SIC - 25312  
NAME- PUBLIC BUILDING AND RELATED FURNITURE  
PCT OF TOTAL- 74.9

SIC - 35415  
NAME- LATHES  
PCT OF TOTAL- 73.9

SIC - 35611  
NAME- INDUSTRIAL PUMPS  
PCT OF TOTAL- 72.8

SIC - 34941  
NAME- AUTOMATIC REGULATING AND CONTROL VALVES  
PCT OF TOTAL- 71.5

INDUSTRY RANKING BY GRADE FOR THE EASTERN OKLAHOMA

EDD

GROWTH COMMUNITY IS MUSKOGEE OKLAHOMA

THIS COMMUNITY HAS SATISFIED ALL CRITICAL REQUIREMENTS FOR INDUSTRIES LISTED BELOW

GRADE C INDUSTRIES (INDUSTRIES FOR WHICH THIS COMMUNITY SCORED BETWEEN 70.0  
----- AND 79.9 % OF THE TOTAL POSSIBLE SCORE, CONT.)

SIC - 22952  
NAME- VINYL COATED FABRICS  
PCT OF TOTAL- 70.9

SIC - 36430  
NAME- CURRENT CARRYING WIRING DEVICES  
PCT OF TOTAL- 70.3

APPENDIX E

ILS Output: Community Ranking for Industry SIC 27322

COMMUNITY RANKINGS FOR INDUSTRY 27322 BOOK AND PAMPHLE. PRINTING OTHER PROCESSES

COMMUNITIES LISTED BELOW SATISFIED ALL CRITICAL LOCATIONAL REQUIREMENTS  
AND RANK IN THE TOP 50 COMMUNITIES

-- GEOGRAPHIC ENTITY --		-- GROWTH COMMUNITY --		COUNT	RANK	TOTAL POINTS	PERCENT OF TOTAL
NAME	TYPE	CITY	STATE				
GREEN RIVER	EDD	HENDERSON	KY	1	1	887	87.65
SOUTHCENTRAL	EDD	SHELBYVILLE	TENN	2	2	874	86.36
LOWERCHATTAH	EDD	COLUMBUSPHEN	GA	3	3	838	82.81
BARREN RIVER	EDD	BOWLING GRN.	KY	4	3	838	82.81
NORTHWESTFLA	EDD	PANAMA CITY	FLA	5	5	835	82.51
PENNYRILE	EDD	HOPKINSVILLE	KY	6	5	835	82.51
GREEN RIVER	EDD	OWENSBORO	KY	7	5	835	82.51
SOUTHEAST TN	EDD	CLEVELAND	TENN	8	8	810	80.04
GOLDEN TRIAN	EDD	STARKVILLE	MISS	9	9	801	79.15
SMPDD	EDD	PASCAGOULA	MISS	10	10	792	78.26
COASTAL AREA	EDD	HINESVILLE	GA	11	11	789	77.96
EAST TENN	EDD	KNOXVILLE	TENN	12	11	789	77.96
COASTAL AREA	EDD	BRUNSWICK	GA	13	13	786	77.67
COASTAL AREA	EDD	SAVANNAH	GA	14	13	786	77.67
SOUTHEASTERN	EDD	WILMINGTON	N.C.	15	13	786	77.67
LOW SAVANNAH	EDD	NO. AUGUSTA	S.C.	16	13	786	77.67
SOUTHEAST TN	EDD	ATHENS	TENN	17	13	786	77.67
TOP OF ALABA	EDD	HUNTSVILLE	ALA	18	18	783	77.37
NORTHGEORGIA	EDD	DALTON	GA	19	18	783	77.37
EAST CENTRAL	EDD	MERIDIAN	MISS	20	18	783	77.37
GOLDEN TRIAN	EDD	WESTPOINT	MISS	21	18	783	77.37
MID-EAST	EDD	GREENVILLE	N.C.	22	18	783	77.37
PEE DEE	EDD	DARLINGTON	S.C.	23	18	783	77.37

