

Siting Industrial Facilities on the Texas Coast



**Texas Coastal Management
Program
Siting Industrial Facilities
on the Texas Coast**

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**Texas General Land Office
Bob Armstrong, Commissioner
September 15, 1978**

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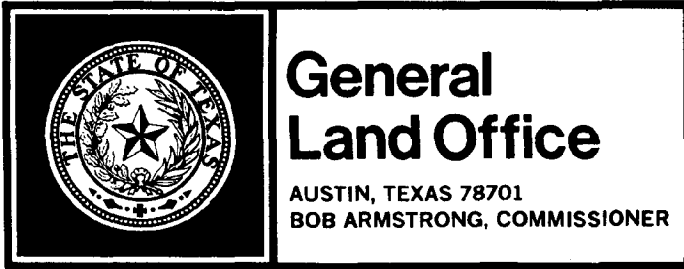
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rpc

research and planning consultants
1705 Guadalupe Austin, Texas 78701



My fellow Texans:

The 1976 amendments of the Coastal Zone Management Act of 1972, Section 305(b), state that "the management program for each coastal state shall include . . . a planning process for energy facilities likely to be located in, or which may significantly affect, the coastal zone, including but not limited to, a program for anticipating and managing the impacts for such facilities." The regulations further state that such a planning process must include:

1. the identification of affected facilities;
2. a procedure for assessing suitability of sites;
3. articulation of state policies for managing facilities and/or their impacts;
4. a mechanism for coordinating state, federal, and local agencies involved in facility siting; and
5. identification of legal and other techniques to meet management needs.

The General Land Office of Texas, the agency responsible for the program, contracted with RPC, Inc., for a study of industrial facility siting in Texas. The study is, in part, addressed to Section 305(b) regulations. The study began in September of 1977 and is described in this document in final version.

This is a technical study. Statements and recommendations contained in this study are not part of the state coastal management program, except to the extent incorporated into the official description of the program. Please consult the most recent draft of the program description.

This is the final version of this study. However, readers concerned with the Texas process for siting facilities may still have input on the way this issue is treated in the program description.

Any comments on this document or on the Texas Coastal Management Program in general should be directed to Ron Jones, Director, Texas Coastal Management Program, 1705 Guadalupe, Austin, Texas 78701, (512) 472-7765.

Sincerely,

A handwritten signature in cursive script that reads "Bob Armstrong".

Bob Armstrong

Acknowledgements

RPC wishes to acknowledge the efforts of many contributors to this technical study. Principal-in-charge was Dr. Ronald T. Luke. Leah Pagan and Frank Sturzl served as project managers. Principal investigators were Chet Allerhand, Marta Braiterman, Chris Caran, Barbara Haefeli, Jim Kimmel, Gail McDonald, Rob McIntyre, Wade Schott, and Meg Wilson.

The maps were drafted by Aldometres Warren with assistance from Stacy Nichol. Elizabeth Christian Wilds edited and coordinated the production of the technical report, with assistance from Nancy Grona.

Production assistance was provided by Joanne Click, Eleanor Dailey, David Fox, Denise Girard, Sheryl Harding, Ray Helmers, Jana McFarland, Kyle Pierce, and Lori Snyder; also, Ruth King and Delores Seaton of the General Land Office.

RPC also acknowledges the invaluable assistance provided by public officials, private citizens, industrial representatives and the advisory committee of the Texas Coastal Management Program.

**Ron Jones
President, RPC**

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List of Abbreviations

AAR	- Activity Assessment Routine
APTRA	- Administrative Procedure and Texas Register Act
CCPC	- Corpus Christi Petrochemical Company
CEIP	- Coastal Energy Impact Program
CZMA	- Coastal Zone Management Act of 1972, as amended
EPA	- Environmental Protection Agency
ETJ	- Extraterritorial Jurisdiction
FCC	- Federal Communications Commission
FEA	- Federal Energy Administration
FERC	- Federal Energy Regulatory Commission
FTC	- Federal Trade Commission
GLO/SLB	- General Land Office/School Land Board
ICNRE	- Interagency Council on Natural Resources and the Environment
IFS	- Industrial Facility Siting
LNG	- Liquefied Natural Gas
NEPA	- National Environmental Policy Act
NPDES	- National Pollution Discharge Elimination System
NRC	- Natural Resources Council (State)
NRC	- Nuclear Regulatory Commission (Federal)
OCS	- Outer Continental Shelf
OCZM	- Office of Coastal Zone Management
PUC	- Public Utilities Commission
RRC	- Texas Railroad Commission
STP	- South Texas Project
TACB	- Texas Air Control Board
TCMP	- Texas Coastal Management Program
TDPW	- Texas Department of Parks and Wildlife
TDWR	- Texas Department of Water Resources
TIC	- Texas Industrial Commission
TNRIS	- Texas Natural Resources Information Service

**Texas Coastal Management Program
Technical Papers**

The Texas Coastal Management Program has published a series of technical papers which give further information on the activity assessment routine and on the industrial facility siting study. The papers are referenced throughout this document. If you desire a copy of one or more of these papers, please contact:

Elizabeth Christian Wilds
1705 Guadalupe
Austin, Texas 78701
(512) 472-7765

1. Pilot Study of the Activity Assessment Routine Social and Economic Component
2. Pilot Study of the Activity Assessment Routine Ecological Systems Component
3. Appendices to the Pilot Study of the Activity Assessment Routine Ecological Systems Component
4. User Reference Manual DW3000, Activity Assessment Routine Social and Economic Component
5. Operations Manual DW3000, Activity Assessment Routine Social and Economic Component
6. Input/Output Models of the Texas Coastal Region, Activity Assessment Routine Social and Economic Component
7. Assessment of Fiscal Impacts, Activity Assessment Routine Social and Economic Component
8. A Methodology to Assess Social/Infrastructural Impacts, Activity Assessment Routine Social and Economic Component
9. Bibliography, Activity Assessment Routine Social and Economic Component
10. Forms for Manual Use, Activity Assessment Routine Social and Economic Component
11. Activity Analysis, Activity Assessment Routine Ecological Systems Component
12. Ecological System Diagrams: Theory and Construction, Activity Assessment Routine Ecological Systems Component
13. Ecological Attribute Alteration Measurement and Evaluation, Activity Assessment Routine Ecological Systems Component

14. Computer Assistance, Activity Assessment Routine Ecological Systems Component
15. Implementation of the Activity Assessment Routine
16. Supplementary Data on the Natural Environment Relevant to the Industrial Facility Siting Study
17. Statutes and Regulations Relevant to Industrial Facility Siting
18. A Case Study of Nuclear Facility Siting: The South Texas Project
19. A Case Study of Petrochemical Facility Siting: The Corpus Christi Petrochemical Company

Other full studies by the Texas Coastal Management Program which are relevant to this study include:

The Activity Assessment Routine
 Ecological Systems Component User's Manual
 Social and Economic Component User's Manual
Offshore Oil: Its Impact on Texas Communities
Inland Canals: An Alternative for Industry
Texas Coastal Management Program
 Preliminary Hearing Draft

Limited quantities of these documents are available from the address above.

1. Introduction and Findings

Purpose of the Study

The purpose of this study is to analyze the ways in which industrial facilities are sited on the Texas coast and to make recommendations for improvements in the siting process. The results of this study will be incorporated into the Texas Coastal Management Program (TCMP), which will be submitted to the governor for his review. If he approves, the program will be submitted to the Secretary of Commerce.

This technical study of industrial siting is mandated by the 1976 amendments to the Coastal Zone Management Act of 1972 (P.L. 92-583). The Texas Coastal Management Program is conducted by Bob Armstrong, Commissioner of the General Land Office, as part of the charge from Governor Briscoe to develop a coastal management program for Texas. This is not the first time the TCMP has considered the interaction of industrial facility siting with the natural and human environments of the Texas coast. Prior work is referred to throughout the study. However, this study, for the first time, describes and analyzes the factors and processes which determine where facilities are sited, and makes recommendations to better accommodate the interests of all affected by siting decisions.

Throughout this study, the term "industrial facilities" will be substituted for "energy facilities," the term used in the federal Coastal Zone Management Act. The distinction is important. The U.S. Department of Commerce does not include facilities such as petrochemical and metal fabricating plants in its definition of energy facilities. Since federal regulations allow states to broaden their definition to include other facilities and since a number of industrial activities are found in the Texas coastal area, the study uses the broader term.

Research Approach

Before needs for change can be stated and recommendations offered, the present situation, the factors which shape it, and the relationship of those factors must be understood. While the recommendations are aimed at state government, the perspective of all participants in the process should be considered in order to better gauge the effects and acceptability of the recommendations.

Numerous sources were consulted in order to obtain knowledge of the present situation. These sources include pertinent statutes, regulations, ordinances, and literature on factors considered important by industry in making siting decisions. Extensive data on existing and potential facilities were also reviewed.

During the course of the study, numerous industrial representatives, local, state, and federal government officials, and a variety of other individuals were contacted and interviewed (see Bibliography, Appendix B). In addition, a number of meetings of the coastal management program's advisory committee were devoted to discussion of the current siting process and the findings of this study. The committee, whose membership is shown in Figure 1, is composed of industrial representatives, local and state officials, representatives of environmental and other citizen groups, and other interested individuals. It was actively involved in the development of information presented in this study, providing helpful insights and contacts with other involved individuals, and assuring that the opinions of a wide cross-section of people were included.

The emphasis throughout this study on both written material and personal contact is important. The process by which a facility is sited changes over time with changes in technology, perceived human and natural resource needs, and governmental policies. Thus, written material is often out-of-date soon after publication. In addition, there were few available written studies of siting in Texas, particularly from the perspective of industry. A large amount of important and relevant information was not in written form but was available from knowledgeable people. Only by interviewing individuals, developing hypotheses, and testing them in further discussion with other individuals could an accurate picture of the siting process in Texas be developed.

A briefing paper was prepared in January, 1978, to obtain comments on the description of the present siting process which was being developed. This paper was mailed to over 1,800 persons and organizations who had previously expressed interest in the TCMP. Readers were invited to respond to the following questions by mail, telephone or in person:

1. Is the present state siting process described in a thorough and balanced manner? and
2. Are there any problems or issues associated with the present process?

Figure 1

TEXAS COASTAL MANAGEMENT PROGRAM ADVISORY COMMITTEE

Owana Anderson	Wichita Falls
Bob Armstrong	Commissioner, Texas General Land Office
John B. Armstrong	Texas and Southwestern Cattle Raisers Assoc.
Jay Barnes	Texas Society of Architects
Ed Bluestein	Attorney, Fulbright & Jaworski
David Brune	Trinity River Authority
George Buch	Houston
William H. Clark	Attorney, Dallas
Allen Cluck	Houston Oil and Minerals Corp.
Gorden Davenport	Monsanto Company
Damon Engle	Union Carbide
Steve Frishman	Coastal Bend Conservation Assoc.
Dr. Peter Gunter	Denton
Robert Hartsfield	Mitchell Energy & Development Corp.
Ed Harte	Corpus Christi <u>Caller-Times</u>
Terry Hershey	Texas Coastal & Marine Council
Bobette Higgins	League of Women Voters of Texas
Dan Hagan	Houston Chamber of Commerce
Hon. Roy Holbrook	Judge, Galveston County
Ed Holder	Outdoor Writers Association
Hon. Bert Huebner	Judge, Matagorda County
Andrew L. Jefferson, Jr.	Attorney, Houston
Julia Jitkoff	Kingsville
Pearce Johnson	Chairman, Parks & Wildlife Commission
Danny Jones	Chemical Workers 900
Louis H. Jones	Brazosport Chamber of Commerce
Harris Kempner	Galveston Marine Affairs Council
John Landry	Dow Chemical Company
Ken Manning	Sierra Club
E. Ward McCown	Texas Farm Bureau
George McGonigle	Friendswood Development Company
Joe Moss	Vice-President, American Petrofina
L.S. "Scott" Murray	Central Power & Light
Jay Naman	Texas Farmers Union
Tom Nelms	Boating Trades Association
Ben Powell	Brown & Root, Inc.
Venable Proctor	Attorney, Victoria
Dr. Barbara Reagan	Southern Methodist University, Economics
Cecil Reid	Sportsmen's Clubs of Texas
Sharron Stewart	Texas Committee on Natural Resources
Harold Tate	Texas AFL-CIO
Frank Tompkins	Tompkins Young Real Estate
Dick Trabulsi	Houston
Harvey Weil	Attorney, Corpus Christi
L.D. "Bubba" Whitehead	Rancher
Dave Winterman	Lakeside Irrigation
Barbara Wooten	Mobil Oil Corporation

The paper also contained an invitation from Land Commissioner Bob Armstrong to attend a public hearing on the siting process in Houston on February 9, 1978. The hearing was attended by 150 persons. Eleven written comments were received. The material in the briefing paper, with minor changes, was apparently acceptable to the reviewers.

The needs for change in the present siting process were developed from material gathered by the researchers, from written and oral statements made in response to the briefing paper and to the draft study, and from the work of the advisory committee.

The advisory committee of the TCMP, with many members who have been involved in the program since 1975, played the major role in identifying the shortcomings of present management and in proposing recommendations to improve the situation. The full committee discussed the briefing paper and the public responses. A subcommittee then developed recommendations which were reviewed by the full committee and presented to Commissioner Armstrong. The statements of need and recommendations discussed in this study are based on this input.

A draft industrial facility siting study was published on April 19, 1978. The draft version of the study reflected comments received on the briefing paper. During the comment period, approximately 20 people made suggestions for this final version. A public hearing in Houston on July 31, 1978, concerning the entire Texas Coastal Management Program, also produced comments on this study. All comments were taken into careful consideration before publication of this final document.

Findings and Recommendations

Findings

1. There is no single agency or law which regulates the siting of facilities in Texas. Rather, the state has a process which evolves out of the interaction between public and private agencies and organizations and federal, state and local laws and regulations. Understanding this process demands a knowledge of the various roles played by these public and private entities and of the natural and human environments of the state.
2. The initial decision of where to locate a facility on the coast of Texas is basically left to industry; and virtually every characteristic which makes a site attractive to industry -- particularly industries engaged in large, energy-related activities -- is found in Texas. However, there are three variables inherent in any siting decision including the political/legal jurisdiction in which siting can be considered, the planned industrial activity, and the personality of the firm.
3. The natural environment and human environment (which includes the economic, political, and regulatory climates) determine how attractive a state or local area is to industry.
4. Because of innumerable uncertainties which permeate the siting process, it is impossible to predict with any validity the precise locations in the Texas coastal area which are most likely to be chosen for industrial siting in the near future.

5. Few attributes of the natural environment, which includes the renewable and non-renewable resources of the coastal area, pose absolute constraints to the location of industrial facilities. Most characteristics of the natural environment pose engineering problems which have solutions at some price. However, some factors may be absolute constraints to siting -- for instance, public ownership, regulatory policy, or prior commitment of resources. It is not the natural environment itself which is the constraint, but rather values and priorities placed on features of the environment by government and citizens.
6. There are two major factors determining the economic climate for further siting of industrial facilities on the Texas coast. The presence of other facilities in similar industrial sectors strengthens the climate by providing proximity to both raw materials and markets. The siting of each new plant encourages the siting of additional plants. Present state taxing policies also serve to reinforce the attractiveness of the economic climate.
7. The political climate in Texas is generally favorable for the siting of industrial facilities on the coast. State policies on taxation and labor law help create this favorable climate; and the general trend along the Texas coast seems to be for local governments, particularly municipalities, to encourage industry to site within their jurisdictions.
8. Organizations favoring additional industrial siting are much more prominent than those expressing objections. The Texas Industrial Commission, Chambers of Commerce, the port authorities and the public utilities all tend to promote industrial growth. In contrast to other geographical areas, organizations in Texas which oppose facility siting have generally lacked the organization, funding and base of popular support necessary to counterbalance pro-development pressures in the political system.
9. Because of their role as industrial developers and because of the importance of waterway transportation in siting, navigation districts will play an increasingly important role in the siting process.
10. Local communities, which experience most directly the effects of an industrial siting decision, are sometimes unaware of possible impacts or unable to effectively manage these impacts in a timely manner. Improved communication between local officials and citizens and industrial representatives responsible for a siting decision is a desirable goal.
11. There are a number of different state and federal agencies which require firms to obtain permits in order construct and operate industrial facilities. The administrative and procedural practices of these agencies create a regulatory climate. As the number and scope of various statutes and regulations designed to protect the natural environment has grown, the regulatory climate of a state has become increasingly important to industry. In fact, in recent years, the ability to obtain the necessary permits to construct a facility on a given site has become a dominant consideration in industry's site selection process. The regulatory climate in Texas also appears to favor further industrial growth.

Recommendations

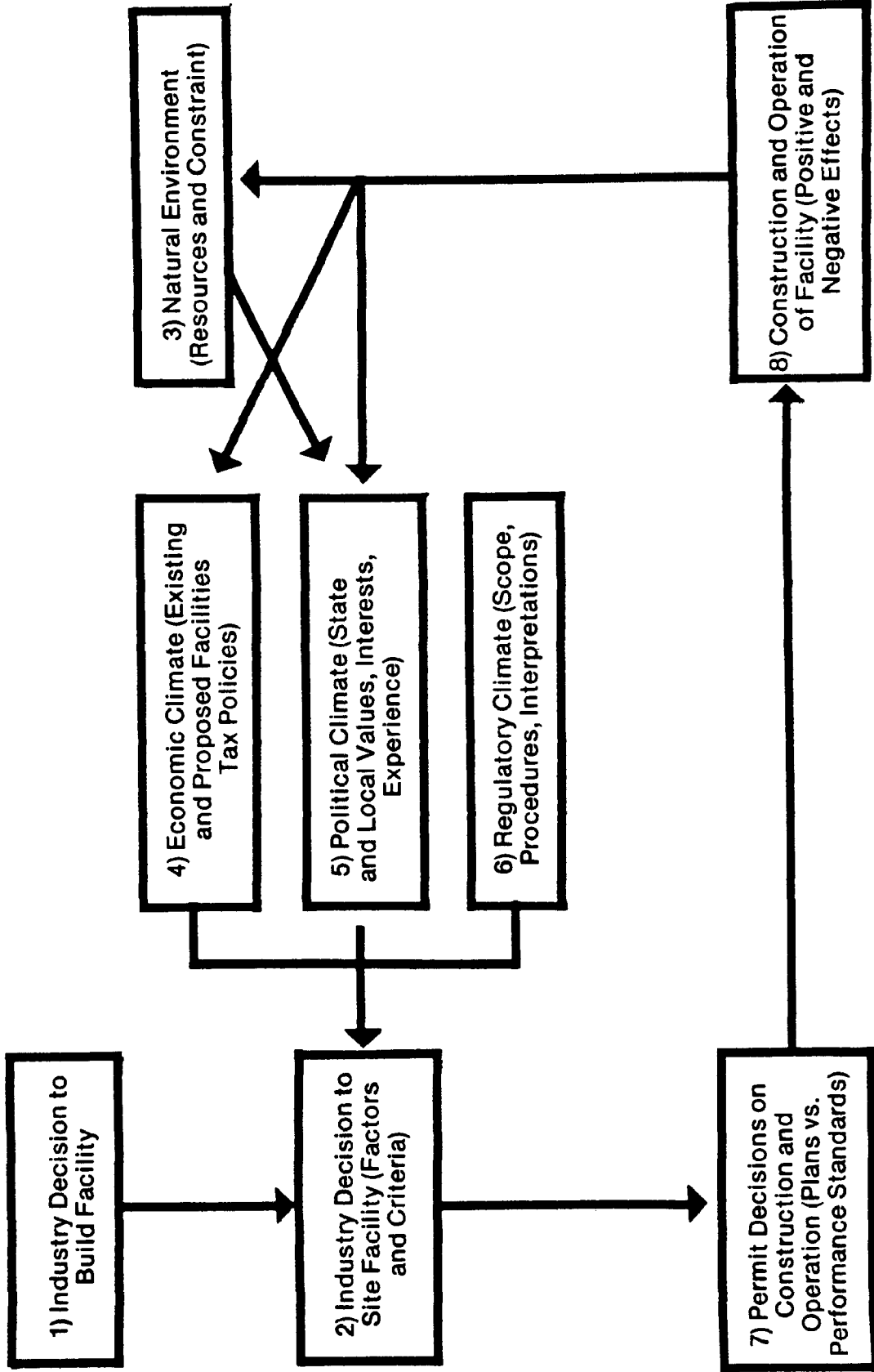
1. The Texas Industrial Commission, together with affected interests, should develop and advise the use of a guidebook to aid in the selection of industrial sites.
2. The Natural Resources Council should recommend that the legislature designate the Texas Industrial Commission to provide technical assistance to local groups (as defined in the study).
3. The Texas Air Control Board (TACB) should provide a forum for consideration of the land use consequences of a proposed facility in reaching a decision on an application for construction permit. In consideration of these applications, TACB should not necessarily allow the land use decisions of a municipal and/or county government to prevail when the benefits of a facility's siting or the effects of a facility's emissions transcend the local political boundaries of a particular jurisdiction. TACB should apply this policy from its date of adoption.
4. The legislature should adopt a policy prohibiting local government from unreasonably, by tax or regulation, restricting the activities on state-owned lands, or excluding industrial facilities of regional or national benefit.
5. Texas agencies which are responsible for managing or regulating the state's natural resources should adopt an explicit policy that they will consider the national interest in their decision-making.
6. The legislature should enact as state policy the requirement that all publicly-sponsored projects meet the same standards applicable to privately-sponsored projects.
7. The Natural Resources Council should develop and recommend to state agencies and to the legislature reasonably uniform provisions for adequate public notice of permit applications and hearings.
8. The Natural Resources Council should evaluate the final Section 208 Areawide Wastewater Management Program and make such findings and recommendations as it deems proper to allow wastewater management plans to address coastal concerns.
9. The Natural Resources Council should evaluate the adequacy of the Coastal Energy Impact Program in the anticipation and management of impacts in its 1980 report.

Conclusion

This chapter has discussed the purpose and research approach of the industrial facility siting study, and has listed findings and recommendations developed during the study. The findings of this study describe the relationships of the major factors in an industrial siting decision in Texas (Figure 2). Chapters 2, 3, and 4 will describe these factors and relationships in greater detail.

Figure 2

THE INDUSTRIAL FACILITY SITING PROCESS



2. The Decision-Making Process of Industry

Introduction

The decision of a private firm to construct an industrial facility sets into motion a series of interlocking private, governmental, and citizen actions. These form the siting process, in which the goals of private enterprise; federal, state, and local statutes and regulations; and the interests of private citizens exert influence and are considered and balanced until resolution is reached.

The process is a series of actions and reactions. Actions come from a private firm in the form of construction applications to governmental agencies, announcements of plans to construct or expand a facility, purchase of land, and many other activities.

Government agencies and private citizens are normally in a reactive position, applying a body of state and federal laws and regulations which, while not so labelled, act to constrain the siting of industrial facilities. The laws and administrative regulations, particularly as they apply in Texas, are fully described in Chapter 4 and in TCMP technical paper #17. The timing and the extent of their influence on the siting process is detailed below.

Private citizens' reactions are based on a variety of variables including attitudes toward economic growth, personal safety and the protection of natural resources.

These reactions are also accounted for in the following description of the siting process. This description is based on a series of in-depth interviews with private sector officials who, for the most part, are involved in private siting decisions on a day-to-day basis. The information obtained in those interviews has been analyzed and compared, the result being an analysis of many bits of information provided by many sources. This is not a description provided by any one industry spokesman.

The Siting Process

Private goals and objectives. Since the siting process is set in motion by a private decision to build or expand an industrial facility, an understanding of the private firm's goals is basic.

The primary goal of the private firm is to maximize return on investment. There is at least one secondary goal: to maintain and enhance the firm's public image so as to protect long-term economic viability. A private firm may not make a decision which provides maximum short term profits if that decision will for some reason harm the firm's public image. The public image goal is also aimed at the maximization of return on investment.

These goals apply when the firm approaches any major capital budgeting decision; siting is not an exception. Thus, the objective of the private firm in the siting process is to site a facility in such a way as to reach the company's goals while adhering to the law and satisfying public demands.

Definitions. Before proceeding with a description of the siting process, it is important to define certain terms which will be encountered.

Criteria. Criteria are the qualities by which prospective sites for the facility are judged. These are also referred to as "site selection criteria." As will be seen, criteria (and the relative importance of each) vary depending on a variety of factors, but the following is a reasonably comprehensive list of possible criteria. No ranking is implied by the numbering.

1. Baseline Physical Elements
 - a. Land availability/prices
 - b. Fresh water supply
 - c. Climate
 - d. Seismic conditions/geologic features
 - e. Soil characteristics
 - f. Flooding probability
 - g. Hurricane/storm hazards
2. Proximity
 - a. To raw materials
 - b. To product markets

- c. To water transportation
 - d. To rail transportation
 - e. To highway transportation
 - f. To pipeline transportation
 - g. To utilities
 - h. To ancillary/support facilities
3. Social Characteristics
- a. Skilled/unskilled labor supply
 - b. Level of unionization/strength of unions
 - c. Community attitudes/acceptance
 - d. Absorptive capacity of community infrastructure (housing, public services and facilities, education, etc.)
4. Legal
- a. Air quality permissibility
 - b. Water quality permissibility
 - c. Specific siting statutes and regulations (e.g., Nuclear Regulatory Commission regulations)
 - d. Regulations concerning dredging and filling
 - e. Other environmental statutes and regulations (Endangered Species Act, etc.)
 - f. Tax structure
 - (1) Number of taxes/jurisdictions
 - (2) Rates/ratios of assessment
 - g. Zoning ordinances
 - h. Applicability of "right-to-work" laws
5. Miscellaneous
- a. Safety factors (air traffic patterns, etc.)

Factors. Factors are the variables which characterize each siting and serve to determine which criteria are important and how important each is. There are three factors in each siting case:

1. The administrative jurisdiction -- the political/legal jurisdiction in which siting can be considered. This can be a large area (United States, North America) or a small one (middle coastal area of Texas), but is always defined as narrowly as possible while still including all areas which the firm would consider.
2. The industrial activity - the type, size, and demands (land, water, port facilities, labor, transportation facilities, etc.) of the facility being considered. This includes a consideration of

the extent to which the technology in question is tolerant of potential problems like fresh water shortages, substitution of raw materials, or a variety of modes of transportation.

3. The personality of the firm - the likelihood of the firm in question to act in a given way. For example, the likelihood that the firm will reject a site because the labor force is tightly unionized, because community acceptance is low, or because the community's infrastructure is unable to absorb an increase in population. The totality of the firm's characteristics, traits, preferences, and experiences.

The siting process. Briefly, the siting process can be described as follows: the factors rank the criteria and all potential sites are compared to the rankings. This is repeated until a site is chosen (see Figure 3).

Figure 3 shows that all potential sites are measured against the criteria. The relevant criteria and the ranking of them cannot be determined unless the factors (administrative jurisdiction, activity, and personality of the firm) are known. For example, if Firm X is considering the construction of a petrochemical plant in California, the relevant criteria and their importance would be far different that they would be if Firm X was considering a steel mill in California. Petrochemical plants are clearly very different from steel mills in terms of fresh water usage, demand for pipeline transportation, air emissions, and many other characteristics.

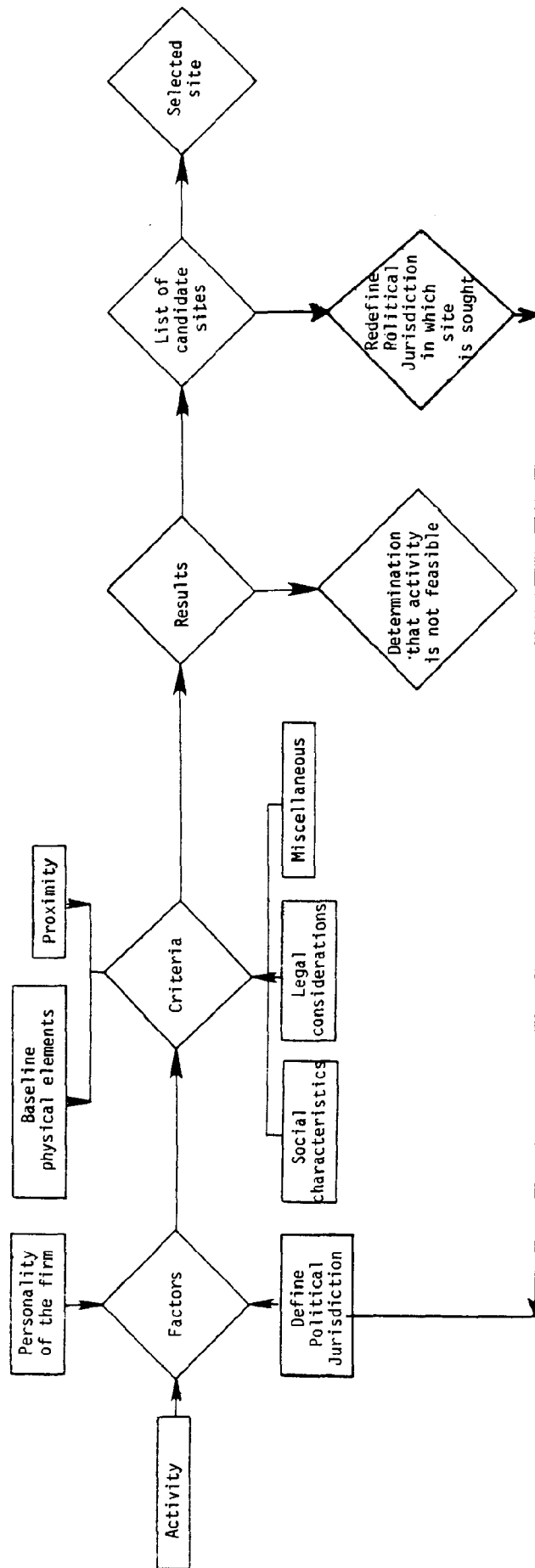
Similarly, if Firm Y is considering a petrochemical plant in California, the criteria would again be ranked differently than in the example above. Firms vary greatly in their concern about different criteria.

After the factors are known and described, the criteria can be arranged in order of their importance to site selection. The most critical can be called "knock-out" criteria. That is, a site which does not satisfy such a criterion is knocked out of contention, regardless of how favorable it may appear on the basis of other, less critical criteria. The number of knock-out criteria (and which they are) depends on the factors.

It is possible that knock-out criteria can eliminate all potential sites. Figure 3, for example, notes that a possible result of the first repetition of the siting process is a determination that the activity is not feasible anywhere in the administrative jurisdiction in question. If such is the case, that activity will not be undertaken by the firm in that particular jurisdiction; a different location or a different activity may then be considered by that firm.

If, on the other hand, some candidate sites remain after all knock-out criteria are considered, the siting process (Figure 3) will be repeated until a site is selected. The extent to which all criteria (including knock-out criteria) can be satisfied and the cost of satisfying them allows differentiation between candidate sites. It is still possible that no candidate site can meet the firm's objectives (see discussion of private goals and objectives above). In that case, the firm will invest in a different activity, at a different time, and/or in a different jurisdiction.

Figure 3
FACTORS AND CRITERIA AFFECTING THE SITING DECISION



Usually each repetition will narrow the jurisdictions under consideration. Each time the jurisdiction is redefined, the ranking of the criteria may change.

The siting process can result in one of the following situations:

1. The facility is sited in a way which accomplishes the firm's objectives;
2. Investment is made in a different activity or at a different time; or
3. No action is taken.

The siting process can be explained further through the use of example. The following example, like the discussion above, is based on numerous interviews. While it is not a history of an actual siting decision, it is realistic in terms of the procedures and concepts which it illustrates.

Example

1. Factors

- A. Administrative jurisdiction: the United States.
- B. Activity: a 200,000 barrel/day oil refinery.
- C. Personality of the firm: the firm is not a "major" oil company. Compared to other firms of its type and size, it cares a great deal about community acceptance and absorptive capacity of the community. The firm definitely wants to avoid union labor. While the base of its operations has traditionally been the Texas Gulf coast, it wants to market the facility's refined products on the east coast of the United States.

2. Criteria

Given the nature of the activity, the jurisdiction under consideration, and the firm, the site selection criteria would be ranked approximately as follows (an asterisk indicates knock-out criteria):

- *A. Proximity to raw materials (by location or through transportation)
- *B. Proximity to product markets (by location or through transportation)
- *C. Air quality permissibility
- *D. Water quality permissibility

- *E. Regulations concerning dredging and filling
- *F. Other environmental regulations
- *G. Zoning ordinances
- H. Pipeline transportation
- I. Water, air, and land transportation
- J. Land availability/price
- K. Utilities
- L. Fresh water supply
- M. Rail transportation
- N. Labor availability
- O. Level of unionization
- P. Acceptance by community
- Q. Absorptive capacity
- R. Proximity to ancillary/support facilities
- S. Tax structure
- T. Seismic conditions, soil characteristics, flooding hazards, miscellaneous safety factors, climate, and others.

The knock-out criteria show that any site that cannot offer commercially feasible proximity to raw materials or markets (either by location or through transportation); or which cannot offer realistic chances of obtaining air, water, dredging, or other permits; or which cannot be considered because of zoning ordinances which are unlikely to be changed; will no longer be considered, i.e., those sites will be knocked out.

3. Evaluation of Sites

It is possible that the activity in this example cannot be conducted anywhere in the United States because one or more of the knock-out criteria eliminates every site. If such is the case, the firm will:

- A. Conduct the activity in a different jurisdiction (e.g., a foreign refinery);
- B. Invest in a different activity;
- C. Wait for a future time, hoping for relaxation of constraints; or
- D. Do nothing.

Knock-out criteria A, proximity to raw materials, would be easily fulfilled by almost any site in Texas. Knock-out criteria B, proximity to product markets, would be satisfied by locating the new refinery on the east coast.

In order to differentiate between the two sites, the other knock-out criteria must be examined by the firm. Although both locations seemed equally attractive on the basis of the first two criteria, consideration of air and water quality permissibility, dredging, filling, and other environmental regulations, and zoning ordinances reveals that a site in Texas would be better for the company. The firm believes a location on Texas' coast is easier and less costly to permit than one on the east coast. As one industry official said, "Federal regulations are the same in every state, but the people who administer them aren't." In addition, state statutes and regulations relevant to industrial facility siting vary widely from state to state, as do zoning ordinances.

Texas is often the site chosen for facilities because of the state's methods of administering regulations. Three reasons for this are consistently cited:

1. Texas' permitting agencies are often staffed by engineers (not economists or attorneys) who base their decisions on "technical considerations," not on "emotional philosophical leanings. "
2. The presence of numerous industrial facilities on the Texas coast causes permitting agencies in Texas to treat applications for new industrial facilities routinely.
3. There is a general pro-development attitude in Texas which is reflected by the boards of permitting agencies.

In short, the manner in which Texas' permitting agencies interpret and apply statutes and regulations and their methods of reviewing applications have great impact on the siting process. These agencies are discussed further in Chapter 4 of this report.

The possibility of satisfying virtually all of criteria H-T in Texas is also extremely good. The following are particularly easy to fulfill:

1. Pipeline transportation - the availability of pipeline rights-of-way and common carrier pipelines in Texas is well-documented.
2. Water transportation - numerous major port areas and barge canals characterize the Texas coast.
3. Land availability has not yet become a critical problem along the Texas coast, with the exception of some long-standing, industrialized areas.
4. Labor is readily available.
5. The level of unionization in Texas is relatively low when compared to other states and is generally attractive to industry.
6. Community acceptance has traditionally been high in Texas coastal communities. Not only has experience with industrial facilities conditioned Texas residents' acceptance of expanding industrialization, but there is also a pro-development philosophy toward construction of industrial facilities. Finally, the prospect of expanding job opportunities influences coastal residents' opinions of industrial growth.
7. Proximity to ancillary/support facilities, as evidenced by the inventories presented in Appendix A of this study, is exceptionally good along the Texas coast.
8. Tax rates, ratios of assessment and the number of taxing jurisdictions are all generally favorable along the Texas coast.

Now that the firm has chosen the coast of Texas for its new facility, a specific site along this coast must be selected. It is at this point that the personality of the firm becomes most important. The firm weighs the criteria again, in order to narrow the choice of sites, and finally decides on an optimum location. This decision is hard to predict, because the personality of the firm is not easily quantified. The final site selection may be based on relatively subjective considerations.

Conclusion

The information obtained from industry spokesmen and the analysis of that information leads to several conclusions:

1. The permissibility of a site has, in recent years, become a dominant consideration in site selection. Some industry spokesmen go so far as to say that the physical characteristics of a candidate site--soil characteristics, drainage, geologic features, and so on--have become engineering problems; permissibility is the key issue.

Government regulations which constrain siting have become knock-out criteria in the site selection process. These are constraints which, unlike those of the natural

environment, cannot be easily "engineered around." For the same reasons, industry is rapidly finding new technologies which enable siting in areas which, while not as physically ideal as some, are easier to permit.

2. Industry has not, in all cases, responded fully to considerations of immediate concern to coastal residents. Some public issues (statutes and regulations which constrain siting) have become critical to industry in the site selection process. This has had the effect of de-emphasizing other important issues (community acceptance/involvement and local impacts), which are equally worthy of attention.

- A. Community acceptance: the two case studies of siting decisions (summaries of which are presented in Chapter 5 and which are presented in full in TCMP technical papers #18 and 19), and discussions with industry spokesmen, indicate that public officials in the area of the selected site are not notified of the impending developments until relatively late in the siting process. That fact raises the question of whether such public officials have adequate time to understand the type and size of the impending construction project, and the kinds of impacts it would have on their jurisdictions.

Among other things, a local official would find it beneficial to know, as soon as possible, (1) the number of construction workers involved; (2) how many workers will be local-hire and how many will be new residents; (3) the projected increase in total population and school-aged children; and (4) which public facilities such as roads, hospitals, and recreation areas are likely to be more heavily used due to the projects.

- B. Local impacts: industry's emphasis on finding a site which is permissible may diminish in importance any consideration of social, economic, or infrastructural impacts on communities in the site area. This, plus the fact that local officials may not be informed of the impending projects until late in the siting process, raises important questions concerning the need to project likely impacts, prepare for them, and ameliorate them. For example, will the tax revenues generated by the project cover the cost of providing additional public services? If not, who should make up the difference? If so, will there be a time lag between public expenditures and collection of tax revenues? Will there be a "boom-bust" cycle, and if so, who should help the community recover when the "bust" comes?

3. Virtually every characteristic which makes a site attractive to industry -- particularly industries engaged in large, energy-related activities--is found in Texas. Throughout the example above, note is made of those site selection criteria which are relatively easy to satisfy in Texas.

Among the characteristics of Texas which are conducive to industrial facility siting are the following:

- A. The favorable manner in which Texas permitting agencies interpret and apply federal and state statutes and regulations and their technical competency and experience in reviewing applications.

- B. Proximity to raw materials and product markets is favorable in Texas due to:
 - (1) A large number of existing industrial (particularly energy) facilities;
 - (2) Ample navigable water and port facilities;
 - (3) An abundance of raw materials and product markets;
 - (4) Extensive pipeline, rail, and highway systems; and
 - (5) Available land.
- C. Texas has an abundance of experienced labor and a relatively low level of unionization.
- D. Community acceptance of industrial activity has traditionally been favorable.
- E. The large number of ancillary or support facilities such as metal fabricating, machinery manufacturing, chemical supply, and equipment suppliers is attractive to industry.
- F. State and local tax structures are generally favorable.

4. Because of innumerable uncertainties which permeate the siting process, it is impossible to predict with any validity the precise locations in the Texas coastal area which are most likely to be chosen for industrial siting in the near future. It is possible, based on legal and administrative constraints and on maps of natural resource attributes in the study area, to nominate certain locations that are more likely than others to undergo industrial development given existing conditions (see Chapter 3 and TCMP technical paper #16). To be more specific than a general description of comparative advantages of sites is not possible.

There are many uncertainties in the siting process. Among them are:

- A. Differences among firms, industrial activities, and jurisdictions complicate any attempt to predict siting.
- B. Any changes in or additions to any statute or regulation which currently constrains siting would probably have the effect of altering the comparative advantage of one site or a set of sites over others.
- C. Since fresh water availability is a site selection criteria, the uncertainty surrounding the locations and sizes of future fresh water impoundments represents a missing piece of information without which projections would be precarious.
- D. There are frequent fluctuations in supplies of raw materials and demand for products.
- E. Technological advances may continue to result in the de-emphasis of some criteria; e.g., water use, soil characteristics, safety factors, and others,

altering the comparative advantages. This list is not meant to be inclusive. It is only an indication of the impracticality of attempting to predict the next area to be chosen for industrial development.

Summary

This chapter has discussed the decision-making process of industry. This process is heavily influenced by the natural and human environments, which are described in the following chapters.

3. The Role of the Natural Environment

Introduction

The natural environment of the Texas coast poses significant constraints and inducements for industry, government, and other affected interests in the siting process. This natural environment includes the resources, renewable and non-renewable, which attract industry. It also includes the renewable resources which must be protected from the potential impacts of industrial development. These natural attributes create construction, operation, and transportation conditions which determine, in part, the economic feasibility of any project.

The natural environment of the Texas coast has been described in great detail by many writers. An annotated bibliography of research activities concerning the Texas coast was prepared in 1974 (TCMP, 1974). Resources of the Texas Coastal Region (TCMP, 1975) summarized much of the critical policy data in text and map form. These reports are incorporated into this study by reference. This overview of the coastal natural resources is intended to highlight certain natural characteristics which are of concern in industrial facility siting both to industry and to those concerned with the impacts of industrial areas.

TCMP has prepared eight maps which provide a graphic overview of the attributes discussed. They may be found in technical paper #16, and a sample map is included as Figure 4. The first six maps show natural features of coastal counties. The

Figure 4

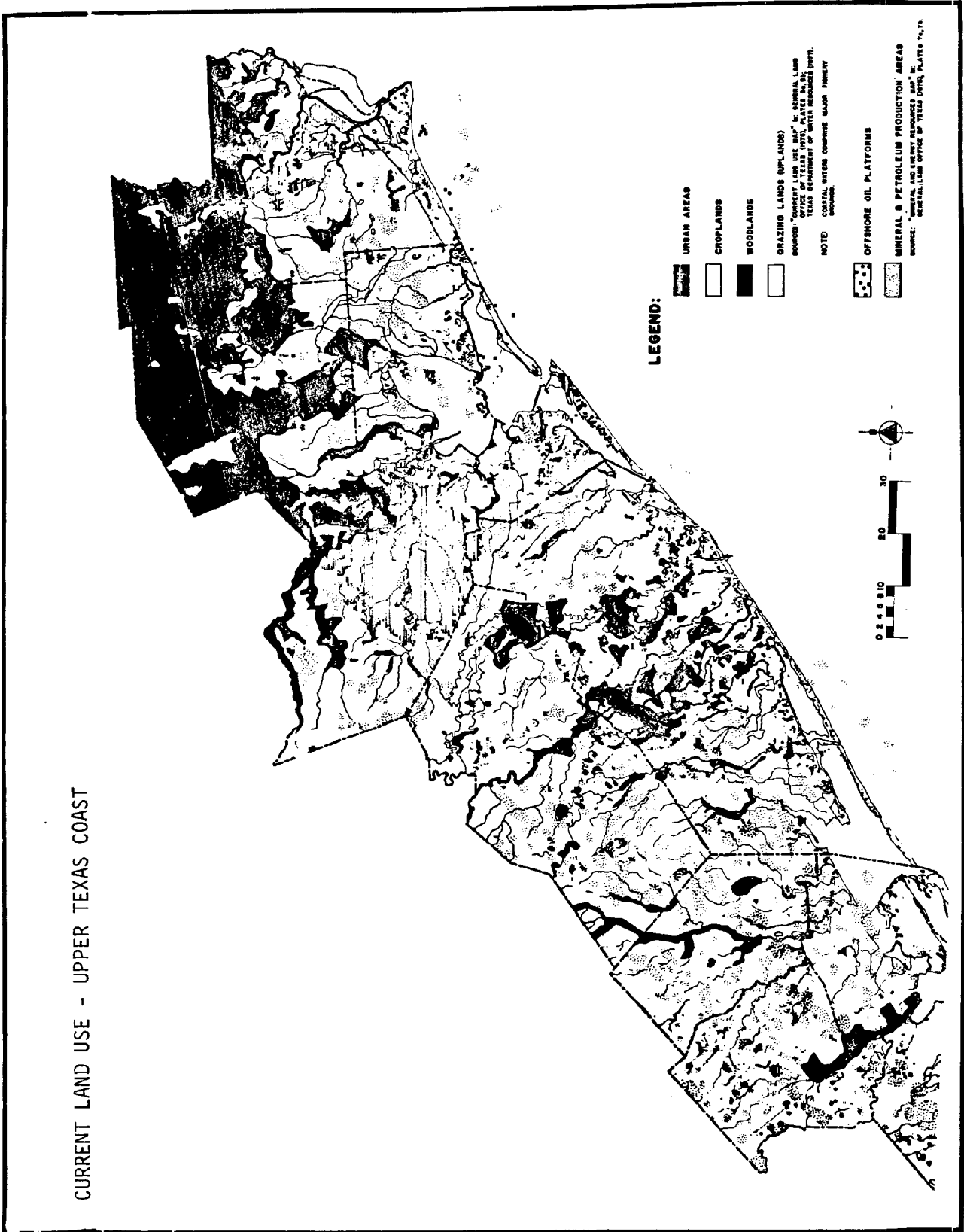
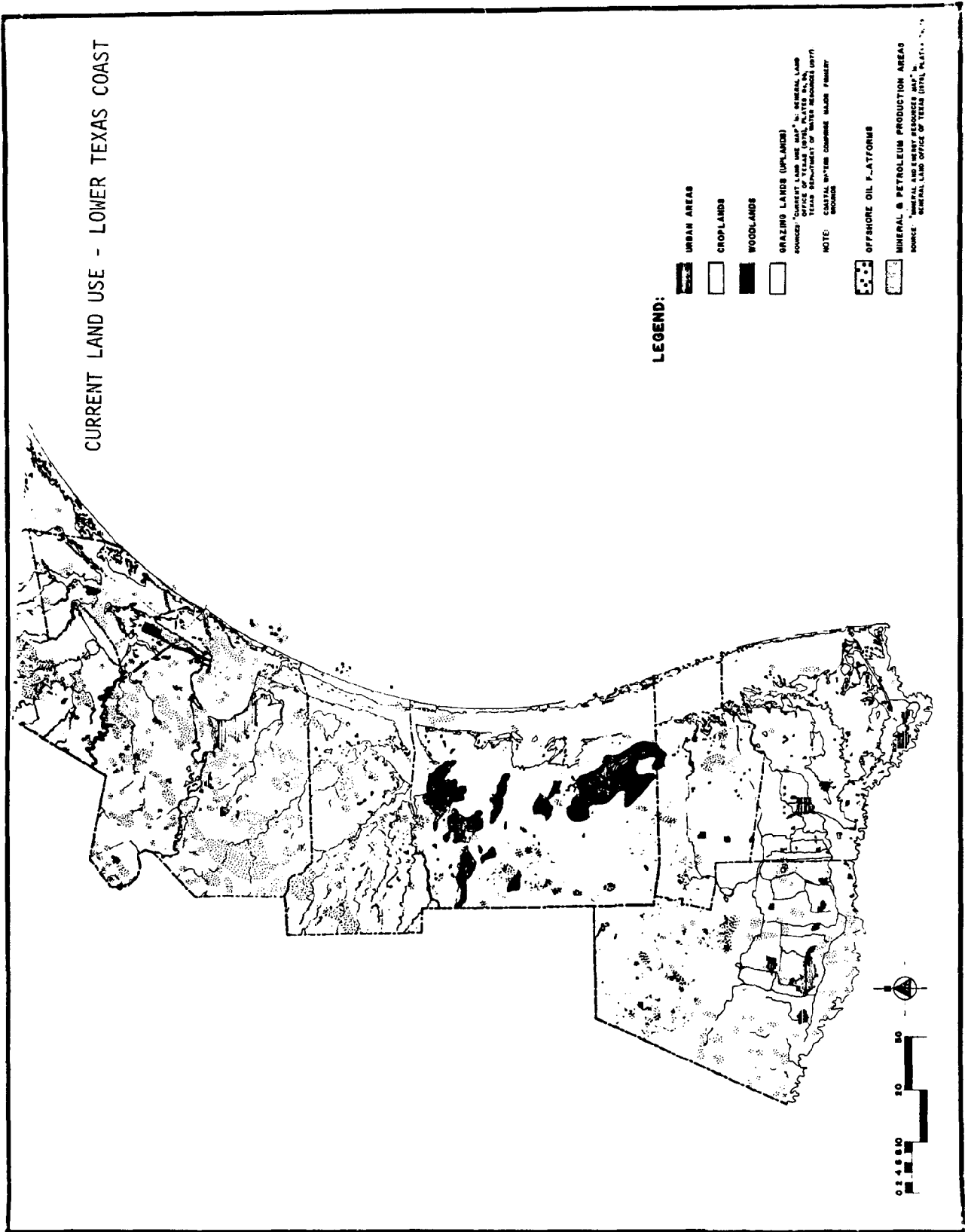


Figure 4 (cont.)



last two maps show present resource commitments in the form of current land use and areas of restricted use. These maps were derived from many recent works which are identified by an abbreviated citation on the map sheets and fully cited in Appendix B of this paper.

There are eight subjects covered by the maps, including climatology meteorology, substrate, active geologic processes, groundwater hydrology, surface water hydrology, biota, current land use, and restricted use areas. These subjects are discussed briefly below.

Climatology Meteorology (Map 1)

Potential hazards such as hurricanes, with accompanying flooding and turbulence, are a major consideration of facility siting on the Texas coast. Other aspects of the meteorology of the coast which are potential constraints to siting include air quality. The Texas Air Control Board has adopted standards pertaining to "non-attainment areas" and "offset" which must be considered by an industry trying to locate a site.