COMMUNITIES LISTED BELOW SATISFIED ALL CRITICAL LOCATIONAL REQUIREMENTS AND RANK IN THE TOP 50 COMMUNITIES

-- GEOGRAPHIC ENTITY --		-- GROWTH COMMUNITY --		COUNT	RANK	TOTAL POINTS	PERCENT OF TOTAL
NAME	TYPE	CITY	STATE				
MID CUMBERLD	EDD	MURFREESBORO	TENN	24	18	783	77.37
UP SAVANNAH	EDD	GREENWOOD	S.C.	25	25	771	76.19
LOWCHATTAAHOO	EDD	COLUMBUSPHEN	ALA	26	26	758	74.90
LOW SAVANNAH	EDD	AIKEN	S.C.	27	26	758	74.90
EAST TENN	EDD	ALCOA	TENN	28	26	758	74.90
EAST TENN	EDD	MARYVILLE	TENN	29	26	758	74.90
CHATT-FLINT	EDD	CARROLLTON	GA	30	30	755	74.60
CUMBERLANDVA	EDD	LONDON	KY	31	31	752	74.31
SMPDD	EDD	HATTIESBURG	MISS	32	31	752	74.31
THREE RIVERS	EDD	TUPELO MISS	MISS	33	31	752	74.31
SOUTHWESTERN	EDD	WAYNESVILLE-	N.C.	34	31	752	74.31
SOUTHCENTRAL	EDD	TULLAHOMA	TENN	35	31	752	74.31
CENTRAL ALA	EDD	GREENVILLE	ALA	36	36	749	74.01
SE ALA EDD	EDD	DOTHAN	ALA	37	36	749	74.01
SOUTH EAST	EDD	ANDALUSIAOPP	ALA	38	36	749	74.01
HEART OF GA	EDD	DUBLIN	GA	39	36	749	74.01
HEART OF GA	EDD	EAST DUBLIN	GA	40	36	749	74.01
CENT SAVANNA	EDD	SWAINSBORO	GA	41	36	749	74.01
BARREN RIVER	EDD	GLASGOW	KY	42	36	749	74.01
NORTHCENTRAL	EDD	GREENWOOD	MISS	43	36	749	74.01
NORTHCENTRAL	EDD	GRENADA MISS	MISS	44	36	749	74.01
CENTRAL MISS	EDD	JACKSON MISS	MISS	45	36	749	74.01
CENTRAL MISS	EDD	VICKSBURG	MISS	46	36	749	74.01

COMMUNITY RANKINGS FOR INDUSTRY 27322 BOOK AND PAMPHLE. PRINTING OTHER PROCESSES

COMMUNITIES LISTED BELOW SATISFIED ALL CRITICAL LOCATIONAL REQUIREMENTS  
AND RANK IN THE TOP 50 COMMUNITIES

-- GEOGRAPHIC ENTITY --		-- GROWTH COMMUNITY --		COUNT	RANK	TOTAL POINTS	PERCENT OF TOTAL
NAME	TYPE	CITY	STATE				
EAST TENN	EDD	MORRISTOWN	TENN	47	36	749	74.01
SOUTHWESTERN	EDD	WAYNESVILLE-	N.C.	48	48	746	73.72
LINCOLNTRAIL	EDD	RADCLIFF	KY	49	49	743	73.42
COASTALPLAIN	EDD	VALDOSTA	GA	50	50	740	73.12
PURCHASEAREA	EDD	PADUCAH KY	KY	51	50	740	73.12
NDRTH DELTA	EDD	CLARKSDALE	MISS	52	50	740	73.12
THREE RIVERS	EDD	ABERDEEN	MISS	53	50	740	73.12

Ben-Zvi, Samuel.

Determining industrial comparative advantages in areas of proposed water navigation projects : an industrial location analysis : a report / submitted to U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources ; by U.S. Army Corps of Engineers, Tulsa District ; Samuel Ben-Zvi.--[Fort Belvoir, Va. : Institute for Water Resources], 1981.

[125] p. ; 28 cm.--(Contract report / Institute for Water Resources ; no. 81-C06)

"December, 1981"

1. Industries, Location of. 2. Industrial sites. 3. Water resources development. I. United States. Army. Institute for Water Resources. II. United States. Army. Corps of Engineers. Tulsa District. III. Title. IV. Series: Contract report (United States. Army. Institute for Water Resources) ; no. 81-C06.

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no. 81-C06