Substrate (Map 2)

Substrate characteristics of the coast -- landforms, slopes, water depths, and the extent of hurricane inundation and floodplains -- largely determine the design of facilities built in the area. Foundations, roadbeds, waste disposal and pipelines all must be constructed properly. Potential sites having substrate characteristics which cannot be "engineered around" are often dropped from consideration.

Active Geologic Processes (Map 3)

Faulting, subsidence, shoreline erosion and accretion and the upwardly mobile nature of salt domes hold the most profound consequences for industrial facility siting. Major limitations may be placed on industrial development by these geologic processes.

Groundwater Hydrology (Map 4)

Groundwater is an important resource in the Texas coastal region. Industries, agriculture and municipalities are heavily reliant on groundwater production as a cost-effective means of obtaining water for drinking, irrigation, and industrial use. However, excessive groundwater withdrawals from aquifers can cause sea water encroachment with resulting contamination of the fresh water supply.

Surface Water Hydrology (Map 5)

Municipal, agricultural, and industrial consumption; recreational uses; wildlife habitat protection and enhancement; navigation; contiguous development; and water quality protection are among the primary and often conflicting considerations in managing the state's surface waters. The water needs of an industry may be high priority among other considerations by focusing many of the environmental concerns with which the industrial planner must deal.

Biota (Map 6)

The coastal waters and shorelands of Texas sustain a diverse and richly productive natural biota. Competition for coastal resources, including rivers, bays, estuaries and lagoons will become more intense as development continues.

Current Land Use (Map 7)

The patterns of existing land use may impose several constraints on incoming industries. Land use controls limit the integration of industrial facilities among other land uses, particularly in metropolitan areas.

Restricted Use Areas (Map 8)

Large areas of the Texas coastal region are within the public domain outright or are subject to special regulation by various governmental jurisdictions. These factors combine to restrict resource development locally.

These themes represented on maps 1 through 8 depict environmental attributes rather than absolute environmental constraints. For example, potential hurricane inundation areas should be given special attention in industrial siting considerations and avoided when suitable alternatives exist. However, certain engineering design techniques may allow successful siting. The characteristics of hurricane landfalls become more important for management of impacts than for any exclusion of activities. The constraint in this case would simply require effective planning for the extreme but infrequent conditions of a hurricane.

Conclusion

Few natural attributes pose absolute constraints to the location of industrial facilities. Most characteristics of the natural environment pose engineering problems which have solutions at some price. However, some factors may be absolute constraints to siting - for instance, public ownership, regulatory policy, or prior commitment of resources. It is not the natural environment itself which is the constraint, but rather values and priorities placed on features of the environment by government and citizens. The next chapter describes the economic, political, and regulatory climates of Texas as they pertain to siting decisions.

4. The Role of the Human Environment

Introduction

While natural resources play a major role in the Texas siting process, the human environment also influences the siting of industry on the Texas coast. In this chapter, the various climates - economic, political and regulatory - of the human environment are discussed. These are interrelated in their effects on siting decisions. The political climate, both directly and by influencing the economic and regulatory climates, encourages or discourages facility siting by industry. The economic and environmental results of this influence modify the political climate. This cycle operates at both state and local levels. The variables in the human environment which affect siting decisions are not uniform throughout the coastal area. This chapter explores these concepts generally. The analysis of two case studies in the following chapter provides specific examples to test the concepts.

The Economic Climate

Introduction

The state of Texas enjoys a healthy economic climate. The variety and number of industrial facilities and the tax policies of the state are two of the major economic

factors shaping this climate. In this section, the existing and potential facilities located in the coastal area and the taxing policies of the state are discussed. The taxing policies of local governments are discussed in a later section which deals specifically with the local role in the siting process.

State Taxing Policies

An important part of the business climate is the tax structure. When all forms of taxation are taken together, excluding severance taxes, Texas has the second lowest per capita tax burden among the fifty states (Figure 5). Among southern tier states, industrial states, and states without an income tax, Texas' per capita tax burden is the lowest (Figure 6). Texas has neither corporate income taxes nor personal income taxes of any kind. The absence of income taxes actually provides two positive incentives for business. The first is the obvious result of lower tax costs to industry. Second, the absence of a personal income tax seems to serve as an incentive to draw business executives to Texas. Another major source of revenue in most states, property taxes, are also lower in Texas. The Texas state and local property tax burden is \$50 below the national average. Still another tax of concern to businessmen is the unemployment insurance tax rate. Texas has the lowest in the country. The sales and use tax for the state has a 4% rate, which is average among states. This tax is the prime revenue generator in the Texas tax structure. In 1977, it accounted for 38% of all tax revenue, or \$1.7 billion.

Existing and Potential Facilities

The 23-county study area currently contains a large number and wide variety of large energy and industrial facilities. These include:

- 23 petroleum refineries,
- 81 gas processing plants,
- 58 petrochemical plants,
- 7 mobile drilling rigs and platform construction yards, and
- 21 conventional electrical generating plants.

In addition, the study area contains 350 petroleum bulk stations and terminals, nine major ship building/repairing facilities, 31 major primary metal processing facilities, 141 major metal fabricating facilities, and 99 major machinery manufacturing facilities. In the case of ship building/repairing, primary metal processing, metal fabricating, and machinery manufacturing, a major facility is one that employs 50 or more persons.

Surveys of facilities under construction, facilities for which applications are pending, and proposed or planned facilities indicate that the kinds of industrial facilities which now exist in the study area are the same as new facilities being drawn to it. These include:

- petroleum refineries,
- petrochemical plants,

Figure 5

PER CAPITA TAX BURDEN BY STATE, 1976

All State Taxes Excluding Severance Tax

	<u>Amount</u>		<u>Amount</u>
Alaska	\$ 1,494	Wyoming	\$ 390
Hawaii	721	Kentucky	383
Delaware	616	Utah	377
Minnesota	545	North Carolina	377
New York	541	Colorado	372
Wisconsin	525	Kansas	369
Washington	501	South Carolina	366
California	500	Virginia	362
Maine	496	Indiana	361
Nevada	482	Mississippi	361
Maryland	473	Oregon	353
Massachusetts	470	Florida	343
West Virginia	455	Arkansas	340
Arizona	448	Georgia	338
Pennsylvania	432	Alabama	336
Vermont	431	Montana	327
North Dakota	427	Nebraska	314
Illinois	426	New Jersey	312
Rhode Island	419	Ohio	309
Iowa	418	Oklahoma	307
New Mexico	417	Missouri	302
Michigan	413	Tennessee	301
U.S. AVERAGE	408	Louisiana	286
Connecticut	405	South Dakota	280
Idaho	395	TEXAS	273
		New Hampshire	223

SOURCE: U.S. Bureau of the Census, State Tax Collections in 1976, January, 1977, pp. 7 and 11.

Figure 6
 PER CAPITA STATE TAX BURDEN, 1976
 Excluding Severance Tax

TEXAS	\$273
National Average	\$408

Sunbelt States

TEXAS	\$273
Alabama	446
Arizona	448
Arkansas	340
Florida	343
Georgia	338
Louisiana	286
Mississippi	361
New Mexico	417
North Carolina	377
Oklahoma	307
South Carolina	366
Virginia	362
Sunbelt Average, excluding TEXAS	\$357

Industrial States

TEXAS	\$273
California	500
Illinois	426
Massachusetts	470
Michigan	413
New Jersey	312
New York	541
Ohio	309
Pennsylvania	432
Industrial States Average, excluding TEXAS	\$425

SOURCE: Bullock, 1977, pg. 21.

primary metal processing facilities,
metal fabricating facilities,
conventional electric generating plants,
pipelines,
gas plants, and
machinery manufacturing facilities.

In addition to these, several nuclear generating plants, nuclear enrichment or fuel processing facilities and LNG terminals and facilities -- facilities which have not existed in Texas before -- were either planned or under construction in the area. (See Appendix A.)

No attempt was made in the appendix to catalogue each individual facility projected for the Texas coastal region; that is, being constructed, planned or applied for. Emphasis was placed instead on determining the types and general size ranges of industrial facilities.

The Texas coastal area historically has attracted large energy-related industrial facilities. Surveys of facilities under construction, permit applications, and proposed or planned facilities indicate that this trend is likely to continue. The analysis in this chapter and in Appendix A produces the following list of industrial facilities which are likely to affect significantly the Texas coastal zone in the future, and which the state's facility planning process should be equipped to assess.

1. Petrochemical plants
2. Gas processing plants
3. Nuclear-powered electrical generating plants
4. Petroleum refineries
5. Mobile drilling rig-platform construction yards
6. LNG plants and associated terminals
7. Conventional electrical generating plants
8. Bulk terminals
9. Salt dome storage facilities
10. Primary metal processing facilities
11. Metal fabrication plants
12. Machinery manufacturing plants
13. Offshore platforms
14. Onshore drilling rigs
15. Oilfield equipment storage depots (for both onshore and offshore drilling)
16. Crew and supply bases (for both onshore and offshore)
17. Deep draft ports
18. Expansion of facilities of existing ports
19. Pipelines (both onshore and offshore)
20. Geothermal energy extraction

This list emphasizes energy facilities because the area now has and is expected to continue to have a relatively high concentration of energy facilities. The list represents a best estimate based on past experience, current trends, and future expectations.

Analysis of existing and projected facilities indicates that the economic climate will remain strong based on the additional economic supply and demand created by new facilities. At present, state taxing policy serves to reinforce the attractiveness of the economic climate. Future tax policy cannot be projected from consideration of economic variables, but depends, in large part, on the future political climate in Texas.

Conclusion - The Economic Climate

This section has analyzed two major factors determining the economic climate for further siting of industrial facilities on the Texas coast. The presence of other facilities in similar industrial sectors strengthens the climate by providing proximity to both raw materials and markets. The siting of each new plant encourages the siting of additional plants. Present state tax policy serves to reinforce the attractiveness of the economic climate. To an extent, economic growth, through industrial development, helps maintain taxes at a low rate by causing government property and transactions to be taxed. However, the level of taxation and the portion of the burden borne by industrial facilities is not determined by economic forces alone, but also through the political process. The next section will discuss the political climate which will determine future tax and regulatory policy.

The Political Climate

Introduction

On both the state and local levels, Texas has a favorable political climate for industry. A majority of Texans living along the coast favors expanding the economy through industrial development. Evidence supporting this fact comes from opinions expressed at the two public meetings held during this study and from other hearings and meetings held by the coastal management program. Participants in these meetings agreed that the natural environment needed to be reasonably protected as this industrial development increased.

State Government

On the state level, at least four major factors influence the favorable political climate. The first of these is the state's formal policy of encouraging various types of industry to site in Texas. The legislated purpose of the Texas Industrial Commission (TIC) is to "plan, organize and operate a program for attracting and locating industry in the state" (V.T.C.S., Chap. 10, Art. 5183-5190.2). The TIC attracts new industry to Texas through national media advertising and the use of industrial start-up training.

The TIC assists communities in diversifying their economic bases and serves as the central information source for the whole state. It maintains automated files on economic characteristics of all Texas counties and on over 500 local communities.

The second policy which contributes to a favorable political climate is the state's labor law. Texas law prohibits any contract which requires employees to be

members of a union when hired or to become union members within a certain period of time in order to continue to hold a job. Such contracts are a violation of state anti-trust laws. The state can intervene to invalidate such contracts.

Third, the administration of permitting statutes and regulations in Texas is an incentive for industry to site within the state. In order to build and operate an industrial facility, a company's plant must meet certain permitting requirements. The exact number of required permits varies depending on the facility and the industrial activity, and there are a number of different agencies which administer the permitting regulations. As the number and scope of the required permits has grown, industry has been increasingly concerned with state-level interpretation and administration of these regulations. Since this is a complex process, it will be discussed in detail later in this chapter and in technical paper #17.

Although in other geographical areas of the United States, various interest groups have been concerned with restricting certain industrial or developmental activities, the impact of such groups has been less in Texas than in other states. While the influence of these groups appears to be growing, until recently, these groups have not, in most cases, possessed the organization, funding or base of popular support to participate effectively in administrative, judicial or legislative forums. However, pressures may increase against siting industrial facilities in areas adjacent to existing residential developments. Sufficient pressure may exist to deter development in certain critical natural areas. In other geographic areas, interest groups currently appear more concerned with managing impacts than with the restriction of certain activities.

Local Government

Introduction. Local governments and organizations may play important roles in the process of siting facilities by enacting policies which influence an industry's choice of sites. This local level experiences the major impacts, positive or negative, of industrial development. From the point when industry begins considering a specific site, the local community becomes intimately involved with the development of the new facility.

Governments at the local level include those of the county and city, as well as navigation districts and ports. There are other local groups which also may be involved in the location of industrial facilities, including Chambers of Commerce and utility companies. These specific governments and organizations are discussed in the following section. Their combined policies are a major factor in industry's decision on where to site a new facility. The local groups' environmental and economic policies influence not only the siting process itself and the impact of industry on the local area, but also the future of neighboring areas.

County Government. The powers and duties of counties are limited to those specifically provided for by the constitution and laws of the state. Initially, the major responsibilities of counties were road construction and maintenance, law enforcement, and tax collection. With growing urbanization and population, counties

have assumed additional responsibilities in areas such as health and social welfare, solid waste management, housing, and community development. Many have adopted various environmental protection and floodplain development controls. However, county powers over industrial facility siting are still quite narrow in scope.

Texas Revised Civil Statutes Annotated state that commissioners' courts in counties of over 190,000 population (Article 2372k) and under 190,000 population (Article 8280-13) have the power to adopt requirements pertaining to streets and drainage in subdivisions located in unincorporated areas. Article 8280 states that a commissioners court may adopt building and development standards for floodplains. Both give counties some control over industrial facility siting and construction.

Bills pertaining to county ordinance-making power have been introduced periodically in both the state senate and the house of representatives, but none have passed. Many of these have specified county ordinance-making power on a local option basis. The prospects for passage of such legislation is improving as more counties encounter developments which cannot be resolved using their traditional powers. If passed, county ordinance-making power could give counties substantial influence on the siting of industrial facilities. Until then, counties will have little ability to either restrict or encourage the location of industry.

City Government. One of the principal local jurisdictions involved with the siting of industrial facilities is city government. Industry is vital for the economic survival of cities, and the general trend along the Texas coast seems to be to encourage industry to site. Texas cities are of three general classes: (1) cities incorporated by special law, (2) cities incorporated under the general laws of the state, and (3) cities incorporated under home rule charter. The class of charter determines the extent of municipal authority.

Of the powers vested in city governments, zoning is one which is most closely tied to the regulation of industrial siting. Many cities have specific areas which are zoned for industry. These zones may be further designated by type of industry, e.g., "light" or "heavy."

General law cities are granted zoning power in Article 1011a:

For the purpose of promoting health, safety, morals, and for the protection and preservation of places and areas of historical and cultural importance and significance, or the general welfare of the community, the legislative body of cities and incorporated villages is hereby empowered to regulate and restrict height, number of stories and size of buildings, and other structures, the percentage of lot that may be occupied, the size of the yards, courts and other open spaces, the density of population, and the location and use of buildings, structures, and land for trade, industry, residence, or other purpose; and, in the case of designated places and areas of historic and cultural importance, to regulate and restrict the construction, alteration, reconstruction, or razing of buildings and other structures.

Home rule cities are granted the authority to zone in Article 1175 (26):

To divide the city in zones or districts and to regulate the location, size, height, bulk and use of buildings within such zones or districts, and to establish building lines within such zones or districts or otherwise, and make different regulations for different districts and thereafter alter the same.

Another means by which industrial facilities are regulated is through building codes. General language in the statutes authorizes cities to have building codes. General law cities are given this power in Article 1015:

(8) Unclean establishment -- To compel the owner or occupant of any grocery . . . or other unwholesome or nauseous house or place, to cleanse, remove or abate the same, as may be necessary for the health, comfort and convenience of the inhabitants. (9) Location of establishment -- To direct the location of business tanneries, . . . and regulate the management and construction of, restrain, abate and prohibit within the city limits, slaughtering establishments and hide houses or establishments for making soap, . . . and all other establishments or places where any nauseous, offensive or unwholesome business may be carried on.

General language in Article 1175 authorizes home rule cities to have building codes:

(25) To provide for the establishment and designation of fire limits and to prescribe the kind and character of buildings or structures or improvements to be erected therein, and to provide for the condemnation of dangerous structures or buildings or dilapidated buildings or buildings calculated to increase the fire hazard, and the manner of their removal or destruction.

Almost all coastal cities use the Southern Standard Building Code. The code details performance standards for the construction, alteration, repair, equipment use, occupancy, maintenance, location, demolition and removal of every building or structure or any appurtenances. The purpose of these standards is to secure public safety, health, and general welfare through structural strength, stability, adequate light and ventilation, sanitation, and safety to life and property from fire and other hazards. Regulations are included for such elements as heating equipment, minimum design loads, foundations, plastering, elevators, steel construction, plastics, glass, signs and outdoor displays, light, ventilation, sanitation, sprinklers and standpipes.

Additional powers given cities which may affect industries are those to levy and collect taxes. For general law cities, these powers are mainly found in Articles 1026 and 1028 of Vernon's Texas Civil Statutes. For home rule cities the powers are defined in Article 1175.

Another mechanism by which a city may have some control over industrial siting is through its extraterritorial jurisdiction. Using their powers of extraterritorial jurisdiction (ETJ) (Article 970a, Section 3 of Vernon's Civil Statutes), cities can maintain control of certain areas outside their city limits, depending on their population. Section 4 authorizes a city to extend to its ETJ all rules and regulations governing plats and the subdivision of land. Thus, if any area within the ETJ is, for instance, part of an industrial park which is subdivided, the city's ordinances concerning subdivisions and standards for streets, drainage, etc. may apply.

A city has the authority to annex territory within the confines of its extraterritorial jurisdiction and thus may affect the siting of industrial facilities. For example, a number of cities have annexed state submerged land in the Gulf of Mexico. Originally, this was done to protect the beaches for tourism, but some cities are now placing substantial restrictions on drilling operations. Currently, some coastal cities do not permit drilling within a certain distance of the shore, and many have other impedances on drilling. There is presently a question as to whether the regulation and taxation of offshore drilling are exclusive to the School Land Board and the Railroad Commission.

A city may choose not to annex the land but to create an industrial district within its ETJ (Vernon's Ann. Civ. St. art. 970a). A city has the power to enter into contracts or agreements with the owner or owners of land within the industrial district "to guarantee the continuation of extraterritorial jurisdiction status of such district, and its immunity from annexation by the city for a period of time not to exceed seven (7) years, and upon such other terms and considerations as the parties might deem appropriate. Such contracts and agreements . . . may be renewed or extended for successive periods not to exceed seven (7) years . . ."

Industrial districts, which are essentially tradeoffs between the city and industry, are common along the Texas coast. A contract is made between a city and an industry within the ETJ for a period of no longer than seven years. The city agrees not to annex the property where the industry is located. In return, industry makes payments to the city at a percentage rate less than what the city taxes would be if it were within the city limits. The percentage paid to the city by industry varies considerably. For example, payments by an industry in one city may be 22½% lower than normal taxes. In another city, the payments may be 75% less.

Other policies of cities on the Texas coast may also pertain to industrial facility siting. For instance, in the case of at least one city, oil refineries and petrochemical plants are exempt from the building codes. Also, cities may have specific performance standards. At least one coastal city has performance standards for new industries, including standards for air, noise, odorous matter, toxic and noxious materials, glare, smoke, fire, and explosive vibration, and open storage.

County and City Governments -- Conclusions. Although counties have fewer powers to regulate industrial facility siting than cities do, counties can significantly affect the process through their control over the maintenance of roads and drainage. The exceptions are a small number of counties which have been granted additional powers by specific legislation. Cities' powers related to the siting of industrial facilities include taxing, building codes, zoning, and extraterritorial jurisdictions.

The fact that counties have fewer methods for regulating the siting of industrial facilities may be an influential factor in an industry's siting decision. Within a county, outside the corporate limits of a city, there may be fewer restrictions placed on an industry, which could act as an incentive for a company to site within the county, but not within a city.

Cities have ample powers to either encourage or discourage industries wishing to site. To date, the general trend along the Texas Gulf coast seems to be the former. However, because political sentiment changes over time, there is no reason to assume this trend will continue.

The question of when city and county governments are notified of an industry's intentions to site in an area is important. The earlier that local governments learn of an upcoming project, the better they can prepare for the project's impacts. However, there are no requirements that industries notify local governments until the beginning of the permitting process. The personality of the firm plays a large part in notification, and some industries do keep local governments informed of siting plans. Other firms may delay any kind of notification in order to prevent competitors from learning of new facilities.

Once the local government has been notified of an industry's intention to site, it is up to the government to secure its own information on possible economic impacts, population projections, transportation needs, etc., which will occur because of the new industry. With few exceptions, the state and federal governments do not provide such information. The Coastal Energy Impact Program's (CEIP) intrastate plan and allotments are awaiting review by the Office of Coastal Zone Management in the Department of Commerce. CEIP will provide federal funds to communities impacted by energy development. The state offers no systematic means, other than the normal formula allocation process, to aid communities in the amelioration of impacts associated with industrial development.

There is another point meriting discussion: citizens living outside a city's incorporated area have no way to voice opinions on an industry's plans to locate within the city limits, although these people may be intimately affected. They cannot participate in the city's political process, having no vote in city elections. Environmental and economic concerns not only overlap but may go beyond these jurisdictions. Industries located in one area may have far-reaching effects on other areas.

Navigation Districts. There are ten major ports in Texas. They have two primary functions: (1) they are exchange points between water and land transportation modes; and (2) they are promoters of industrial and general economic development. Eight are navigation districts created by the state legislature. These are:

- (1) Beaumont
- (2) Brownsville
- (3) Corpus Christi

- (4) Freeport
- (5) Houston
- (6) Orange
- (7) Port Arthur
- (8) Port Lavaca

One, Texas City, is privately-owned and maintained. Galveston Wharves is owned by the City of Galveston. Galveston differs from the majority of ports in that its primary function involves shipping material rather than leasing or selling dock space. Ninety percent of all port facilities involves the provision of private docking facilities; that is, promoting industrial development. The constitutional authority for navigation districts is found in two articles of the Texas Constitution. A 1904 amendment to Article III, Section 59 authorized the formation of districts for public improvements, including navigation. In 1916, an amendment to Article XVI, Section 59, declared the conservation and development of the state's natural resources to be public rights and duties. The amendment includes navigation development and authorizes the establishment of special districts for that purpose. General statutes relating to navigation districts enacted pursuant to this constitutional authority have been codified in Chapters 60-63 of the Texas Water Code (Figure 7).

Ports play two major roles -- the traditional one of transportation and the newer one of industrial development. Ports in highly developed areas generally assume the more traditional role. Galveston is a good example of this. On the other hand, ports such as Brownsville or Corpus Christi are located in less highly developed areas and are surrounded by available land. These ports play the newer role of encouraging industrial development. Most Texas ports are interested in development and maintenance of channels, new industries, and private marine terminals. Revenues are derived primarily from leases on both land and/or special facilities rather than through traditional services such as stevedoring, haulage, and other associated activities. These are generally provided by private companies on a contract basis. While most landlord ports include some public facilities, these will normally comprise only a very small portion of the total port facilities. Galveston, which is the only municipal port in Texas, is also the only port in the state which owns virtually all its port facilities and provides all port services.

The ports are fiercely competitive. Each spends from \$30,000 to \$100,000 per year on promotion and development (about five percent of gross non-tax revenues).

In the past, there were two primary means by which land for ports was acquired:

1. The state sold submerged lands to districts for \$1.00 per acre under Article 8225 until 1969, when a moratorium was placed on such sales. In 1973, Texas enacted a law which put a permanent stop to all sales. The replacement was a procedure whereby the ports could lease submerged land from the state which they needed for maritime development; and

2. Some ports requested that state legislature grant fee simple title gratis.

Figure 7

TEXAS WATER CODE CHAPTERS AFFECTING NAVIGATION DISTRICTS

	Chapter 60	Chapter 61	Chapter 62	Chapter 63
Applicability	Catchall chapter, applicable to all navigation districts regardless of constitutional origin. Establishes promotional and development fund for district with city over 100,000	Applies to districts created under Article III, § 52.	Applies to districts organized under Article XVI, § 59 - Conservation and Development Dist.	Self liquidating districts. Applies to all Navigation Districts organized under Article XVI, § 59 and Chapter 62, T.W.C. which have voted bonds, but not issued or disposed of them.

Origins

Codifies 1909 and 1921 general enabling acts.

Codification of 1925 general enabling act.

Voter Limitations

Requires a 2/3 vote for issuance of bonds to be supported by real or personal property taxes.

Simple majority of qualified voters required to authorize district's creation and approve tax bond issuance.

Bonded Indebtedness

Total bonded indebtedness not to exceed 1/4 assessed valuation of district's real property.

No restriction on navigation district indebtedness.

General Comments

SOURCE: Texas Port Facts Book by Center for Marine Resources, Texas A & M University, p. 75

Spoil disposal was not a problem in the past; however, this has changed. Recent environmental legislation and government policies protecting the environment have made it difficult to handle the spoil disposal problem. In fact, spoil disposal is now the single most serious problem faced by ports (Espey, Huston and Associates, December, 1976).

Increasingly strict environmental regulations have forced many ports to make modifications and additions at considerable cost. To date, more than \$100 million worth of industrial air and water pollution facilities have been financed (Texas Coastal and Marine Council, 1977). This does not include the more than \$305 million spent for waste treatment facilities in the Houston-Galveston area by the Gulf Coast Waste Disposal Authority.

Ports, as well as other affected bodies, have taken issue with spoil disposal policies and those maintaining air and water quality. This requirement has significantly increased the costs of the local sponsor, who is responsible for supplying acceptable disposal areas. In fact, acceptable areas may not exist at any price in some instances.

One recent study of Texas ports concluded that:

Because Texas ports also have a role in attracting industrial development, air and water quality regulations affecting industry impact port development programs. New approaches to environmental management, such as EPA's trade-off (offset) policy for controlling air pollution, are likely to ultimately have a major impact on growth within the various port areas. (Texas Coastal and Marine Council, January, 1977)

Most of the large ports (Corpus Christi, in particular) work closely with the Chamber of Commerce, the electric utility (Central Power & Light, in the case of Corpus Christi) and the city, the county (particularly if the city boundary and the county boundary are coterminous), and the council of governments. The ports act as "honest brokers," or middlemen, and often promise to get the necessary permits and commitments from utility companies to provide the requisite inputs at a reasonable cost. A water-dependent industry seeking a port site may first make contact with port officials rather than with Chamber of Commerce officials, and thus, the port officials act much like a chamber.

Relations between state government and Texas ports have frequently been strained. Some of the conditions that have contributed to the tension between ports and state agencies are:

- (1) Ports have historically dealt principally with the federal government and have had minimal dealings with the state.

- (2) Some state agencies apparently don't appreciate the broad, general purpose of ports to promote economic and industrial development, as well as to serve as an intermodal interface between land and water carriers.

(3) Some state agencies whose main concern is environmental protection frequently hold ports responsible for environmental degradation, even though ports usually have no control over the entity that may be causing the problems.

(4) Ports perceive themselves to be entirely autonomous bodies and independent of state agencies.

(5) Some state agencies may believe ports have greatly abused their privilege of acquiring the use of state lands, which in the past could be acquired for \$1.00 an acre. (Marine Commerce, January, 1977, Texas Coastal and Marine Council.)

The impact of ports on the Texas economy has been substantial. Figure 8 shows their impact in 1974.

The availability of low-cost water transportation clearly has been of vital significance to the economic success of Texas. It has stimulated economic growth and development in many diverse industries and geographic regions in Texas. The fact that most goods produced in the state are marketed elsewhere, and that Texas' heavy industry is becoming increasingly dependent on imported raw materials will insure that the ports of Texas will continue to play a vital role in the economic health of the state.

Chambers of Commerce and Other Local Organizations. The role of the Chambers of Commerce is to promote the growth of business and industry. They frequently work with other local organizations - such as utilities and major banks - to promote industrial development. These relationships are usually informal; however, in at least one city, Corpus Christi, the relationship between four important jurisdictions, the city, the county, the port authority, and the Chamber of Commerce, has been formalized into the Corpus Christi Industrial Commission.

There are several ways in which local organizations promote industrial development. Typically, these local organizations advertise in business publications like Business Week, the Wall Street Journal, Fortune, and trade journals. Economic development missions are frequently undertaken to major cities both in the United States and abroad. Sometimes several neighboring cities, or cities throughout the state (coordinated through the Texas Industrial Commission), jointly undertake an economic development mission.

Not only Chamber of Commerce officials participate. Other prominent local citizens, such as bankers, railroad executives, power company executives, industrialists and city officials, will often take part in these missions.

The third means by which industrial development is promoted is through contacts. When local officials learn that a particular firm is looking for a suitable site, they will contact that firm and make a presentation on the benefits of siting in their city or region.

Figure 8

TOTAL PORT AREA ECONOMIC IMPACT

	Thousands of Tons			Thousands of Dollars				TOTAL ECONOMIC IMPACT (2.96)x
	TONNAGE			DIRECT ECONOMIC IMPACT				
	Dry Bulk	Liquid Bulk	General Cargo	Dry Bulk (\$8)	Liquid Bulk (\$7)	General Cargo (\$30)	Total	
Beaumont	4,530	23,369	299	\$ 36,240	\$ 198,583	\$ 8,970	\$ 243,793	\$ 721,627
Port Arthur	1,358	22,668	3,770	10,864	158,676	113,100	282,640	836,615
Orange	693	409	228	5,544	2,863	6,840	15,247	45,131
Houston	21,493	54,443	13,172	171,944	381,101	395,160	948,205	2,806,687
Galveston	3,666	1,615	1,891	29,328	11,305	56,730	97,363	288,195
Texas City	68	20,052	17	544	140,364	510	141,418	418,597
Freeport	216	8,513	105	1,728	59,591	3,150	64,469	190,828
Port Lavaca	4,128	796	12	33,024	5,572	360	38,956	115,310
Corpus Christi	10,159	30,781	87	81,272	215,467	2,610	299,349	886,073
Brownsville	1,251	1,282	259	10,008	8,974	7,770	26,752	79,186
Grand Totals	47,562	168,928	19,840	\$380,496	\$1,182,496	\$595,200	\$2,158,192	\$6,388,249

Source: 1976 Questionnaire Survey, Texas Coastal and Marine Council
 Secondary Source: Economic Impacts of Texas Ports and Waterways by Robert R. Richards, p. 23

In summary, many local organizations can, and frequently do, promote the economic growth of their city or area by a variety of means, including advertisements in business and trade journals, economic missions, and personal visits with prospective industries. The Chamber of Commerce often acts as a coordinator of these activities and brings together those groups - like bankers, industrialists and city officials - interested in local economic development.

Summary - Local Governments and Organizations. The preceding sections have described the primary local groups which are influential in the siting of industrial facilities. Of these groups, cities and counties have been given explicit authority by their citizens and by the state to regulate development within their boundaries. Mechanisms available to them vary.

Ports (navigation districts) are also governmental jurisdictions which have been delegated specific powers by the Texas Constitution. One of their main functions is to promote industrial and general economic development.

Chambers of Commerce have not been given powers by law but are, nevertheless, quite powerful. Chambers of Commerce, by their very nature, encourage industries to site within their towns. Their major role is to promote the growth of business and industry.

Utilities represent still a different type of interest. They have only to gain from an industry's siting within the area and using their facilities. However, it is the choice of the company whether or not to get involved in the industrial siting process. Some utilities, e.g., Central Power and Light, even have special divisions which help industry to locate.

Relationships between these entities are usually informal. However, in at least one city, Corpus Christi, the relationship between the city, the county, the port authority, and the Chamber of Commerce has been formalized in the Corpus Christi Industrial Commission.

These various groups may, within the same geographic area, work either toward the same end or toward opposite ends, depending on what they regard as being in their best interest. Industry would tend to locate in an area where all of these entities favored its situating there.

This discussion has treated county and city governments, ports, Chambers of Commerce, and utility companies as separate entities, which they are. It is the combination of the policies of these entities which is influential in where an industry chooses to locate. However, the environmental and economic concerns of these specific entities influence each other and the surrounding region: an adjacent or neighboring city or county, the state, and sometimes even the nation. Environmental and economic concerns cannot easily be divided into distinct parcels.

Conclusion

This description indicates that the political climate in Texas is generally favorable to the siting of industrial facilities on the coast. State policies on taxation and labor law help create this favorable climate. The power of counties to restrict siting has remained limited. Cities, while having the power to restrict siting, also have the authority to waive taxes and exempt industrial facilities from building codes.

Organizations favoring additional industrial siting are much more prominent than those expressing objections. The Texas Industrial Commission, Chambers of Commerce, the port authorities and the public utilities all tend to promote industrial growth. Organizations opposed to facility siting have generally lacked the organization, funding and base of popular support necessary to counterbalance pro-development pressures in the political system.

The political climate may also be gauged by examining the regulatory climate. State regulatory agencies must be sensitive to the general political climate. They are headed by elected officials or appointees of elected officials. The scale and scope of their operation is determined by the legislature. The regulatory climate is also influenced by who appears before the board or hearing examiner. As in any adjudication proceeding, certain questions will only be examined if raised by a contesting party. There has been little effective opposition in state proceedings. This indicates a lack of substantial objection, to the siting of new facilities, in most cases, by local officials or interest groups. However, various private interests have been effective in their opposition.

The Regulatory Climate

Introduction

Once an industry has actually chosen a particular site on which to locate a specific facility, laws demand that a number of functional requirements be met. Not until these requirements have been met and the necessary permits obtained may a firm begin construction and operation of a facility. Thus, a third part of the human environment is the regulatory climate. The character of the regulatory climate, especially at the state and federal levels, has become increasingly important in the industrial siting process. This chapter describes the regulatory climate and the permitting process of the state.

Various agencies issue permits controlling resources and promulgate rules and regulations setting out the standards projects are required to meet. The standards may be restrictive, but are generally realistic. The maximum standard is usually defined by whatever is technologically feasible at the time, regardless of cost, and the minimum standard is generally defined by public health or statutory requirements.

Water resources are controlled by the Texas Department of Water Resources (TDWR) and the Environmental Protection Agency (EPA). The Texas Department of Water Resources must issue a permit before anyone can appropriate state water, discharge pollutants into state waters, or purchase water from reservoirs. The Texas Water Commission must approve plans for levees or other improvements that will regulate or change the flood waters of any stream. EPA must also issue a permit before pollutants can be discharged into navigable waters.

The discharge of air pollutants is controlled by the Texas Air Control Board (TACB). Before a facility is constructed, TACB must issue a construction permit. Once a facility begins operations, the operator has 60 days to apply for a TACB operating permit. In areas attaining the ambient air standards, a prevention of significant deterioration on permit is required from EPA for certain categories and sizes of sources.

The disposal of solid waste is controlled both by the Texas Department of Health (TDH) and the Texas Department of Water Resources. TDWR regulates solid waste generated by industry. TDH regulates municipal solid waste.

Several agencies are responsible for the management of public lands. Before operations may cross these lands, the General Land Office must grant a right-of-way easement. This includes pipelines which will cross coastal public lands. Before the construction, reconstruction, or major renovation of a structure in, on, or under navigable water (which is defined to include almost every type of water), the U.S. Army Corps of Engineers must issue a permit. The Corps must also issue a permit before the discharge of dredged or fill material into navigable waters (a 404 permit). The Corps circulates the 404 permit applications to all interested parties, including the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Texas Parks and Wildlife Department, and the Texas Antiquities Committee. All of the agencies comment on the effect of the project on the resources controlled by the Corps. Although these agencies are not given veto power by the law, the Corps has not in practice issued a 404 permit over the objection of the U.S. Fish and Wildlife Service. State archaeological landmarks, like shipwrecks or old buildings, cannot be removed or disturbed without a permit from the Texas Antiquities Committee.

The Texas Parks and Wildlife Department (TPWD) must issue a permit for the disturbance or dredging of sand, shell, or marl in publicly owned waters. Publicly owned waters are defined as: waters within the state's tidewater limits, islands within the tidewater limits, and certain fresh water areas of the state. TPWD is also responsible for the management of the state's fish and wildlife resources.

Before a nuclear reactor can be built, the Nuclear Regulatory Commission must issue a construction permit. The reactor will also require an operation permit from NRC. These are additional permits which are not in lieu of the normal state agency permits.

The Federal Energy Regulatory Commission (FERC) must issue a certificate of public convenience and necessity before the construction of any facilities for the sale or transportation of natural gas in interstate commerce. FERC has established guidelines for siting of natural gas facilities within its jurisdiction. These guidelines are based upon the National Environmental Policy Act and require the preparation of an environmental impact statement.

Retail public utilities must secure a certificate of convenience and necessity from the Public Utility Commission of Texas (PUC) before rendering any services. PUC must consider "the adequacy of existing service, the need for additional service, the effect of the granting of a certificate on the recipient of the certificate and on any public utility of the same kind already serving the proximate area, and on such factors as community values, recreational and park areas, historical and aesthetic values, environmental integrity, and the probable improvement of service or lowering of cost to consumers in such areas resulting from the granting of such certificate." TEX. REV. CIV. STAT. ANN. art. 1446c, sec. 54 (Supp. 1977). A public utility that sells or acquires a facility costing more than \$100,000 must report that transaction to PUC or the Railroad Commission of Texas (RRC). If PUC or RRC determines that the transaction is not in the public interest they may disallow the inclusion of the cost in the rate base of the utility. TEX. REV. CIV. STAT. ANN. art. 1446c, sec. 63 (Supp. 1977).

Figure 9
Government Permits and Requirements

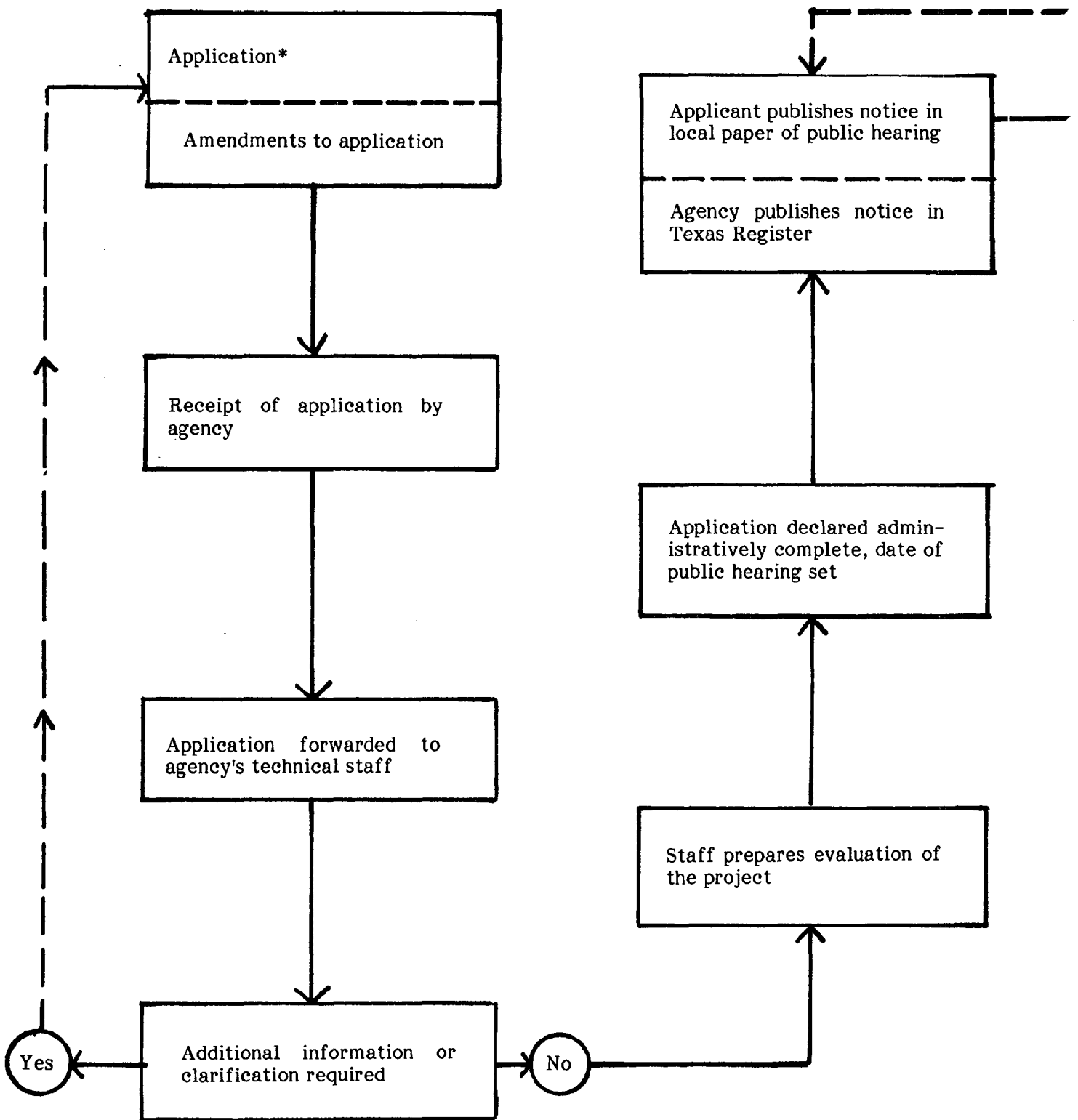
<u>Area of Control</u>	<u>Type of Permits and/or Requirements</u>	<u>Agency</u>	<u>Statute or Regulation</u>
<u>STATE:</u>			
Air Quality	Construction	Texas Air Control Board (TACB)	Texas Clean Air Act
	Operation Variance	TACB TACB	Federal Clean Air Act Federal Clean Air Act
	Purchase raw water	Texas Department of Water Resources (TDWR)	Texas Water Code (TWC), ch. 11, sec. 11.036
Water Use	Appropriation and diversion of water from rivers and streams	TDWR	TWC, ch. 11, sec. 11.121
	Approve construction of intake and discharge structures	TDWR	TWC, ch. 26
Solid Waste Disposal	Industrial solid waste	TDWR	Solid Waste Disposal Act
Salt Domes	State approval of dikes or levees	TDWR	TWC, ch. 16
	Site-injection well permit	TDWR	TWC, ch. 26
	State permit to operate surface brine pits	Railroad Commission of Texas (RRC)	TWC, ch. 29
Water Quality	Waste discharge	TDWR	TWC, ch. 26
	Deep-well waste injection	TDWR	TWC, ch. 27
	Protect aquatic life and wildlife	Texas Parks and Wildlife Dept. (TPWD)	TWC, ch. 26
	State dredging of state-owned submerged land	TPWD	Parks and Wildlife Code
Health	Municipal solid waste	Texas Department of Health (TDH)	Solid Waste Disposal Act
	License use of nuclear material for calibration of nuclear equipment	TDH	Art. 4590f, sec. 6, V.T.C.S.
Power Generation	Certification of all power generation facilities (including nuclear)	Texas Public Utility Commission	Texas Public Utility Act

Figure 9 (continued)

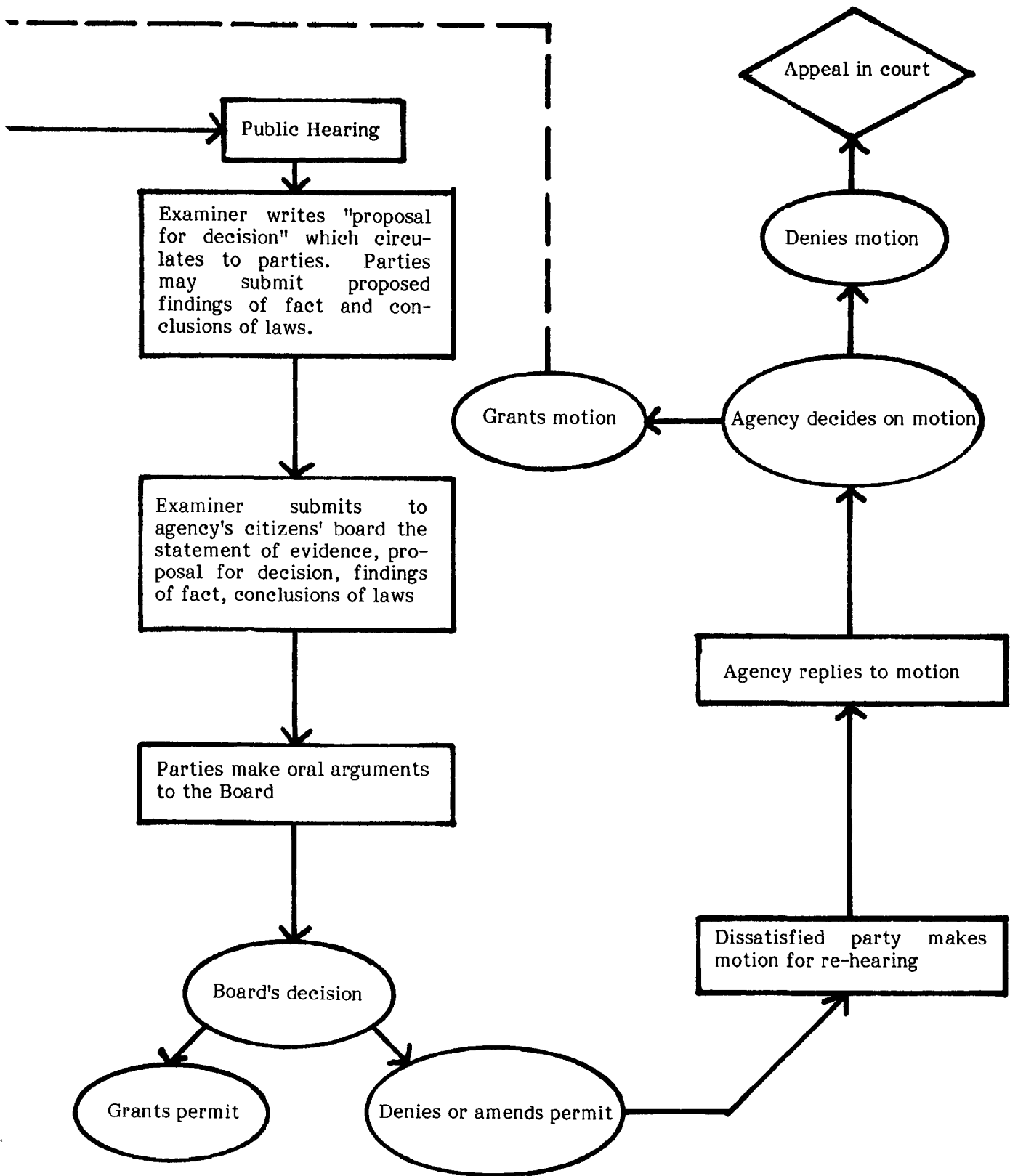
<u>Area of Control</u>	<u>Type of Permits and/or Requirements</u>	<u>Agency</u>	<u>Statute or Regulation</u>
Acquisition of Public Lands	State archaeological landmarks Dredging permits Rights of way over public lands	Texas Antiquities Committee TPWD General Land Office	Antiquities Code Parks and Wildlife Code Art. 6020a, V.T.C.S.
FEDERAL:			
Air Quality	Prevention of significant deterioration	Environmental Protection Agency	Federal Clean Air Act
Water Quality	National Pollutant Discharge Elimination System	Environmental Protection Agency	Federal Water Pollution Control Act
Aviation Safety	Notification of construction of nuclear reactor containment building	Federal Aviation Administration	Art. 77B, Federal Aviation Regulations
Floodplain	Floodplain insurance	National Flood Insurance Program	National Flood Insurance Act, Title 42 U.S.C., sec. 4001-4127
Dredging	Modification (intake and/or discharge) to navigable waterways	U.S. Corps of Engineers (COE)	Rivers and Harbors Act of 1899, sec. 10 (33 U.S.C. 403)
Discharge of Dredged Materials	Discharge of dredged and fill materials	COE	Sec. 404, Federal Water Pollution Control Act
Nuclear Generating Facilities	Construction permits 1) Geotechnic factors 2) Demographic factors 3) Meteorological factors 4) Land-use factors 5) Ecological factors 6) Local impacts	Nuclear Regulatory Commission (NRC)	10 Code of Federal Regulations (CFR) 100, Amendment A
	Licensing of production and utilization facilities	NRC	10 CFR 50
	Licensing and regulating policy and procedures for environmental protection	NRC	10 CFR 51
Liquified Natural Gas Facilities	Certificates for construction and operation of natural gas pipeline facilities	Federal Energy Regulatory Commission	Natural Gas Act (15 U.S.C. 717 f (c))

TIMING OF THE PERMITTING PROCESS

Figure 10



*Applicant may withdraw or amend application at any time.



In the first section below, the state's formal permitting process is reviewed briefly. The relationship of the state and federal permitting agencies is discussed in the final section. With a few notable exceptions, federal agencies have little direct permitting authority over most industrial facilities. However, their power, particularly that of the EPA, lies in their ability to enforce federal standards by imposing those standards on state agencies and through litigation. Should a facility not meet the required federal standards, it may be held in violation of the act and ordered to halt construction or operation.

The Formal Permitting Process

There are a number of different kinds of permits and a corresponding number of administering agencies. Although certain unusual cases require different procedures, the actual permitting process varies little from agency to agency.

The major types of permits and the agencies which administer them can be found in Figure 9. TCMP technical paper #17 describes the various permits and the laws which mandate them. In addition, the two volumes produced by the Texas Coastal Management Program in June of 1976 titled "Current Permitting Processes in State and Federal Natural Resource Agencies" are recommended to those who wish to review the process in greater detail. The information in this study was collected in interviews with agency personnel, from permit applications and form opinions expressed in public meetings. Although some of the material is now slightly out-of-date, the study still represents a very comprehensive report on the permitting process.

The Texas Administrative Procedure and Texas Register Act (APTRA) establishes minimum standards of practice and procedure before a state agency. TEX. REV. CIV. STAT. ANN. art. 6252-13a (1978). Before APTRA, each state agency set its own time limits, provisions for notice, and standards for a public hearing. APTRA imposes a time frame on state agencies after a public hearing is set.

Notice of the hearing must be given at least ten days before it occurs. After the hearing is closed, an agency has 60 days to issue a final decision. These 60 days may be extended if the case is heard by other than a majority of the officials of an agency and if the time extension is announced at the end of the hearing. State agencies can circumvent this provision by closing the record, so that no more evidence or testimony can be presented, but not closing the hearing. After a final decision is made, a dissatisfied party must file a motion for rehearing within 15 days of the final decision (Figure 10).

Under APTRA, an agency decision cannot be appealed to the courts unless a timely motion for rehearing is made. Replies to a motion for rehearing must be filed within 25 days of the final decision. The agency has 45 days from the date of the final decision to grant or deny the motion for rehearing. If the agency takes no action within the 45 days, the motion for rehearing is overruled by operation of law and the dissatisfied party may appeal to the district court. The agency may extend the time for filing motions for rehearing and replies up to 90 days, but an agency must take action within the 90 days.

Some state agencies operate under specific laws that establish time limits, notice provisions for public hearings, or standards for public hearings. If the requirements of the specific laws are more stringent than APTRA, they take precedence over APTRA. If more lenient, they do not.

Regulatory agencies are given authority by statute to enact rules to administer their permitting authority. APTRA requires these rules to be on file and open to the public. The rules set out the basis for granting or denying a permit as well as the procedure necessary to obtain a permit. Generally, an applicant for a permit writes the agency and requests the proper form of a particular permit. The application requires identification of the applicant and project, location of the project, and detailed plans and specifications of the project. The plans and specifications are required to cover only that part of the project relevant to the agency's jurisdiction. For example, an applicant to the Texas Department of Water Resources for a waste discharge permit need not submit plans and specifications to TDWR for its air pollution equipment. State agencies do not generally examine the total and cumulative effects of a facility on the surrounding area.

The application is submitted to the agency and forwarded for evaluation to the technical staff, who may visit the site and circulate the application for comment to other regulatory agencies. The technical staff may also request additional information or clarification from the applicant and advise the applicant of any designs or procedures that the agency does not accept. The staff then prepares an evaluation of the project. The applicant may withdraw or amend the application at any time.

After the application is declared administratively complete the matter is set for public hearing. The applicant must publish notice of the hearing in a local newspaper before the hearing. The agencies also publish notice of the hearing in the Texas Register and maintain mailing lists of people who may be interested. These lists usually include local governments. The hearing is open to the public and everyone who attends must register. Although there are no requirements for the specific location of the hearing, most agencies either hold the hearing in the community where the project will be located or at the agency's main office.

The hearing is conducted by an attorney called a hearing examiner, who is an employee of the agency. The examiner is to be impartial and not represent the viewpoints of the agency. The hearing examiner conducts the hearing, designates parties (either "applicant" or "opposition"), rules on evidence, opens and closes the record, and continues the hearing from time to time and place to place. According to agency policy, almost anyone can be designated as a party. Parties are usually the applicant, the agency staff, and the opponents. Anyone can testify, but parties on either side may call witnesses, cross-examine witnesses, and submit evidence. Strict rules of evidence are not followed, but the examiner may disallow evidence. All testimony and evidence becomes a part of the record.

After the hearing and records are closed the examiner writes a "proposal for decision," which is circulated to the parties who may file exceptions or replies. Parties may also submit proposed findings of facts and conclusions of laws. The examiner submits a statement of the evidence to the agency's citizens' board, along with a proposal for decision, findings of facts, conclusions of laws, and a proposed permit.

The record (the transcription of testimony and evidence presented at the hearing) is usually voluminous and members of the agency board rarely read it in its entirety. Parties may present oral arguments to the board. The board may then grant, deny, or amend the proposed permit by motion and vote. As specified in APTRA, a dissatisfied party may make a motion for rehearing which the agency board can either

grant or deny. If the motion for rehearing is denied, the decision can be appealed to the courts. If a permit is issued, the completed application is incorporated for reference.

The only time limits imposed upon permitting agencies are those specifying the amount of time allowed from the hearing date to the issuance or denial of the permit. In other words, the amount of time an agency may take to process an application up until the hearing date is not mandated by APTRA.

The Relationship of State and Federal Agencies. The major federal agencies which play a role in the permitting process are: the Environmental Protection Agency (EPA), the Army Corps of Engineers (COE), and Nuclear Regulatory Commission (NRC). As shown in Figure 9, the EPA is responsible for National Pollution Discharge Elimination System (NPDES) Permits and the COE is responsible for 404 permits. (See TCMP technical paper #17 for a detailed discussion of these permits.) In addition, the EPA can enforce the federal Clean Air Act by issuing a violation order on a specific facility through federal court. The Department of Interior administers federal surface mining regulations. A facility which is held to be in violation of this federal act may be required to halt construction or cease operation.

NRC is the only agency directly involved in actual siting of the facility. NRC must approve the actual site of a nuclear facility as well as the detailed plans and specifications, although state agencies also have the normal permitting control. NRC's rather unique role in the siting process is primarily the result of the potential danger associated with the generation of electricity from nuclear energy. There is no other type of facility whose siting is so closely governed by a federal agency; however, a bill before the 95th Congress (Senate Bill 2273) proposes a similar type of control over liquefied natural gas plants by the Secretary of Energy.

Individual state agencies, by the very nature of their activities, maintain slightly different relationships with federal agencies. With the possible exception of the permitting of nuclear plants and NRC, the basic policy of state agencies has been to attempt to assume responsibility for administration of federal statutes. Two recent examples of this policy are presented below.

The Dredge Materials Act and 404 Permitting. In 1977, the 65th Texas Legislature passed the Dredge Materials Act. This act, which grew out of the state's coastal management program, declared the policy of the state to be:

to seek, to the fullest extent permissible under all applicable federal law or laws, the delegation to the state of the authority which the Corps of Engineers exercises under Section 404. . . , over the discharge of dredged or fill material in the navigable waters of the State of Texas.

This act did not call for a duplication of 404 permitting at the state level but rather for the state's seeking to have the Corps of Engineers delegate its authority to issue 404 permits to the Texas Water Quality Board (now in the Department of Water Resources).

The Texas Air Control Board and the Emissions Offset Policy. A strict interpretation of the Clean Air Act would have halted the construction of all new facilities in non-attainment areas if the deadlines for attaining the national air quality

standards had passed or were about to pass. Many charged that this strict interpretation by EPA would lead to a no-growth policy. EPA responded by adopting the offset ruling which stated that construction of new facilities could continue provided that:

1. Sources of new emissions demonstrated the "Lowest Achievable Emission Rate" (LAER);
2. The emissions of existing sources were reduced by a greater amount than the emissions from new facilities; and
3. Assurance was received that reasonable progress would be made toward achievement of national ambient air quality standards.

TACB favors a different approach to the air quality problem and seeks to have facilities utilize the best available controls possible. TACB chairman John Blair said that "the offset policy is untimely, may be inconsistent with the Federal Clean Air Act, encourages deceit, promotes waste and, worst of all, promises what it probably will not deliver—cleaner air." Blair went on to state:

"We believe that the offset policy will work heavily in favor of established industries as new industries will be able to obtain 'pollution rights' only through purchase, barter, or community assistance. This harsh deterrent to new competition in the private business sector is a serious failing of the offset policy. To me, the idea of an industry receiving compensation for and being able to transfer ownership of a right to pollute the environment is totally repugnant and unacceptable. I am more concerned about controlling and significantly reducing air pollutant emissions than I am about any complex and doubtfully effective bureaucratic, paper shuffling, numbers game scheme." (Texas Natural Resources Reporter, January, 1978, page 1 of Current Developments)

In August of 1977, the United States Congress amended the Clean Air Act, Section 129, to allow EPA to waive its offset policy in the case of any state. A state applying for a waiver was required to meet a number of requirements. In effect, these requirements demanded the applying state have a program similar in its intent and scope to the offset policy.

The Texas Air Control Board passed a resolution to request a waiver from EPA. Texas was the first and is the only state thus far to request such a waiver. However, in December of 1977, EPA denied TACB's request citing a number of deficiencies in the waiver application. In January, 1978, after holding several public hearings, TACB adopted changes to its permitting regulations to include offset provisions.

The recent examples show the position of state agencies in relation to permitting at the federal level. Certainly, this should not be taken to imply that there is not a generally cooperative relationship between state and federal agencies. However, the issue is not one of cooperation but rather one of control over the administration of federal laws.

The basic policy of state and federal agencies, with certain exceptions (for example, nuclear plants), is to allow an industry to choose a plant site. In essence, suitability of a site is only governmentally (on the state and federal level) restricted by the ability of the facility to meet permitting requirements.

Conclusion - The Regulatory Climate

Texas has developed a regulatory climate which includes agencies which together have a broad scope of review over siting decisions. With the passage of APTRA, the regulatory procedures of agencies were made open and accessible to all concerned parties. The agencies are generally manned by trained, experienced professionals in the major areas of concern. Although some agencies are just now building staffs, generally the scope of review, procedures and quality of agencies' staffs appear to be comparable or superior to those in other states.

In administering their authority, agencies' policies tend to require applicants to employ the best available technology to reduce environmental impacts. However, the agencies do not always regard public interest as exclusion of industries when present technology does not allow an overall standard to be met in a particular case. Certain issues are not raised, but this is not because the process or policies exclude them, but because no party raises them. Agencies are in the business of administering statutes and policies which require a balance to be struck between economic, technological and environmental impacts. Each agency must strive to strike this balance. In a democratic society, it is the political climate which will substantially influence this process.

This chapter began by suggesting that the economic, political and regulatory climates which comprise the human environment are related through influence and feedback loops. The political climate, both directly and by influencing the regulatory climate and parts of the economic climate, discourages or encourages the siting of facilities. The response of industry to these conditions has impacts on people which cause changes in the political climate. This cycle continues on state and local scales over time.

The material presented here suggests that the present political climate is shaping the economic and regulatory climate to provide favorable conditions for industrial facility siting on the Texas coast. The political climate favors reasonable protection of natural resources, but wishes to protect the resources without excluding industrial activities. This is accomplished through performance standards and resolutions on the use of certain critical areas. Some individuals disagree with the dominant political philosophy; also, the dominant philosophy may change over time. This report describes the current situation only - it does not attempt to predict the future.

Institutional mechanisms appear capable of transmitting any change in the political climate to regulatory and legislative bodies. The present balance of interests would not be greatly altered by new agency procedures excluding presentation of opposing viewpoints. Improvement in the current procedures may be possible. The following chapter tests these general observations by an analysis of two case studies of recent industrial siting decisions.

5. Analysis of the Case Studies

Introduction

As part of the industrial facility siting study, two case studies were conducted. They are published as TCMP technical papers #18 and 19. These case studies were performed for several reasons. First, they serve as specific examples to illustrate the siting process. Also, by observing the actual siting process it is possible to check hypotheses about the siting of industrial facilities. Further, important elements in the siting process which had not been noted or recognized previously were identified during these case studies. Finally, there are many groups involved in the siting process, ranging from the federal government, to local interest groups, to industry itself. The case studies allowed examination of the various viewpoints of all the parties involved and illustrated their inter-relatedness.

The case studies deal with the siting of the Corpus Christi Petrochemical Company (CCPC) facility and of the South Texas Project (STP). The Corpus Christi Petrochemical Company is a joint venture of Champlin Petroleum Company (37.5%), ICI United States (37.5%), and Soltex Polymer Company (25%). The plant is being constructed on a 1200-acre tract of land 4½ miles east of Robstown, outside the Corpus Christi city limits but within its extraterritorial jurisdiction (ETJ). In March, 1977, site preparation was begun for a plant designed to manufacture 1.2 billion pounds per year of ethylene, which will be its major product, as well as other ancillary chemicals. CCPC reflects three trends in the petrochemical industry today. First, it is a joint venture of oil and chemical companies. Second, the facility will be a large and significant capital investment. Third, liquid feedstock will be used in the production of ethylene, propylene, benzene, butadiene, and various butylenes.

The South Texas Project will be a major nuclear generating plant consisting of two 1250-megawatt nuclear powered electric generating units. To be built in

Matagorda County, it is intended to meet the growing demands for power in both the urban and rural areas of South Texas. It will cover 12,352 acres approximately 12 miles southwest of Bay City. The South Texas Project, expected to be completed in the early 1980's, is owned jointly by Houston Lighting and Power (30.8%), City Public Service of San Antonio (28%), Central Power and Light (25%) and the City of Austin (16%).

The Corpus Christi Petrochemical Company and the South Texas Project were chosen as case studies for several reasons. They were recent siting decisions in the coastal area. Both were presently involved in the permitting process. This was important because siting considerations appear to have changed drastically in recent years, with increased consideration of permissibility and of proximity to markets. They are major facilities of the type likely to continue to site in the study area. One is in an urban and one is in a rural location. CCPC was chosen because it represents the petrochemical industry; an industry which is likely to continue to expand in the coastal area. STP was chosen because it represents a new kind of siting decision for the coastal area, that of a nuclear facility.

The two case studies were conducted independently of each other over a three-month period. Although working separately, the researchers had an opportunity to discuss their findings with each other and to exchange ideas. They also spoke to individuals responsible for the analysis of general industrial siting theory in order to help relate the theoretical criteria to the actual studies. Drafts were reviewed by the relevant and interested industry and government officials.

The CCPC study is based largely on personal and telephone interviews with key spokesmen for industry and government. These interviews were supplemented by governmental permitting material including correspondence between governmental agencies and the company, documents, and transcripts of hearings.

The STP case study is based primarily on the volumes of published material which discuss in detail the numerous factors - environmental, economic, social, governmental and political - that play a role in the siting decision process. This material is supplemented by interviews conducted with key people involved in the siting decision.

Conclusion

The procedures used to site the facilities of the Corpus Christi Petrochemical Company and the South Texas Project proved to be quite different. STP relied from the beginning on Nuclear Regulatory Commission guidelines, while CCPC relied heavily on the internal goals and objectives of the firm, with government influence minimal until the permitting stage. The Corpus Christi Petrochemical Company was committed to the Texas Gulf coast from the outset. There were four major reasons for selection of the Corpus Christi area over others, including the ability to obtain necessary permits, the availability of land, port facilities and proximity to raw materials. The most important factor, though, in the siting of the facility in Corpus Christi, was Champlin's commitment to the area. In the specific site selection process, important factors included:

1. access to raw materials (feedstocks),
2. ability to obtain permits,

3. safety,
4. land availability and cost,
5. soil characteristics,
6. access to wastewater disposal streams or ditches,
7. subsidence and runoff patterns, and
8. character of surrounding area.

The siting of the South Texas Project, on the other hand, was based on the Nuclear Regulatory Commission requirements. The siting process proceeds from general areas to the selection of more specific sites in judging the suitability of regions and sites for both regulatory and operational requirements. The basic progression was: 1) preliminary selection of candidate regions, 2) final evaluation of candidate regions, 3) site selection, and 4) cost comparison of candidate sites. Five factors are mandated by Nuclear Regulatory Commission guidelines: geotechnic, demographic, land use, ecological, and meteorological. The sufficiency and availability of fresh surface water were also considered of prime importance.

After the sites were selected, applications for permits were submitted. The case studies pointed out agencies, mainly federal and state, involved in permitting for industrial facilities. These agencies include: the Corps of Engineers; the Environmental Protection Agency; the Federal Aviation Administration; the Texas Department of Water Resources, Water Rights Division; the Texas Department of Water Resources, Water Quality Division; the Texas Parks and Wildlife Department; the Texas Department of Health; and the Texas Air Control Board.

Notification procedures worked differently in each of the cases. CCPC worked closely with officials of the Corpus Christi Industrial Commission, who in turn discussed the planned facility with the city officials. On the other hand, the officials of Matagorda County were not officially notified until after the decision to site the South Texas Project had been made. This difference appears to reflect differences in the personalities of the firms involved.

The case studies also examined the extent of community opposition, which, in these two instances, was negligible. Opposition to CCPC came from adjacent land owners who feared a decrease in their property values due to odor and fumes. Rice farmers in Matagorda County objected to the site of STP because of the fact it would be on prime rice land. In both cases, opposition did not proceed past testimony at public hearings.

Although the studies did not focus on impact assessments, these were discussed briefly. Those considered were thought to be immediate, rather than those with any far-reaching consequences. Possible impacts of CCPC were seen to be changes in air and water quality, an increase in the direct and induced employment opportunities, and increased noise and traffic in the community. A socioeconomic impact assessment for STP was required by the Nuclear Regulatory Commission, but there was no requirement that the project remedy the impacts caused. The most noticeable impacts have been on the jail and on the highways, especially a nine and one-half mile stretch of U.S. Highway 71 in the northern part of Matagorda County which has been "wrecked."

The case studies tend to confirm the general description of the Texas siting process presented in Chapters 2, 3, and 4. The following points seem particularly important:

1. The initial determination on where to site a facility was left to industry. In both cases, the private decision-maker used a repetitive criteria ranking procedure to arrive at a preferred site. While true to a greater degree in the STP case, a large percentage of the criteria in both cases was dictated by regulatory considerations. Other physical criteria appeared subordinate to permissibility.
2. The natural environment did not appear to pose absolute constraints on either project. However, many regulations applicable to the projects were stated in reference to attributes of the natural environment and of existing land uses. The natural environment of the Texas coast evidently was attractive to both projects.
3. The economic climate of the Texas coast was important to both projects. In neither case was the primary attraction the availability of raw materials. Rather, the attraction is the existence of strong product markets. For CCPC, state tax policy appears to have prevented the consideration of an adjacent state as a serious alternative.
4. The case studies only partially demonstrate general elements in the political climate. The Texas Industrial Commission was probably not a significant factor in either process as both firms were already operating in Texas. The capital intensive nature of both industries limits the importance of state labor laws. On the other hand, neither project appeared to have undue difficulty or delay in the state regulatory process. Perhaps, most importantly, there was so little organized opposition to either the petrochemical plant or the nuclear power station that no environmental litigation resulted.
5. Local government participated as anticipated. STP located in an unincorporated area of Matagorda County and was subject to no significant local control. CCPC located near Corpus Christi's industrial zone with the city's blessing. The city allows CCPC the tax advantages of non-annexation. Local acceptance of both projects appears high.
6. The regulatory climate for the two projects differed greatly. CCPC seems to have been evaluated in regard to air and water emission standards, but not as to the overall impact of the facility. STP was evaluated both in terms of the need for the facility and the impact of the facility on the environment. Both broad evaluations were the result of federal requirements, and not those of the state. However, nuclear generating facilities are now required to obtain a certificate of need from the state Public Utilities Commission.

The case studies confirm the general description of the present siting process as discussed in preceding chapters. This general description and the more specific information obtained from the two case studies form the basis for discussion of the problems, issues, and needs for improved management in the present process which is found in the next chapter.

6. Problems and Issues: The Current Siting Process and Recommendations for an Improved Process

Requirements for Improvement in the Siting Process

The process for siting industrial facilities on the Texas coast cannot be defined exclusively as a governmental planning or regulatory process. To do so would ignore several essential factors in siting decisions — the natural environment, the human environment, and the internal decision-making process of industrial developers.

These factors are dynamic, and so is the role of state government in the siting process. Many of the current regulatory and planning mechanisms are responses to past changes in economic and political conditions. This pattern of reactive behavior in the siting process by state government is consistent with the state's general pattern of activities. A basic tenet of the Texas political culture is apparently that the growth of government should occur one step at a time, and that radical expansion or restructuring should not occur unless lesser changes cannot deal with a situation.

A major restructuring of the present siting process could involve adoption of one of several familiar concepts. Such concepts include siting permits such as those issued for nuclear power plants by the Nuclear Regulatory Commission. They also include "lead agency" and "superagency" patterns of permitting. However, these concepts seem to find little acceptance among any coastal interests. A concentration of state power over facility siting would certainly disrupt established working relationships between public and private sectors, but would in no way guarantee any interest group more influence over siting decisions.

A broad spectrum of interests appears willing to acknowledge that new concerns about the impact of industrial facilities have developed. There is also recognition that state government does have the power but does not, in all cases, have adequate mechanisms to deal with these concerns. However, it appears possible to develop necessary mechanisms within the framework of existing state agencies. Thus, needs and recommendations are discussed in this study under the assumption that incremental adjustments in the role of state government in the siting process are preferred

by the majority of concerned parties. There is presently a minority now favoring more substantial change, and there is no way to predict what the majority opinion will be in the future.

This chapter addresses two sets of issues. The Texas Coastal Management Program has previously studied requirements for improved coastal management (State of Texas, Preliminary Hearing Draft, April 10, 1978), several of which are relevant to the industrial facility siting process. These are discussed briefly. Recommendations are presented in this section for consideration by the Texas Coastal Management Program.

Industrial Facility Siting Aspects of Previous Requirements

The needs for improved management already determined by the Texas Coastal Management Program are:

- (1) Bay and estuarine management
 - (a) Freshwater inflows
 - (b) Dredged material placement
 - (c) Fishery management
- (2) Management of coastal public areas
 - (a) Access to beaches and recreational areas
 - (b) Dune protection
- (3) Management of coastal hazards
 - (a) Hurricanes and flooding
 - (b) Subsidence
 - (c) Erosion
- (4) Management of coastal development
 - (a) Development of the federal outer continental shelf
 - (b) Industrial facility siting
- (5) Management of state government
 - (a) State permitting process
 - (b) Budgetary policy and planning
 - (c) Information and research management

Several of these areas have implications for industrial facility siting and are discussed in this section. They are: freshwater inflows, wetlands preservation, hurricanes and flooding, subsidence, development of the federal outer continental shelf (OCS), and the state permitting process.

Freshwater Inflows

Many industries seeking to locate on the Texas coast are heavy users of fresh water. Industries seeking to appropriate state waters must obtain approval from the Texas Department of Water Resources. These appropriations may reduce inflows of fresh water reaching the bays and estuaries at critical times in the life cycles of important species. Inadequate management of river basins can result in appropriations which, individually or collectively, could damage the natural systems during periods of drought.

To protect these natural systems, the Texas Department of Water Resources is instructed to "assess the effects, if any, of the issuance of such permits upon the bays and estuaries of Texas." TEX. LAWS 1977, Chap. 870, sec. 11.147, sec. 16.051 instructs the Texas Department of Water Resources to similarly consider the effects of its upstream water developments. To this end, freshwater inflow standards are being developed.

Protection of bays and estuaries may, at some point, limit the siting of new industries in the drier sections of the coast. For existing industries, there is the possibility that enforcement of state policy might force reduction of the appropriation during drought periods. These considerations may have several effects on industrial facility siting. They may discourage water-intensive industries from locating in drier parts of the coast. They may encourage industries to select less water-intensive technologies, or to develop groundwater as a partial water supply. However, consideration of industrial siting does not appear to require any recommendations for further action beyond those stated in the previous report by the Texas Coastal Management Program.

Wetlands Preservation

A major priority of the Texas Coastal Management Program is the protection of the state's wetlands from unnecessary alteration. The TCMP has long recognized that the state's program to control non-point source pollution (Section 208) is critical to preservation of many wetlands. This study also recognizes the relationship between the 208 program, which has not been finalized at the state level, and industrial development. A recommendation by this study regarding this program may be found on page 76. Historically, one of the principal reasons for the filling of wetlands was the creation of industrial sites with access to navigation. The acceptability of this practice depends on the alternative sites which meet industrial needs. One alternative is to site industries inland of wetland areas and provide access to navigation via a man-made canal. Environmental damage from the canal is minimized by locating it away from natural drainage features.

This concept was investigated by Texas Coastal Management Program and the results published in Inland Canals: An Alternative for Industry (TCMP, 1977). The study demonstrated the concept to be economically feasible. It further demonstrated major advantages in providing suitable sites with very limited wetland alteration. This study specifically addressed barge navigation. No formal study was conducted relevant to deep draft navigation, but the Bayport Industrial Park seems to indicate the approach is feasible for this as well.

Further, the Corpus Christi Petrochemical Company, examined in the case study in TCMP technical paper #19, demonstrates an additional means of reducing the

wetlands alteration necessary for industrial facility siting. The plant itself is built in an upland area. The only portion of the operation to be located on the bay margin is the terminal for vessel loading and unloading.

The existence of these alternatives suggests that massive alteration of wetlands is not always necessary for industrial facility siting with access to navigation. Subsequently, it may be expected that state agencies charged with protection of the biological productivity of wetlands will oppose any proposals for siting industrial facilities on wetlands unless the industry can demonstrate that an uplands siting is impossible. This opposition may be expressed in denials of applications for permits and easements and in review of applications for federal permits. Industry appears to understand that there will be continuing enforcement of laws and policies restricting siting in wetlands.

Hurricanes and Flooding

The engineering studies required to design and obtain permits for most industrial facilities appear to limit any concern that the owner of a facility will be unaware of the risks involved in the siting decision. Industrial siting concerns with hurricanes and flooding must center on possible damage to the property and lives of others. There appear to be two issues. Certain types of industry produce toxic substances which could be released by hurricane floodwaters causing damage to natural systems and human health. The Texas Department of Water Resources has the authority to issue regulations for the prevention and clean-up of such releases. TEX. WATER CODE, sec. 26, Subchapter G. This regulation has usually resulted in the construction of dikes and diked moats around facilities which pose this hazard. Potential flooding and storm surge levels are considered in setting the specifications for these structures.

The requirement of dikes raises the second issue. There are many washover channels along the coast through which high-velocity currents flow during hurricanes. Few major facilities could be located in these channels without extensive diking. The dikes protect the facility and prevent the energy contained in the storm surge from being dissipated through the channel. This increases surge pressures in other areas and may cause a new washover channel to form in an area previously protected by dunes or other features.

The Flood Control and Insurance Act gives all political subdivisions of the state the authority to control any such development. TEX. WATER CODE, sec. 16.311. Further, to the extent the dikes and levees can be classified as reclamation projects, TDWR will also examine their impact on other property in the surrounding area. These measures appear adequate to avert any damage to other parties from industrial siting in floodplains and washover channel.

Subsidence

It is clear that the water-intensive industries have contributed to subsidence problems in the Houston area. However, this does not raise an industrial siting issue but a water supply issue. The drilling of new wells is regulated by the Harris-Galveston Coastal Subsidence District. TEX. GEN. LAW, Chap. 284, 1975. Present policy of the district is to reduce the number of groundwater users. Thus, new industries locating in the area will not expect and will not be allowed to make significant groundwater withdrawals. The Texas Coastal Management Program has already proposed that the Bureau of Economic Geology monitor other subsidence-

prone areas and report changes in elevation. The Harris-Galveston Coastal Subsidence District is responsible for evaluating these changes. These actions appear adequate to deal with the industrial facility siting impacts on the subsidence issue.

Development of Federal Outer Continental Shelf

The Texas Coastal Management Program has conducted an extensive study of the impact of OCS development on Texas communities. To compensate communities for adverse impacts, the federal government created the Coastal Energy Impact Program (Sec. 308) in the 1976 amendments to the Coastal Zone Management Act. This fund provides loans and grants to communities impacted by OCS and other coastal energy development. The Governor's Office is responsible for administration of the program in Texas. Regulations have recently been issued but have not been evaluated by this study on their adequacy. Because there is a strong need to examine the Texas CEIP after it becomes operational in order to make any necessary adjustments, this study recommends that the NRC evaluate this program (see page 77).

The most pronounced effect of OCS development on the state of Texas will be fiscal deficits for affected local governments (TCMP, 1977). OCS-generated fiscal effects are the result of a unique characteristic of federal OCS activity: the equipment required to extract hydrocarbons in federal waters - rigs, platforms, pipelines, and more - is beyond the taxing jurisdiction of state and local governments; but the people who operate that equipment consume government services just as they would if the equipment were onshore and taxable. While the onshore developments related to OCS activities generate tax revenues, coastal governments nevertheless incur service costs at a faster rate than they accrue revenue.

Sociocultural impacts from OCS development are likely to be minimal in populous, economically diverse areas which have had extensive experience with OCS oil and gas development and which possess a developed administrative structure. When an area is less populous, has a simpler economy, has limited experience with OCS development, or has limited administrative capabilities, sociocultural impacts are likely to be more pronounced.

State Permitting Process

Needs for improvement in the industrial facility siting process have many implications for the permitting process. These implications, both procedural and substantive, reflect the growing concern that the impacts of significant industrial facilities be better anticipated and managed by all parties. The focus of the next section of this chapter is these needs for improvement.

Recommendations to the Texas Coastal Management Program

Research and public input have indicated eight policy areas which are in need of improvement to satisfy concerns with the industrial facility siting process. These recommendations will be input into the TCMP for the program's consideration. First, TCMP's recommendation(s) is/are listed, then each area is discussed with regard to the present situation, problems and issues, current approaches of state government and further action required of state government.

Site Selection by Industry and Technical Assistance to Local Governments

- a. *The Texas Industrial Commission (TIC), together with affected interests, should develop and advise the use of a guidebook to aid in the selection of industrial sites.*
- b. *The Natural Resources Council (NRC) should recommend that the legislature designate the Texas Industrial Commission to provide technical assistance to local groups (as defined in the study).*

Present situation. The site selection process employed by most major industries involves ranking of areas by criteria important to the firm, gradually eliminating candidate sites, until a specific site is selected. This process is often carried out completely inside the firm, with outside parties contacted only for specific information relative to a criterion. State and local officials may be contacted for information regarding permissibility, community acceptance and public services, but they frequently are not advised of the specific site under consideration until the time of public announcement.

Firms indicate they maintain confidentiality in their site selection process to avoid revealing capital investment plans to competitors and to prevent inflation of land prices. Some firms say they restrict information on sites under consideration to protect local communities. Particularly in a small community, announcement of intent to construct a major facility can inflate land prices and cause expansion of public and private services. People do not always appreciate the uncertainties which surround siting a major plant and may take a preliminary announcement of intent to site as a firm commitment. If plans fail to materialize, citizens may be disappointed, public funds wasted, and the reputation of the firm may suffer.

Once an industry has selected a site, a local community may experience a variety of environmental and social and economic impacts. These impacts may be both positive and negative and are presently managed through the joint efforts of the private and public sectors as described in Chapter 4.

Problems and Issues. While confidentiality in the site selection process has its advantages, it causes certain problems for local citizens, local government and industry. Most industries are not in the position of owning land and deciding what to build on it. They are in the position of looking for land on which to build a specific project. Some of the issues raised by proposals to place specific projects on certain sites are standard. However, other issues may not be as easy to define or anticipate. An issue - environmental, economic or social - is relevant to a siting decision whenever a substantial body of local opinion believes it is. If an industry fails to consult with a broad range of local interests, other than the Chamber of Commerce, it is not likely to discover all the potential problems with certain sites in a locality. By failing to consider local concerns, industry may purchase land and spend funds on site engineering before it realizes there is opposition. If the opposition is substantial, it can delay or stop the project. Even if the necessary permits for construction are obtained, community acceptance of the project may be greatly reduced.

The failure of firms to consult with local officials early in the planning process can harm the ability of city and county government to provide and maintain the services and facilities necessary for the people constructing and operating the

project. Budgets of local government are often set up a year in advance. Failure to consult local officials early enough may reduce the officials' chance to allocate funds to upgrade roads to be used by heavy equipment, hire additional law enforcement personnel, and enact ordinances to prevent undesirable patterns of residential and commercial development.

Local citizens and officials need to understand the uncertainties which could kill or delay a project. There is a need to evaluate methods of consulting interest groups and local officials to determine a method which is sufficient to elicit reliable information without igniting premature activities. There are other problems as well. There have been situations in which firms have provided citizens and officials full details of their plans in advance of construction, but the local people were unable to use the information to estimate the effects on public services, needs for housing, and patterns of future development. Without assistance from a designated state agency, local governments may not have the staff or experience necessary to translate corporate data into useful information in order to evaluate and ameliorate any possible impacts.

Current Approach. The current approach of state government is to encourage industry to locate on the Texas coast, but to regulate its environmental impacts through the permitting process. For the most part, social and economic impacts are left for industry and local government to resolve. Limited assistance is presently given to local governments by the Texas Industrial Commission and the Texas Department of Community Affairs. However, the state has not taken a major role in the management of these impacts. The Texas Industrial Commission currently provides industry with statistics on communities. Although its staff may be familiar in this respect with a community, it is unlikely it has the inside perspective necessary to anticipate local issues. The major utilities and railroads provide similar services for firms exploring sites in their service areas. Neither of these approaches addresses the issues raised above because the information flow is almost entirely to the firm. Local citizens and officials, even when consulted, are usually not given sufficient information to estimate what they may be concerned with. Some firms have adopted a more consultative planning approach, and there are cases where this has been successful. However, the majority of firms do not presently employ such an approach to siting.

Needs for Further Action. There is a need to improve consultation between interest groups, local officials and industries selecting plant sites. Such consultation will allow industry to avoid sites which impinge on local concerns and allow local officials to anticipate increased services demands. However, a locality's knowledge of possible impacts will not necessarily provide solutions. This consultation must be coupled with technical assistance in order for local communities to anticipate and manage impacts.

Policy. The Texas Industrial Commission (TIC) should develop a definition of the siting process which includes early consultation between industry, local officials, and interested groups and adopt this as an advisory policy. The state should give the TIC primary responsibility for providing local governments with the technical assistance necessary to assess the potential impacts of specific industrial facilities.

Authority. Until such a consultative process is developed, used, and shown to be advantageous to all concerned, it would be imprudent to require its use. Thus, there appears to be no need for additional state authority at this time. Similarly, the provision of technical assistance to local communities is within the present authority of the TIC.

Data and Analysis. Insight is needed on the uncertainty of plant construction and of the plant siting decision to allow citizens and officials to understand the limits and changeability of information from a firm. Standard methods are also needed to aid local officials in analyzing the information firms provide to estimate the effects a project might have.

Funding. It may be desirable to provide some training to local officials, industry representatives and interest group members on the consultative process and in the use of data and analytic tools made available by the state. The Texas Industrial Commission should be appropriately funded by the legislature, through Section 306 of the Coastal Zone Management Act of 1972 as amended, if such funding is necessary.

Consideration of Land Use Consequences of Facilities

The Texas Air Control Board (TACB) should provide a forum for consideration of the land use consequences of a proposed facility in reaching a decision on an application for construction permit. In consideration of these applications, TACB should not necessarily allow the land use decisions of a municipal and/or county government to prevail when the benefits of a facility's siting or the effects of a facility's emissions transcend the local political boundaries of a particular jurisdiction. TACB should apply this policy from its date of adoption.

Present Situation. From both an environmental and a social and economic standpoint, some sites are more suitable than others. Natural constraints differ from site to site. Areas differ in their ability to absorb the new population a facility can bring. Existing patterns of development may complement or conflict with the facility itself. The facility may be located in one taxing jurisdiction and the population it attracts may move to another.

These factors should be balanced in reaching permit decisions so that the net land use consequences are considered. As with other considerations, many potentially adverse effects of a facility can be eliminated if they are considered prior to construction.

Problems and Issues. The need to consider land use consequences in the process of siting a facility raises several problems and issues. First, there is presently no adequate forum for considering these factors. Second, were a proper forum to exist, many local officials and groups would still lack the ability to calculate the impacts of a proposed project and to develop a position in support or in opposition.

Land use factors are most likely to be considered by the city within whose jurisdiction the facility is to be located. The city will be able to evaluate whatever factors it wishes in its zoning proceedings and in the negotiation of industrial district agreements. However, in many cases, particularly with major facilities, a city cannot provide a proper forum. Land use consequences extend past city boundaries to other cities, school districts and the county. Persons in these adjacent areas have no legal or political standing in city proceedings. Even if they did, one city's zoning board is hardly an objective place to discuss intercity issues.

In many cases, facilities locate in unincorporated areas of the county where there is no way for the public to consider these issues. This might be changed were

counties to receive ordinance-making power, but this cannot be predicted. Even were it to occur, it might be some time before many counties develop the capability to make reasonable decisions.

The state is the best level of government at which to consider land use consequences. The state is more likely than local governments to understand and consider the national interest in major facilities. However, with few exceptions, state agencies do not formally assess or consider land use consequences in granting permits. The clear exceptions are the Railroad Commission in regard to surface mining, and the Department of Health in regard to solid waste disposal facilities.

There are a variety of reasons other agencies do not formally consider land use consequences in permit decisions. Without attempting to specify the reasons with regard to particular agencies, they are as follows:

1. The statutory authority or duty of the agency to consider such effects is lacking or is unclear;
2. The agency regards these consequences as adequately considered if the jurisdiction in which the site is located gives zoning approval;
3. The agency has no policies to instruct its staff in what instances to assess and consider these factors;
4. The agency has not instructed its staff on what methods to use for assessment or what policy criteria to apply in evaluating the estimated impacts; and
5. The agency staffing patterns provide no one with the expertise required to assess or review land use consequences.

An additional reason agencies do not formally consider these factors is that, in the past, the issues were seldom effectively raised by affected interests. In small cities and rural counties, officials do not have the means to evaluate a proposed project to determine if there are matters which should be resolved as a condition of the permit. It is only when events actually occur that local officials see the problem. By then, all permits are granted, engineering and construction plans are final, and the firm has no funds budgeted to aid in the amelioration of these impacts.

In areas of limited population, it may be difficult to systematically determine the concerns of residents. However, individuals living in incorporated or residential areas adjacent to proposed industrial sites may experience a variety of impacts as the results of projects. Individuals in this situation may have sufficient interest to employ litigation to force agencies to consider these factors along with air and water quality.

Current Approach. Generally, agencies receive, but do not always require, evidence on land use consequences. The Texas Department of Water Resources has broad guidelines on the contents of a land use assessment. Various agencies have broad "public interest" policies which allow the net value, both environmental and social and economic, of the project to be considered, but few have specific policies which might guide the staff or the board in making a balanced decision. In many cases, however, information supplied by the applicant on the net benefits of the project has influenced agencies to accept a certain amount of alteration of the natural environment.

The Texas Clean Air Act states that the TACB should consider all facts bearing on the reasonableness of emissions from facilities. Specific factors to be considered include the net social and economic benefit of the facility and the question of priority of location in the area involved. TEX. REV. CIV. STAT. ANN. Art. 4477-5, Sec. 3.13. TACB rules pertaining to construction permits state that the applicant must demonstrate that the facility will be located with proper consideration of land use consequences. TEX. AIR CONT. BD. RULES 131.08.00.003 (a)(5).

The Federal Clean Air Act (42 U.S.C.S. 7401), as amended in 1977, indirectly necessitates consideration of land use consequences. The 1977 amendments incorporated the concepts of the Environmental Protection Agency's standards on offsets in nonattainment areas and on nonsignificant deterioration.

Air quality siting decisions imply complex considerations of land use. Such technical considerations are best undertaken by the Texas Air Control Board, acting in cooperation with interested parties under the recommendations of the Natural Resources Council.

Needs for Further Action.

Policy. The TACB should provide a forum for consideration of land use consequences of a proposed facility in reaching a decision on permit applications. TACB should consider regional and national interest when making its decisions.

Authority. The TACB needs to clarify its existing authority by seeking opinions of the attorney general on its ability to enforce the policies described above. In the event the authority is found lacking, recommendations should be made to the legislature to grant the authority.

Data and analysis. The TACB should establish reasonably uniform methods for estimating land use consequences. Such methods should be available to the public. Baseline data on geographic areas should be maintained to reduce the cost of analysis.

Funding. The state should provide training and technical assistance to local officials and interest groups in assessing their interest in proposed major facilities. Training should also be made available to those industrial representatives or others likely to represent facility proponents. Appropriate funding through Section 306 of the Coastal Zone Management Act should be supplied.

Limitation on Local Control

The legislature should adopt a policy prohibiting local government from unreasonably, by tax or regulation, restricting the activities on state-owned lands, or excluding industrial facilities of regional or national benefit.

Present Situation. Two situations presently exist which may require the state to limit the power of local government to tax or regulate siting of industrial facilities. The first concerns municipal control of offshore oil and gas drilling on state-owned lands. The second concerns potential county ordinance-making power.

Coastal cities have traditionally annexed portions of the Gulf of Mexico. Some of these lands, such as those in Galveston, are patented to the city. Others are owned by the state. Offshore areas have traditionally been zoned, taxed and regulated just like onshore lands. This has allowed the cities to control activities which might spoil the aesthetics of the beach. The City of Galveston has restricted oil and gas drilling on state-owned lands within its city limits. Recently, the City of Crystal Beach annexed offshore areas by extending its boundaries to the state's three league limit. It has claimed the right to tax and regulate all state leases in this area. The companies involved have questioned the action and are paying tax and permit fees into an escrow account. They have appealed to the General Land Office for assistance in resolving the issue.

The lands in question and others which might be subject to similar action are producing areas for oil and gas. Restriction of production from these lands will decrease domestic energy production, at least marginally. Royalties from minerals produced go into the state's permanent school fund which provides state aid to the public school system of Texas.

Texas counties do not have ordinance-making power at the present time. This prevents counties from taking action which might unreasonably exclude facilities of regional or national interest. Because of the large amount of unincorporated land in coastal counties, it is not possible for local governments to exclude such facilities from substantial areas of the Texas coast. However, there is a strong possibility the legislature will grant counties some form of ordinance-making power in 1979 or 1981.

Problems and Issues. If the action of Crystal Beach is allowed to stand, and other coastal cities follow this pattern, the development of the state's offshore minerals could be interrupted, which would be detrimental to the nation's energy supply and to the public school systems. A judicial resolution of the problem is undesirable because this could result in a non-uniform series of district court decisions. A complete exemption from local regulation and taxation of state-owned lands and activities thereon also may not be desirable.

If counties are granted zoning powers it might allow them, in conjunction with cities, to exclude facilities of regional or national interest from substantial sections of the coast, when the state would normally permit them. Even if counties abused their power, it would be politically difficult to remove powers once they were granted. While judicial relief from arbitrary action is available, the situation placing the burden of seeking such relief on the applicant should not be created carelessly.

Current Approach. At the present, coastal cities exercise some regulatory and taxing power over lessees of state lands. The present means of preventing counties from excluding facilities of regional or national interest is the denial of ordinance-making power. Judicial resolution is possible at the present time, but it has proved to be a cumbersome process.

Needs for Further Action.

Policy. The state should adopt a policy that development of state lands and facilities of regional or national interest cannot be unreasonably restricted by decisions of local government.

Authority. The legislature should grant the commissioner of the General Land Office the authority to invalidate local actions which unreasonably tax or regulate activities on state-owned land.

The legislature should include in any statute granting ordinance-making power to counties a provision granting the Governor the authority to invalidate local actions which unreasonably restrict or exclude facilities of regional or national benefit.

Data and Analysis. No further action needed.

Funding. No further action needed.

Consideration of National Interest

Texas agencies which are responsible for managing or regulating the state's natural resources should adopt an explicit policy stating they will consider the national interest in their decision-making.

Present Situation. There is no simple formula to determine the national interest. Many elements, some of which may be in conflict, comprise the national interest in a given area. Marine-related transportation, sport and commercial fishing, recreation, mineral extraction, preservation of endangered species habitat, electric power plants, pipelines -- these are only some of the factors which may involve the national interest in specific state decisions. The size and variety of the Texas coastal area means that there is a national interest consideration in many of the major natural resource decisions.

Problems and Issues. Section 306(c)(8) of the Coastal Zone Management Act of 1972 as amended (16 U.S.C. 1451 et seq.) and the regulations issued pursuant to the Act (15 CFR 923.52) require states seeking approval under Section 306 of the Act to consider the national interest involved in the planning and siting of facilities, including energy facilities, which are necessary to meet requirements that are more than local in nature. The regulations require states to specify the decision points where national interests will be considered after program approval (923.52(b)3). The requirements are procedural only. The states must consider the national interest, but the decision need not be based on the national interest.

Current Approach. No Texas state agency concerned with natural resources appears to have an explicit policy stating it will consider the national interest. There is no indication however, that agencies do not consider the national interest. It is also apparent that national interests often coincide with state interests which the agencies are explicitly mandated to consider.

Needs for Further Action.

Policy. In order to meet the formal requirements of the federal Coastal Zone Management Act, each Texas natural resource agency should adopt an explicit policy to consider the national interest in its decisions. The policy would not commit the agency to base its decisions on the national interest.

Authority. State agencies appear to have sufficient authority under the terms of their enabling statutes to adopt a policy to consider the national interest. For example, the Texas Air Control Board has the authority "to make rules and

regulations consistent with the general intents and purposes of this Act and to amend any rule or regulation it makes." TEX. REV. CIV. STAT. ANN., art 4477-5 (1976).

Data and Analysis. No further action needed.

Funding. No further action needed.

Performance Standards Applicable to Public Facilities

The legislature should enact as state policy the requirement that all publicly-sponsored projects meet the same standards applicable to privately-sponsored projects.

Present Situation. Projects sponsored by various units of federal, state, and local government are not presently required to secure all the state permits necessary for private firms. Federal facilities are now required to obtain only state air and water permits.

Problems and Issues. Except in unusual cases, there appears to be no sound basis for holding public facilities to lesser performance standards than private facilities. This is particularly apparent when the public and private facilities serve the same purpose. There are several disadvantages in failing to hold public facilities to usual state standards. First, lower standards of performance by public facilities will often negate the value of compliance by private facilities. It makes little sense to require sophisticated engineering from private facilities to protect bays and estuaries only to have these resources damaged unnecessarily by substandard public engineering.

Second, since public funds are always in short supply, money will probably not be used to meet optional performance standards unless public facilities are forced to meet them.

Third, litigation is often a direct result of exempting public facilities from the normal standards. If differences between the sponsoring agency, interest groups and regulatory agencies cannot be resolved through informal negotiation, going to court offers the only resolution to the problem.

Current Approach. The present approach is quite complex. Almost all projects, including federal ones, now require state air and water permits. Depending on the type of project, other state agencies can express an opinion through non-binding review and comment. If proposed projects violate major state policies, state agencies or interested groups may resort to litigation.

Needs for Further Action.

Policy. The state should adopt the policy that all publicly-sponsored projects are subject to the same state standards and permit requirements as privately-sponsored projects.

Authority. In the case of federal projects, the state will acquire necessary authority when the Texas Coastal Management Program receives federal certification under Section 307 of the Coastal Zone Management Act of 1972, as amended.

Similarly, the state will have authority to require operations of the Texas-federal outer continental shelf to meet the same standards as are required inside the three-league limit.

For state, local or other public projects, a state statute is needed requiring the sponsoring agency to obtain the same state permits as a private sponsor would, prior to commencement and/or operation.

Data and Analysis. No further action needed.

Funding. No further action needed.

Notice Procedures of State Agencies

The Natural Resources Council should develop and recommend to state agencies and to the legislature reasonably uniform provisions for adequate public notice of permit applications and hearings.

Present Situation. The need to give public notice in the siting process arises at least twice. Notice of the filing of a permit application is needed to allow interested parties to inform themselves and determine if they wish to request a hearing. Notice of hearings is necessary to allow the parties to prepare their presentation for the agency. Figure 11 shows current agency practice for providing notice of applications filed. Figure 12 shows current agency practice for providing notice of hearings.

Problems and Issues. Inadequate notice procedures cause problems for all parties. Those with objections or concerns are unable to present them in a timely fashion in agency proceedings. This can lead to an undesirable decision or to litigation to resolve the questions. Proper notice is in a project proponent's interest. If persons with concerns or objections have the opportunity to come forward at an early date, the firm can attempt to allay the concerns through better information or changes in project design. Avoiding litigation saves time and money and safeguards the reputation of the firm. Parties denied proper notice are likely to feel distrustful toward the firm, even if notice is an agency's responsibility.

The method of notice is also important. Publication in the legal notice section of a local newspaper is usually inadequate since most people do not read that section. Since the coast is an area of statewide concern, statewide notice is probably necessary. An ideal situation would be if those individuals or groups with a continuing interest in coastal development could obtain written notice automatically.

There is a need for uniformity between agencies in notice provisions. This will make it easier for all parties to know when proper procedures have been satisfied and how to obtain desired information. It should be possible to provide notice without delaying the permitting process or imposing undue financial burdens, particularly on those with very small projects.

Current Approach. Figures 11 and 12 show the current agency approaches to notices. Three agencies have no procedure for notice of application. One has no procedure for notice of hearings. For others, the primary form of notice for permits is publication in local newspapers. Some agencies use a mailing list. Use of the Texas Register is limited to certain rulemaking bodies and actions by the General Land

Figure 11

Comparison of Agency Policies for Providing Public Notice of Permit Applications*

Agency	The general public in the affected area is notified, or only certain individuals?	Notice is published where?	Notice published more than once?	Notice must be published how soon after filing of the application?	Does applicant or the agency publish the notice?
Dept. of Health	General public (301.82.01.005(8))	In a local newspaper (301.82.01.005(8))	Once (301.82.01.005(8))	15 days after the applicant receives the "Notice of Filing of Application" (301.82.01.005(8))	Applicant (301.82.01.005(8))
Railroad Commission (surface mining)	General public, surrounding landowners, and certain local officials (051.07.02.030)	At the county courthouse and in a local newspaper (051.07.02.030)	At least once a week for 4 consecutive weeks (051.07.02.030)	Notice is published when the application is filed (051.07.02.030)	Applicant (051.07.02.030)
Parks and Wildlife Dept.	General public (127.30.04.005(a)(2); 127.30.05.004)	In a daily newspaper in each county affected (127.30.04.005(a)(2); 127.30.05.004)	Three consecutive days (127.30.04.005(a)(2); 127.30.05.004)	Notice is published when application is filed (127.30.04.005(a)(2); 127.30.05.004)	Applicant (127.30.04.005(a)(2); 127.30.05.004)
Dept. of Water Resources	General public (156.10.20.010; 156.11.20.005)	In a newspaper of general circulation in each county affected (156.10.20.010; 156.11.20.005)	Weather modification permit: At least once a week for 3 consecutive weeks (156.11.20.005) Others: Once a week for at least two consecutive weeks (156.10.20.010)	The second publication must be made 20 days before the hearing (156.10.20.010)	Applicant (156.10.20.010)
*The following agencies do not have specific rules pertaining to public notice of the filing of permit applications: Texas Air Control Board, General Land Office/School Land Board, and Antiquities Commission.					

Figure 12

Comparison of Agency Policies for Providing Notice of Public Hearings*

Agency	The general public in the affected area is notified, or only certain individuals?	Notice is published where?	Notice published more than once?	Notice must be given how far in advance of the hearing?	Does applicant or the agency publish the notice?
Dept. of Health	General public (30.82.01.005 B)	In a newspaper in one or more counties (30.82.01.005 B)	At least once (30.82.01.005 B)	20 days (30.82.01.005 B)	Applicant (30.82.01.005 B)
Railroad Commission	Surface mining permits: General public and selected individuals (051.07.02.033)	Surface mining permits: In the local newspaper of greatest circulation (051.07.02.033)	Surface mining permits: At least once a week for 3 weeks (051.07.02.033)	Surface mining permits: 21 days (051.07.02.033) Others: 10 days (051.04.02.045)	Agency (051.07.02.033)
Parks and Wildlife Dept.	General public (Art. 5421q, V.T.C.S.)	Easement requests: In a newspaper of local circulation (Art. 5421q, V.T.C.S.) and at the Secretary of State's Office (Art. 6252-17, V.T.C.S.) Oyster leases: In the county newspaper (127.30.20.001)	Easement requests: Once a week for three consecutive weeks (Art. 5421q, V.T.C.S.) Oyster leases: At least once (127.30.20.001)	Contested Proceedings: 10 days (127.01.02.005b) Easement requests: 30 days (Art. 5421q, Sec. 2) Oyster leases: Not less than 10 nor more than 20 days (127.30.20.001M)	Easement requests: Agency (127.01.04.003, 127.30.05.005) Oyster leases: Applicant (127.30.20.001(1))
Air Control Board	Rulemaking hearings: General public and those on mailing list (APTRA, Sec. 5(b)) Other hearings: General public (Texas Clean Air Act, Sec. 317(c)) and those on the mailing list	Rulemaking hearings: In the Texas Register (APTRA, Sec. 5(a)) and in a newspaper(s) in the areas to be affected (Texas Clean Air Act Sec. 3.17(c))	At least once (Texas Clean Air Act, Sec. 3.17(c))	Rulemaking hearings: 30 days (APTRA, Sec. 5(a)) except for emergency rules (APTRA, Sec. 5(d)) However, Texas Clean Air Act, Sec. 3.09, requires 20 days notice	Rulemaking hearings: Agency

Figure 12

<p>Department of Water Resources</p>	<p>Water discharge permits and permits to use state water: General public, surrounding landowners, and certain public officials (156.22.01.012(a)) Revocation, Suspension, or amendment of waste discharge permits: General public and certain public officials (156.25.10.004(b)) Renewals: Affected individuals (156.25.20.003(b)) Rulemaking: Individuals on the mailing list (156.01.15.004)</p>	<p>In a newspaper in each county affected. (156.22.01.012(a))</p>	<p>Permit to use state water: Once a week for 2 consecutive weeks (Water Code, Subchapter D, Sec.11.132(d)) Other permits: At least once (156.22.01.012(a)); 156.25.10.004(b); Water Code, Subtitle D, Chap.26, Subchapter B, Sec.26.022(b)</p>	<p>Renewals: 30 days (156.25.20.004(b)) Others: 20 days (156.22.01.012(a)); Water Code, Subtitle A, Chap.5, Subchap. D, Sec. 11.132(f);</p>	<p>Waste discharge permits & renewals: Applicant (156.22.01.012(a)); 156.25.20.004(c); Others: Agency (156.25.10.004(b)); Water Code, Subtitle D, Chap. 26, Subchap. B, Sec. 26.022(b))</p>
<p>General Land Office</p>	<p>Deepwater ports: General public and those on a mailing list (126.30.02.005)</p>	<p>Deepwater ports: In the Texas Register and the county newspaper (126.30.02.002)</p>	<p>Deepwater ports: At least twice, in each of two consecutive weeks (126.30.02.002)</p>	<p>Deepwater ports: 30 days (126.30.02.002)</p>	<p>Agency</p>
<p>School Land Board</p>	<p>State-Owned Lands and Flats, and State-Owned Uplands: General public and those on a mailing list (135.18.02.003(e))</p>	<p>State-Owned Lands and Flats, and State-Owned Uplands: In the Texas Register and a county newspaper (135.18.02.003(b); 135.30.01.003)</p>	<p>State-Owned Uplands: At least twice in 2 consecutive weeks (135.30.003) State-Owned Lands and Flats: At least 3 times (135.18.02.003(b))</p>	<p>State-Owned Uplands: 30 days (135.30.01.003) State-Owned Lands and Flats: Not less than 14 days nor more than 28 days (135.18.02.003(b))</p>	<p>Agency</p>
<p>* The Antiquities Committee does not have specific rules pertaining to the notice of public hearings.</p>					

Office/School Land Board. Responsibility for giving notice is split between the agency and the applicant.

Needs for Further Action.

Policy. The NRC should develop reasonably uniform procedures regarding notice of applications and hearings. Such procedures should address the method(s) of notice and be designed to prevent any lengthening of the permit process.

Authority. The agencies have authority to adopt such procedures. In the event agencies are unwilling to adopt such procedures, the procedures should be incorporated into the Administrative Procedure and Texas Register Act.

Data and analysis. In designing procedures, the NRC should examine practices in other jurisdictions and should consult with representatives of affected interests in drafting.

Funding. No additional funding is required.

Evaluation of the Final Section 208 Areawide Wastewater Management Program

The NRC should evaluate the final Section 208 Areawide Wastewater Management Program and make such findings and recommendations as it deems proper to allow wastewater management plans to address coastal concerns.

Present Situation. Non-point source pollution is dealt with by areawide waste treatment plans being developed by the state pursuant to Section 208 of the Federal Water Pollution Control Act amendments of 1972 (33 U.S.C.S. 1288 (Supp. 1977)). The act requires the governor of each state to identify each area of the state which has substantial water quality control problems, for the purpose of developing areawide treatment management plans for such areas. EPA oversees and approves or disapproves such designations and the waste treatment planning process devised for each area and makes grants to fund development of the plans. However, the actual planning and administration of the program occur at the state level; thus the program and its effect on non-point source pollution of streams flowing into bays and estuaries are essentially state functions.

Problems and Issues. It has long been recognized by the Texas Coastal Management Program that the state's program to control non-point source pollution (Section 208) is critical to the preservation of many wetlands. Control of runoff from agricultural and industrial areas can benefit wetlands by preventing the introduction of toxic materials. However, it is possible that non-point source management plans could reduce total freshwater runoff, thus altering the biologic balance and negatively affecting some wetlands.

Because of the timing of this program, neither this study nor the Texas Coastal Management Program as a whole will be able to thoroughly assess the impacts of the final Section 208 plans on coastal concerns. There is a need for such an assessment to be made when the appropriate data are available.

Current Approach. The Governor of Texas has identified eight designated areas in the state and has also defined 15 state planning areas to provide planning for the remaining nondesignated areas in the state. In each of these twenty-three areas a local planning agency has been appointed. All are under the general supervision of the Texas Department of Water Resources. Each plan created for one of the eight designated or 15 state planning areas will include appropriate plans for sources of pollution and will provide the basis for revisions of the State Water Quality Standards and the Statewide Policy on Antidegradation to accomplish the planning goals. During plan development, the federal CZM coordinator will be provided a copy of the final Detailed Work Plan for each designated planning area. At the point of final plan approval, the CZM coordinator will be provided each completed 208 plan, the environmental assessment report for each plan, and each final water quality management plan. In reviewing and revising the state's water quality standards, the Department of Water Resources will establish standards which, wherever attainable, are consistent with the national water quality goals of the Federal Water Pollution Control Act amendments of 1972. TDWR will also ensure that water quality standards protect the quality of downstream waters.

Needs for Further Action.

Policy. The NRC should evaluate the final 208 program.

Authority. No further action needed.

Data and Analysis. No further action needed.

Funding. If necessary, appropriate funding should be supplied by the state legislature.

Evaluation of the Coastal Energy Impact Program

The NRC should evaluate the adequacy of the Coastal Energy Impact Program in the anticipation and management of facility impacts in its 1980 report.

Present Situation. To compensate communities for adverse impacts, the federal government created the Coastal Energy Impact Program (Sec. 308) in the 1976 amendments to the Coastal Zone Management Act.

Problems and Issues. Texas' share of CEIP funds for the year ending September 30, 1978, is over \$18 million in planning assistance, loans and loan guarantees, and grants. At the state level, the Texas Department of Community Affairs (TDCA) has a rural area assistance program and a program of comprehensive planning grants. These programs, however, lack either an energy or coastal focus and are funded at such a level that they will not be major sources for coastal communities. The Texas Energy Advisory Council (TEAC) has an energy focus for its local assistance, but so far has concentrated on energy conservation.

Current Approach. The Governor's Office of Budget and Planning is responsible for administration of the program in Texas. Regulations have recently been issued but have not been evaluated by this study on their adequacy.

Needs for Further Action.

Policy. The NRC should evaluate the adequacy of the CEIP in its 1980 report.

Authority. No further action needed.

Data and Analysis. No further action needed.

Funding. If necessary, appropriate funding should be supplied by the state legislature.

Summary

This chapter has presented the needs for improvement in the industrial facility siting process. The changes needed are incremental. They work within the established structure of government and reflect the situation found by this study. It is felt that the further action, if taken, would meet the present concerns with the industrial siting process.

Appendices

A. Existing and Potential Facilities

Introduction

The Texas coastal area has historically drawn to it large energy-related industrial facilities. Surveys of facilities under construction, permit applications, and proposed or planned facilities indicate that such is likely to continue.

The analysis detailed in this appendix produces the following list of industrial facilities which are likely to significantly affect the Texas coastal zone in the future and which the state's facility planning process should be equipped to assess.

1. Petrochemical plants
2. Gas processing plants
3. Nuclear-powered electrical generating plants
4. Petroleum refineries
5. Mobile drilling rig/platform construction yards
6. LNG plants and associated terminals
7. Conventional electrical generating plants
8. Bulk terminals
9. Salt dome storage facilities
10. Primary metal processing facilities
11. Metal fabrication plants
12. Machinery manufacturing plants
13. Offshore platforms
14. Onshore drilling rigs
15. Oilfield equipment storage depots (for both onshore and offshore drilling)
16. Crew and supply bases (for both onshore and offshore)
17. Deep-draft ports
18. Expansion of facilities of existing ports
19. Pipelines (both onshore and offshore)
20. Geothermal energy extraction

This list emphasizes energy facilities because (a) the area now has and is expected to continue to have a relatively high concentration of energy facilities, and (b) federal regulations mandating a coastal facility planning process stress energy facilities. The list represents a best estimate based on past experience, current trends, and future expectations.

The projection of the types of industrial facilities for possible future siting decisions in the Texas coastal area is based on five inventories:

1. Existing industrial facilities;
2. Industrial facilities under construction;
3. Industrial facilities for which state and/or federal applications are pending;
4. Proposed or planned facilities; and
5. Projections of future industrial siting in the Texas coastal area prepared by various organizations.

These five inventories centered around the following types of industrial facilities:

1. Petroleum refineries;
2. Gas processing plants;
3. Nuclear generating plants and enrichment or processing facilities;
4. Petrochemical plants;
5. Construction yards for offshore drilling platforms and mobile drilling rigs;
6. Liquefied natural gas (LNG) terminals, transmission facilities, storage facilities, and treatment plants;
7. Conventional electrical generating plants;
8. Petroleum product storage terminals;
9. Ship building/repairing facilities;
10. Primary metal processing facilities (including blast furnaces and aluminum smelters);
11. Metal fabricating facilities; and
12. Machinery (other than electrical) manufacturing facilities.

The five inventories were compiled to provide a basis for projections of the types of industrial facilities which may in the future affect the Texas coastal area. It was not assumed, however, that such projections would necessarily be limited to the twelve types of industrial facilities inventoried.

U.S. Department of Commerce regulations implementing the 1976 Amendments to the Coastal Zone Management Act specify that the identification of facilities which may significantly affect the coastal zone must include, in addition to the industrial facilities listed above, the following:

1. Oil and gas platforms, storage depots, and crew and supply bases;
2. Facilities, including shallow-draft and deep-draft ports and deepwater terminals, used for the transfer of petroleum;
3. Pipelines and transmission facilities; and
4. Petroleum-related terminals.

While it is important to note that the installation or expansion of those facilities will affect the coastal zone, their current existence in the Texas coastal area is not inventoried in this report for various reasons.

First, offshore oil and gas platforms, oil and gas production equipment storage depots, crew and supply bases, port facilities (particularly as they relate to petroleum cargo), and Texas Federal OCS pipelines are inventoried elsewhere (Texas General Land Office, 1977a, vol. 4). Second, inventories of onshore oil/gas production rigs and onshore pipeline rights-of-way and transmission facilities or terminals are maintained and periodically updated by the Texas Railroad Commission, Oil and Gas Division (Texas Railroad Commission, 1977). Third, inventories of pipelines and production platforms in state-owned waters are maintained by the Texas General Land Office both in the form of right-of-way or lease records and maps (Texas General Land Office, 1975a). All of the inventories referenced above are incorporated by reference.

Existing Industrial Facilities

Existing industrial facilities in the study area include 23 petroleum refineries, 81 gas processing plants, 58 petrochemical plants, seven mobile drilling rig and platform construction yards, and 21 conventional electrical generating plants. In addition, the study area contains 350 petroleum bulk stations and terminals, 9 major shipbuilding/repairing facilities, 31 major primary metal processing facilities, 141 major metal fabricating facilities, and 99 major machinery manufacturing facilities. Nuclear generating plants, nuclear enrichment or fuel processing facilities, and LNG terminals or facilities do not currently exist in the study area. (Some of these facilities, however, are now under construction, being applied for, or being planned; see subsequent sections of this chapter.) In the case of ship building/repairing, primary metal processing, metal fabricating, and machinery manufacturing, a "major facility" is defined as a facility that employs 50 or more persons. Figures 1 through 10 present the results of these inventories.

Facilities Under Construction

A survey of facilities under construction indicates that the kinds of industrial facilities which now exist in the study area continue to be drawn to it. As of September 1, 1977, at least one refinery, one nuclear power generating plant, four petrochemical plants, one primary metal processing facility, two metal fabricating facilities, three conventional electrical generating plants, and seven machinery manufacturing facilities were under construction in the study area. Of the seven machinery manufacturing facilities, at least three will manufacture equipment directly related to energy production (offshore oil field equipment, pipe inspection equipment, and blowout preventers).

The inventory of industrial facilities currently under construction in the study area included an examination of such periodicals as "Texas Industrial Expansion," a monthly publication of the Bureau of Business Research at the University of Texas at Austin, key news clipping service pamphlets such as that compiled by the Texas Coastal and Marine Council, and discussions with officials of relevant agencies or organizations including the Texas Industrial Commission and the Bureau of Business Research. No attempt was made to catalogue each individual facility being constructed. Because the inventories are to provide a basis for projecting the type of facilities which may affect the coastal zone in the future, emphasis was placed on determining the types and general size ranges of industrial facilities under construction. This resulted in a representative sample of the kinds of industrial facilities which have been under construction since that last inventory of existing facilities (1974 County Business Patterns) was compiled.

Pending Applications

The facilities for which applications are pending tend to be the same type of industrial facilities that currently exist or are under construction or expansion in the study area. They include petroleum refineries, petrochemical plants, oil field service

facilities, electrical generating stations, pipelines, gas plants, and LNG plants (Texas Water Quality Board, 1977a).

Interviews of staff members of the Texas Water Quality Board, the state's water quality permitting agency, indicate that petrochemical facilities represent the one most numerous type of application for siting or expansion in the study area.

As was the case in the inventory of facilities under construction, the search for pending applications emphasized facility types and general size ranges, and did not attempt to provide an exhaustive listing.

Proposed or Planned Facilities

The following facilities are currently being proposed or planned for the study area: ten petrochemical plants, one petroleum refinery, three LNG plants and associated terminals and transportation facilities, one primary metal processing plant, one conventional electrical generating plant, and two metal fabricating facilities.

This inventory focused on identifying types and size ranges of facilities that are being proposed or planned, but are not yet into the application or construction phases. Due to the extensive amount of proprietary information inherent in the early stages of facility planning and the limitations of sources of information, it must be recognized that unknown number and types of facilities may be proposed or planned.

Conversations with officials of the Texas Industrial Commission (Britton, 1977), the Texas Coastal and Marine Council (Moseley, 1977), and the Texas Water Quality Board (Maddox, 1977) indicate that petrochemical facilities will continue to generate the largest demand for major industrial sites.

Projections of Other Sources

Many studies provide projections of industrial activities. Some of these studies focus on the nation as a whole or on a particular industry and the projected nationwide demand for its products. More specific analyses conducted by local chambers of commerce, councils of governments, and private industries focus on local or regional service areas. Some projections center on employment, some on final demand, others on water use, and so forth.

An understanding of the types of projections available, as well as what they reveal, can be gained by an analysis of a representative few. A complete list of sources can be found in Figure A-11.

1. Statewide Employment Projections

The Texas Employment Commission forecasts of employment through 1980 for the seven largest SMSAs in Texas reveal that the major industrial sectors

currently situated in the study area are expected to expand in the Houston, Beaumont-Port Arthur-Orange, and Corpus Christi SMSAs (Figure A-12, Appendix A). The one exception is petroleum refining in the Houston SMSA. In some cases, the projected percent of increase is dramatic: for example, a 44.4% increase in employment in the fabricated metals sector in the Houston SMSA and a 33.3% increase in employment in the primary metals sector in the Beaumont-Port Arthur-Orange SMSA. All three coastal SMSAs included in the TEC projections are expected to experience employment growth in primary metal processing, machinery manufacturing, utilities or electric light and power, and chemical and allied products.

The Texas Water Development Board has also made employment projections by industrial sectors for counties in the study area (Texas General Land Office, 1975b). In general, there are many similarities between the TEC projections (Figure A-12) and the TWDB projections (Figure A-13). For example, both sets of projections anticipate relatively large increases in employment in the chemical and allied products sector. The same is true of machinery (except electrical) manufacturing, primary metal (except in Southeast Texas in Figure A-13), fabricated metals, and utilities.

The TWDB projections for the entire coastal area include six counties which are not included in this study, but there is no reason to believe that the relative magnitude of those projections would be significantly changed if the six additional counties were factored out (Figure A-13). This appendix arrays the TWDB projections for the entire coastal area and for the Southeast Texas, Houston-Galveston, Golden Crescent, Coastal Bend, and Lower Rio Grande Valley areas.

2. Water Demand Projections

The Texas Water Development Board has published projections of water use by manufacturers through 2030 which indicate (a) an increasing use of water by manufacturers in all coastal basins, (b) that counties in this report's study area are expected to represent the greatest demand, and (c) that petroleum refining and petrochemical processing are expected to be the major water-demanding manufacturers (see Figure A-14).

3. Regional Councils of Governments Projections

The councils of governments in the study area have largely adopted the employment projections made for their areas by such state agencies as the Texas Employment Commission and the Texas Water Development Board. Regional councils vary greatly in their needs for and capabilities to produce projectoins of industrial activities in their service areas. For example, the Southeast Texas Regional Planning Commission has published a set of land use maps, one of which projects industrial land use in 1990. Projections of specific industry types, however, are less definite.

The Houston-Galveston Area Council has not attempted to project specific types of industrial facilities expected to site in the eight-county service area, except to note that manufacturing and, more importantly, the petrochemical industry are expected to expand.

4. Local Projections

Local chambers of commerce in the study area commonly establish Industrial Development Committees or similar entities, but they generally do not do extensive projections. Officials of these committees in various sites in the study area display great familiarity with facilities under construction or being planned in their respective areas. Due to the proprietary nature of the information surrounding planned facilities, however, chamber of commerce officials are often reluctant to discuss such facilities. These officials were, on the other hand, very helpful in verifying information derived from other sources.

5. Specialized Projections

General analyses of the future of various energy sectors are readily available. Such sectors as petroleum refining, petrochemical production, petroleum storage, mobile drilling rig and platform construction, liquified natural gas processing, geothermal energy production, nuclear-powered electrical generating plants, and port facilities have been analyzed in terms of general trends and prospects for the future.

a. Petroleum Refining

Any increase in the petroleum refining sector is expected by most sources to come in the form of expansion of existing facilities rather than in the construction of newly sited facilities. The Oil and Gas Journal recently reported that "designers and builders of large oil refining facilities see a leveling off ahead in the work" (August, 1977). In addition, officials of the Texas Industrial Commission doubt that new refineries will be built in Texas in the near future. They cite the depletion of domestic reserves, the increasing costs of construction, and federal regulations as reasons for a refinery construction slowdown. Nevertheless, the Texas experience, even in recent years, does not allow elimination of the possibility of new refinery construction during the next 20 years. Uncertainties surrounding conservation practices, federal legislation and regulations, international supply, domestic demand and other variables leave open the possibility of continued refinery construction in the study area.

Various federal agency scenarios of expansion in U.S. refinery capacity have been analyzed elsewhere (General Land Office, 1977a, vol. 3). Depending on which federal agency and which set of assumptions are used, the needed expansion in refining capacity by 1985 is expected to be between 1.1 and 6.4 million barrels per calendar day. In any of the scenarios, the possibility of new refineries in or near the Texas Gulf Coast should be included in this study.

b. Petrochemical Plants

The probability of new petrochemical plants in the study area is stressed by virtually every source consulted. The inventories of existing facilities, facilities under construction, pending applications, and proposed or planned facilities all provide ample evidence of an ongoing demand for new sites for petrochemical plants.

c. Storage Facilities

Storage facilities for crude petroleum, finished products, natural gas, and other products are likely to become increasingly important if a recent emphasis on strategic petroleum storage continues.

Aside from the fact that construction or expansion of refineries, gas plants, or petrochemical plants is normally accompanied by construction of storage tanks, there is much conflicting evidence as to the projected need for bulk terminals and tank farms. One study has found a significant amount of unused storage capacity in the study area (General Land Office, 1977a, vol. 3). This fact is seemingly contradicted, however, by the current effort by the federal government to store petroleum in salt domes instead of conventional storage facilities. So while construction of conventional storage facilities and tank farms may reasonably be expected to continue as refining capacity expands, strategic storage of petroleum in salt domes is of equal importance.

d. Mobile Drilling Rig and Platform Construction

The mobile drilling rig and platform construction market is notoriously cyclical and difficult to predict. Recent analyses have concluded that expansions in the drilling rig construction sector can reasonably be expected by 1980 and that minor expansions in the platform fabrication sector can also be anticipated (General Land Office, 1977a, vol. 3). The report expects that those capacity expansions are most likely to affect Louisiana, but may affect the Texas Gulf Coast as well.

e. Liquefied Natural Gas Facilities

Liquefied natural gas terminals, transmission facilities, and processing plants are beginning to make their appearance in the study area as the inventories presented early in this chapter indicate. Many sources agree that there will be increasing demand for sites for such facilities. The American Gas Association, for example, has predicted that "LNG trade will grow over the next ten years to account for a significant portion of new gas supplies for the U.S. . . ." (Oil and Gas Journal, January 19, 1976).

f. Geothermal Energy

Geothermal energy production seems less certain. Although geothermal belts underlie the study area, several sources consider their future development to be uncertain. One report, for example, concludes that "it would appear that geothermal development is a marginally viable alternative to the continued development of electric production with present technology in the South Texas Coastal Zone" (University of Texas at Arlington, 1976). Even sources that are more optimistic about geothermal energy anticipate commercialization in 10-12 years at the earliest (University of Texas at Austin, 1976). Although test wells have been drilled, widespread commercial use is still an uncertainty.

g. Nuclear Power Plants

Nuclear power plants will probably continue to be proposed and planned. In addition to the one now being built in the study area, two others will operate in counties adjacent to the study area. While it is true that the future construction of nuclear plants is surrounded by uncertainty, they cannot be ruled out as facilities which will significantly affect the Texas coastal zone.

h. Port Facilities

Recent action by the governor to establish a deepwater port commission indicates that a deepwater monobuoy (either publicly or privately owned), with its associated pipeline rights-of-way and other facilities, will be built and may significantly affect the Texas coast.

Figure A-1

Petroleum Refineries

<u>County</u>	<u>Company and Location</u>	<u>Crude Capacity (Barrels/Calendar Day)</u>
Aransas	None	-
Brazoria	Phillips Petroleum Co., Sweeney	85,000
Calhoun	None	-
Cameron	None	-
Chambers	Union Texas Petroleum, Division of Allied Chemical Co., Winnie	9,425
Fort Bend	None	-
Galveston	Amoco Oil Co., Texas City	333,000
	Marathon Oil Co., Texas City	64,000
	Texas City Refining Inc., Texas City	76,500
Hardin	South Hampton Co., Silsbee	18,100
Harris	Atlantic Richfield Co., Houston	213,000
	Charter International Oil Co., Houston	64,000
	Crown Central Petroleum Corp., Houston	100,000
	Eddy Refining Co., Houston	2,800
	Exxon Co., Baytown	390,000
	Shell Oil Co., Deer Park	294,000
Hidalgo	Crystal Oil Co., LaBlanca	5,462

Figure A-1 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Crude Capacity (Barrels/Calendar Day)</u>
Jackson	None	-
Jefferson	American Petrofina, Inc., Port Arthur	84,000
	Gulf Oil Co., Port Arthur	312,000
	Mobil Oil Corp., Beaumont	325,000
	Texaco, Inc., Port Arthur	406,000
	Texaco, Inc. Port Neches	47,000
	Union Oil Co. of Calif., Nederland	120,000
Kenedy	None	-
Kleburg	None	-
Liberty	None	-
Matagorda	None	-
Nueces	Champlin Petroleum Co., Corpus Christi	67,000
	Coastal States Petrochemical Co., Corpus Christi	185,000
	Quintana-Howell Joint Venture, Corpus Christi	44,400
	Suntide Refining Co., Corpus Christi	57,000
Orange	None	-
Refugio	None	-
San Patricio	None	-
Victoria	None	-

Figure A-1 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Crude Capacity (Barrels/Calendar Day)</u>
Wharton	None	-
Willacy	None	-

Source: International Petroleum Encyclopedia, 1975 and 1976

Figure A-2

Gas Processing Plants

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
Aransas	Pearce Plant, Fulton Field	75.0
Brazoria	Phillips Petroleum Co., Alvin Plant, various fields	1,000.0
	Amoco Production Co., Old Ocean Plant and Field	570.0
	Exxon Corp., Pledger Plant and Field	220.0
	Amoco Production Co., Hastings Gasoline Plant and Field	70.0
	Phillips Petroleum Co., Brazoria Plant, Chocolate Bayou Field	55.0
	HNG Petrochemicals, Inc., Liverpool Plant, various fields	24.0
Calhoun	Aluminum Co. of America, Alcoa Plant, various fields	150.0
	Exxon Corp., Kellers Bay	47.1
	Exxon Corp., Heyser Plant and Field	22.0
	Cities Service Oil Co., San Antonio Bay Plant and Field	12.4
Cameron	None	-
Chambers	Exxon Corp., Anahuac Plant and Field	275.0
	Houston Oil & Minerals Corp., Smith Point Plant, Bolivar Field	150.0

Figure A-2 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
Chambers (cont.)	United Texas Transmission Co., Galveston Bay Plant and Field	40.0
	Getty Oil Co., Umbrella Point Plant and Field	12.0
	Cities Service Oil Co., Mont Belvieu Plant, various fields	NR*
Fort Bend	Exxon Corp., Thompson Plant and Field	40.0
	Warren Petroleum Co., Moores Orchard Plant	NR*
Galveston	Amoco Gas Co.	140.0
	Amoco Production Co., South Gillock Cycling Plant and Field	32.0
	Charter Oil Resources Co., Alta Loma Plant and Field	22.0
	North Texas LPG Corp., Galveston Plant, Lafitte's Goldfield	15.0
Hardin	Atlantic Richfield Co., Silsbee Plant and Field	80.0
	Atlantic Richfield Co., South Hampton Plant and Field	25.0
Harris	Exxon Corp., Clear Lake Plant and Field	200.0
	HNG Petrochemicals, Inc., Plant and Field	100.0
	Exxon Corp., Tomball Plant and Field, Goodrich	80.0
	Texaco, Inc., Humble Plant	3.0

Figure A-2 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
Hidalgo	Tenneco Oil Co., Ward Plant, McAllen Field	140.0
	Coastal States Gas Corp., Hidalgo Plant and Field	80.0
	Anchor Gasoline Corp., Tabasco Plant and Field	67.0
	Amoco Production Co., LaBlanca Plant and Field	50.0
	Coastal States Gas Corp., Mission Plant	30.0
	Clark Fuel Producing Co., Sullivan City Plant and Field	20.0
Jackson	Mobil Oil Corp., Vanderbilt Plant, West Ranch Fields	88.0
	Exxon Corp., West Ranch Plant and Field	23.0
Jefferson	Union Texas Petroleum Division of Allied Chemical Corp., Winnie Plant, various fields	240.0
	Continental Oil Co., Port Plant, Port Arthur Fields	175.0
	Exxon Corp., Lovell Lake Plant and Field	59.0
	Union Texas Petroleum Division of Allied Chemical Corp., Marrs- McLean-Dryex Plant, McLean Field	35.0
	Warren Petroleum Co., Fannet Plant	33.0
	Exxon Corp., Amelia Plant and Field	16.0
	Cosden Oil & Chemical Co.	12.0

Figure A-2 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
Kenedy	Exxon Corp., Sarita Plant and Field	255.0
Kleberg	Exxon Corp., King Ranch Plant, Seelingson Field	2,650.0
	Cities Service Oil Co., May Plant and Field	50.0
Liberty	Atlantic Richfield Co., Dayton Plant and Field	70.0
	Atlantic Richfield Co., Hull Plant and Field	18.0
	Houston Oil & Minerals Corp.	18.0
Matagorda	Lo-Vaca Gathering Co., Bay City Plant	500.0
	Marathon Oil Co., Markham Plant, North Markam-North Bay City Fields	165.0
	Amoco Production Co., East Bay City Plant and Field	150.0
	Tenneco Oil Co., Leebo Plant, Palacios Field	95.0
	Texaco, Inc., Blessing Plant	65.0
	Monsanto Co., El Maton Plant and Field	15.0
	Exxon Corp., Sugar Valley Plant and Field	12.0
Nueces	Champlin Petroleum Co., Gulf Plains Plant	250.0
	Lo-Vaca Gathering Co., Corpus Christi Plant	200.0
	Tenneco Oil Co., Dean Plant, various fields	100.0

Figure A-2 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
	Amoco Production Co., Luby Plant, Luby-Petronilla Field	90.0
	HNG Petrochemicals, Inc., Robstown Plant, various fields	75.0
	Cities Services Oil Co., Robstown Plant and Field	65.0
	United Gas Pipeline Co.	35.0
	Sun Oil Co., Luby Plant and Field	10.0
Orange	None	-
Refugio	Exxon Corp., Tom O'Connor Plant and Field	150.0
	Amoco Production Co., La Rosa Plant and Field	16.0
	HNG Petrochemicals, Inc., Refugio Plant and Field	7.5
	Atlantic Richfield Co., Refugio Plant and Field	6.5
San Patricio	Sun Oil Co., Red Fish Bay Plant	140.0
	Cities Services Oil Co., Corpus Christi Bay Plant, Corpus Christi Bay Field	75.0
	HNG Petrochemicals, Inc., Geogory Plant	70.0
	Atlantic Richfield Co., Taft Plant, White Point Field	60.0
	Marathon Oil Co., Welder Plant, Plymouth Field	55.0

Figure A-2 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (M M Cubic Feet/Day)</u>
	Warren Petroleum Co., Encinal Plant	21.3
	Superior Oil Co., Portilla Plant and Field	15.0
Victoria	HNG Petrochemicals, Inc., Victoria Plant	94.0
	Sun Oil Co., Victoria Plant	40.0
	Sun Oil Co., West Helen Gohlke Plant and Field	40.0
Wharton	Exxon Corp., Magnet Withers Plant and Field	100.0
	Getty Oil Co., West Bernard Plant and Field	30.0
Willacy	Amoco Production Co., La Sal Vieja Plant and Field	9.0

Source: International Petroleum Encyclopedia, 1976, pp. 392-399.

Figure A-3

Petrochemical Plants

<u>County</u>	<u>Company and Location</u>	<u>Capacity</u>
Aransas	None	---
Brazoria	Amoco Chemical Co., Chocolate Bayor	1 billion lb/y 466 mt/d
	Dow Badische Co., Freeport	595 MM lb/y
	Dow Chemical Co., Freeport	NA
	Monsanto Co., Alvin	235,932,000 mt/y 75 million lb/y
	Phillips Petroleum Co., Sweeney	895,000 mt/y
Calhoun	Union Carbide Corp., Seadrift	315,000 mt/y
Cameron	Union Carbide Corp., Brownsville	250,000 mt/y
Chambers	Union Texas Petrochemical, Winnie	10,000 mt/y
Fort Bend	Dow Chemical, Oyster Creek	NA
Galveston	Monsanto Co., Texas City	1,725,000 mt/y 100 MM gal/y
	Union Carbide Corp., Texas City	779,000 mt/y
	Marathon Oil Co., Texas City	209,600 mt/y

Figure A-3 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity</u>
	Texas City Refining Co., Texas City	50,000 mt/y
	Amoco Chemical Corp., Texas City	2,594 mt/d
Hardin	South Hampton Co., Silsbee	231 mt/y 27,216 mt/y 23 mt/d
Harris	Shell Chemical, Houston	3,691,000 mt/y
	Celanese Chemical, Clear Lake	1,465,000 mt/y
	Tenneco Chemicals, Pasadena	721,000 mt/y
	Arco Chemical Co., Houston	589,000 mt/y
	Phillips Petroleum Corp., Pasadena	503,500 mt/y
	U.S. Industrial Chemical Co., Houston	485,000 mt/y
	Gulf Oil Chemicals Cedar Bayou	437,800 mt/y
	Petro-Tex Chemical Corp. Houston	433,000 mt/y
	Oxirane Chemical Co., Bayport	410,000 mt/y
	Goodyear Tire & Rubber, Houston	386,000 mt/y
	Rohm & Hass Co., Deer Park	320,000 mt/y
	Charter Int'l Oil, Houston	314,485 mt/y

Figure A-3 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity</u>
	Arco Chemical Co., Channelview	232,600 mt/y
	Crown Central Petroleum Corp., Houston	145,000 mt/y
	Hercules, Inc., Bayport	91,000 mt/y
	Merichem Co., Houston	9,000 mt/y
	Dixie Chemical, Bayport	2,000 mt/y
	J.M. Hubor Corp., Baytown	318 mt/y
	Arco/Polymers, Inc., Houston	770 MM lb/y
	Diamond Shamrock, Pasadena/Deer Park	NA
	Diamond Shamrock, Pasadena	NA
	Ethyl Corp., Pasadena	NA
	Exxon, Baytown	NA
	Reichhold Chemicals, Houston	NA
	Soltex Polymer Corp., Deer Park	NA
Hidalgo	none	---
Jackson	none	---
Jefferson	Gulf Oil Chemicals, Port Arthur	1,044,200 mt/y
	Mobile Chemical Co., Beaumont	1,022,000 mt/y

Figure A-3 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity</u>
	Jefferson Chemical Co., Port Neches	772,000 mt/y
	Texaco, Inc., Port Arthur	340,000 mt/y
	Goodyear Tire & Rubber Co., Beaumont	142,000 mt/y
	Union Oil Company of Calif., Beaumont	104,000 mt/y
	Houston Chemical Co., Beaumont	101,750 mt/y
	Cosden Oil & Chemical Co., Groves	39,000 mt/y
	Arco Polymers, Inc., Port Arthur	485 mm lb/y
Kenedy	none	---
Kleberg	none	---
Liberty	none	---
Matagorda	Celanese Chemical Co., Bay City	361,000 mt/y
Nueces	Celanese Chemical Co., Bishop	660,000 mt/y
	Suntide Refining Co., Corpus Christi	418,500 mt/y
	Coastal States Petro- Chemical Co., Corpus Christi	339,700 mt/y
	Champlin Petroleum Co., Corpus Christi	99,900 mt/y

Figure A-3 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity</u>
Orange	Firestone Synthetic Rubber & Latex Co., Orange	230,000 mt/y
	Gulf Oil Chemicals, Orange	90,700 mt/y
	Phillips Petroleum Co., Orange	52,000 mt/y
	Allied Chemical Co., Orange	NA
Refugio	none	---
San Patricio	none	---
Victoria	none	---
Wharton	none	---
Willacy	none	---

Source: 1976 International Petroleum Encyclopedia. pp. 366-372.

Legend: lb/y - pounds per year of products measured in pounds
 mt/d - metric tons per day of products measured in metric tons
 mt/y - metric tons per year of products measured in metric tons
 gal/y - gallons per year of products measured in gallons
 N/A - Not Available

Figure A-4

Mobile Drilling Rig and Offshore Platform Construction Yards

<u>Name of Yard</u>	<u>County</u>	<u>Employment</u> ¹
Marathon LeTourneau	Cameron	2,224
Todd Shipyards	Galveston	1,233
Bethlehem Steel	Jefferson	1,978
Levingston Ship- building	Orange	3,136
Baker Maine	San Patricio	550 ²
Brown and Root (Green Bayou Harbor)	Chambers	80
Brown and Root (Ingleside/Aransas Pass)	Nueces	74

¹Employment figures (except those for Baker Marine) are monthly averages obtained from the Texas Employment Commission.

²Employment figure obtained from industry official is a 1978 projection.

Figure A-5

Conventional Electrical Generating Plants

<u>County</u>	<u>Company and Location</u>	<u>Capacity (Kilowatts)</u>
Aransas	none	—
Brazoria	none	—
Calhoun	Ennis S. Joslin Station, Pt. Comfort, Central Power and Light	261,000
Cameron	San Benito, Central P & L	219,200
	Brownsville, Brownsville Municipal	53,000
	Brownsville, Brownsville Municipal	66,570
Chambers	Cedar Bayou, Houston Lighting & Power Co. (HL&P)	2,295,000
Fort Bend	W.A. Parish, HL&P	1,271,720
Galveston	P.H. Robinson, HL&P	2,330,820
Hardin	none	—
Harris	Sam Bertron, HL&P	875,260
	Greens Bayou, HL&P	1,253,400
	Webster, HL&P	630,320
	Deepwater, HL&P	334,850
	T. H. Wharton, HL&P	1,946,420
	Hiram O. Clarke, HL&P	306,000
	Gable Street, HL&P	53,000

Figure A-5 (continued)

<u>County</u>	<u>Company and Location</u>	<u>Capacity (Kilowatts)</u>
Hidalgo	J. L. Bates, Central P&L	188,700
Jackson	none	—
Jefferson	Neches, Gulf States Utilities Co.	452,272
Kenedy	none	---
Kleberg	none	---
Liberty	City of Liberty, Texas	---
Matagorda	none	---
Nueces	Nueces Bay, Central P&L	595,500
	Lon C. Hill Station, Central P&L	574,200
	City of Robstown, Texas	20,665
	Barney M. Davis Station, Central P&L	703,800
Orange	Sabine, GSU	1,543,600
Refugio	none	---
San Patricio	none	---
Victoria	Victoria Station, Central P&L	553,500
	Sam Rayburn Station, South Texas Elec. Corp.	48,000
Wharton	none	---
Willacy	none	---

Source: FERC Files, December, 1976 data revised by Federal Energy Regulatory Commission, Ft. Worth Regional Office. May 24, 1978.

Figure A-6

Storage Capacity of Petroleum Bulk Stations
and Terminals, 1972

<u>County</u>	<u>Number</u>	<u>Capacity (1000's of Barrels)</u>
Aransas	3	4.3
Brazoria	30	29.7
Calhoun	7	8.7
Cameron	31	366.3
Chambers	8	15.0
Fort Bend	13	18.05
Galveston	13	100.9
Hardin	10	32.98
Hidalgo	30	50.7
Jackson	5	10.8
Jefferson	18	109.1
Kenedy	—	—
Kleberg	6	8.6
Liberty	14	20.1
Matagorda	18	16.5
Nueces	24	585.9
Orange	6	14.0
Refugio	4	7.1
San Patricio	12	11.3

Figure A-6

<u>County</u>	<u>Number</u>	<u>Capacity (1000's of Barrels)</u>
Victoria	11	106.2
Wharton	12	13.8
Willacy	7	7.5

Source: Bureau of Census, 1972 Census of Wholesale Trade. Vol. I.

Figure A-7

Shipbuilding/Repairing Facilities

Employment

<u>County</u>	<u>50 to 99</u>	<u>100 to 249</u>	<u>250 to 499</u>	<u>500 to 999</u>	<u>1,000 or more</u>
Aransas		1			
Brazoria	1				
Calhoun			NONE		
Cameron			NONE		
Chambers			NONE		
Fort Bend			NONE		
Galveston			1		
Hardin			NONE		
Harris	1	1			1
Hidalgo			NONE		
Jackson			NONE		
Jefferson	1		1		
Kenedy			NONE		
Kleberg			NONE		
Liberty			NONE		
Matagorda			NONE		
Nueces		1			
Orange	1				
Refugio			NONE		
San Patricio			NONE		

Figure A-7 (continued)

<u>County</u>	<u>50 to 99</u>	<u>100 to 249</u>	<u>250 to 499</u>	<u>500 to 999</u>	<u>1,000 or more</u>
Victoria			NONE		
Wharton			NONE		
Willacy			NONE		

Note: Platform Construction Yards have been factored out and listed separately.

Source: 1974 County Business Patterns, issued Jan., 1977.

Figure A-8

Primary Metal Processing FacilitiesEmployment

<u>County</u>	<u>50 to 99</u>	<u>100 to 249</u>	<u>250 to 499</u>	<u>500 to 999</u>	<u>1,000 or more</u>
Aransas			NONE		
Brazoria					1
Calhoun					1
Cameron			NONE		
Chambers			NONE		
Fort Bend			NONE		
Galveston	3		1		
Hardin			NONE		
Harris	9	6	3		2
Hidalgo			NONE		
Jackson			NONE		
Jefferson			NONE		
Kenedy			NONE		
Kleberg			NONE		
Liberty			NONE		
Matagorda			NONE		
Nueces	1			1	
Orange				1	
Refugio			NONE		
San Patricio				1	
Victoria			NONE		
Wharton			1		
Willacy			NONE		

Source: 1974 County Business Patterns, issued Jan., 1977.

Figure A-9
Metal Fabricating Facilities

<u>County</u>	<u>50 to 99</u>	<u>100 to 249</u>	<u>250 to 499</u>	<u>500 to 999</u>	<u>1,000 or more</u>
Aransas			NONE		
Brazoria	1	2			
Calhoun			NONE		
Cameron	2				
Chambers			NONE		
Fort Bend	2	2	1	1	
Galveston		1			
Hardin			NONE		
Harris	53	38	12	9	1
Hidalgo			NONE		
Jackson			NONE		
Jefferson	2	8	2		
Kenedy			NONE		
Kleberg			NONE		
Liberty			NONE		
Matagorda			NONE		
Nueces	2				
Orange			NONE		
Refugio			NONE		
San Patricio			NONE		
Victoria	1	1			
Wharton			NONE		
Willacy			NONE		

Source: 1974 County Business Patterns, issued Jan., 1977.

Figure A-10

Machinery (Other Than Electrical) Manufacturing Facilities

<u>County</u>	<u>Employment</u>				
	<u>50 to 99</u>	<u>100 to 249</u>	<u>250 to 499</u>	<u>500 to 999</u>	<u>1,000 or more</u>
Aransas			NONE		
Brazoria	2	1			
Calhoun			NONE		
Cameron	2				
Chambers			NONE		
Fort Bend			NONE		
Galveston			NONE		
Hardin			NONE		
Harris	37	33	10	4	3
Hidalgo		1			
Jackson			NONE		
Jefferson		1	1		
Kenedy			NONE		
Kleberg			NONE		
Liberty			NONE		
Matagorda			NONE		
Nueces		1			
Orange	1				
Refugio			NONE		
San Patricio			NONE		
Victoria	1	1			
Wharton			NONE		
Willacy			NONE		

Source: 1974 County Business Patterns, issued Jan., 1977.

Figure A-11

Sources of Industrial Projections

1. U.S. Department of Commerce
2. Federal Energy Administration
3. Economic Development Administration
4. Environmental Protection Agency
5. National Constructors Association
6. National Construction Industry Council
7. National Planning Association
8. National Utility Contractors Association, Inc.
9. National Association of Manufacturers
10. Industrial Development Research Council
11. National Petroleum Refiners Association
12. American Petroleum Institute
13. American Chemical Society
14. Manufacturing Chemists, Inc.
15. Oil and Gas Journal
16. Fortune
17. Texas Industrial Commission
18. Texas Water Quality Board
19. Texas Water Development Board
20. Texas Air Control Board
21. Texas General Land Office
22. Texas Employment Commission
23. Texas Energy Advisory Council
24. Texas Coastal and Marine Council
25. Greater South Texas Cultural Basin
26. Rice Center for Community Design and Research
27. University of Texas at Austin
28. University of Texas at Arlington
29. Coastal Bend Council of Governments
30. Golden Crescent Council of Governments
31. Houston-Galveston Area Council
32. South East Texas Regional Planning Commission
33. Lower Rio Grande Valley Development Council
34. Houston Lighting and Power
35. Central Power and Light
36. Gulf States Utility Co.
37. Todd Shipyards
38. Chambers of Commerce of Houston, Beaumont, Brownsville, Brazosport, Galveston, Texas City, Victoria, and Port Lavaca
39. Corpus Christi Industrial Development Commission

Figure A-12

Selected Employment Projections (By SMSA)

A. Houston SMSA

Employment

<u>Sector</u>	<u>1970</u>	<u>1976</u>	<u>1980</u>	<u>1970-1980</u>	
				<u>Net</u>	<u>%</u>
Primary Metals	8,800	9,000	9,400	600	6.8
Fabricated Metals	20,700	26,200	29,900	9200	44.4
Machinery (Except Elec- trical)	26,700	31,900	35,100	8400	31.5
Petroleum Refining	11,300	10,300	9,700	-1600	-14.2
Electric Light and Power	5,600	6,300	6,800	1200	21.4
Chemical and Allied Products	23,200	27,000	29,600	6400	27.6

B. Beaumont-Port Arthur-Orange SMSA

<u>Sector</u>	<u>1970</u>	<u>1976</u>	<u>1980</u>	<u>Employment</u>	
				<u>Net</u>	<u>1970-1980</u> <u>%</u>
Primary Metals	600	700	800	200	33.3
Fabricated Metals	2,900	2,900	2,900	0	0.0
Machinery (Except Elec- trical)	900	1,000	1,000	100	11.1
Petroleum and Coal Products	14,000	14,000	14,100	100	.7
Chemical and Allied Products	9,500	10,200	10,600	1,100	11.6
Utilities, Sani- tary Services	2,400	2,500	2,600	200	8.3

C. Corpus Christi SMSA

Employment

<u>Sector</u>	<u>1970</u>	<u>1976</u>	<u>1980</u>	<u>1970-1980</u>	
				<u>Net</u>	<u>%</u>
Primary Metals	1,700	1,700	1,800	100	5.9
Fabricated Metals	500	500	500	0	0.0
Machinery (Except Electrical)	400	1,000	1,400	1,000	250.0
Petroleum and Coal Products	1,700	1,800	1,800	100	5.9
Utilities, Sani- tary Services	2,500	3,000	3,300	800	32.0
Chemical and Allied Pro- ducts	2,900	2,900	3,000	100	3.4

Source: Changing Horizons, A Profile of Jobs to 1980, Published by the Texas
Employment Commission, June, September and October, 1975.

Figure A-13

Employment ProjectionsCoastal Area¹Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	43,815	62,847	43.4
Machinery (Except Electrical)	26,712	35,904	34.4
Primary Metals	17,399	19,932	14.6
Fabricated Metals	23,483	31,252	33.1
Utilities	26,414	32,014	21.2

Southeast Texas²Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	8,889	12,054	35.8
Machinery (Except Electrical)	919	1,113	21.1
Primary Metals	671	641	-4.5
Fabricated Metals	2,055	2,423	17.9
Utilities	2,882	2,979	3.4

Houston-Galveston³Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	30,396	44,079	45.0
Machinery (Except Electrical)	24,988	33,669	34.7
Primary Metals	12,865	14,729	14.5
Fabricated Metals	20,592	27,550	33.8
Utilities	17,169	21,743	26.6

Golden Crescent⁴Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	1,998	2,978	49.1
Machinery (Except Electrical)	78	92	18.0
Primary Metals	1,394	1,790	28.4
Fabricated Metals	122	193	58.2
Utilities	801	882	10.1

Coastal Bend⁵Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	2,132	3,194	49.8
Machinery (Except Electrical)	434	613	41.2
Primary Metals	2,392	2,687	12.3
Fabricated Metals	465	828	78.1
Utilities	3,406	4,127	21.2

Lower Rio Grande Valley⁶Employment

<u>Sector</u>	<u>1970</u>	<u>1980</u>	<u>%</u>
Chemical and Allied	400	542	35.5
Machinery (Except Electrical)	293	417	42.3
Primary Metals	77	85	10.4
Fabricated Metals	249	258	3.6
Utilities	2,156	2,283	5.9

- ¹ Includes Aransas, Bee, Brazoria, Brooks, Calhoun, Cameron, Chambers, Fort Bend, Galveston, Goliad, Hardin, Harris, Hidalgo, Jackson, Jefferson, Jim Wells, Kenedy, Kleberg, Liberty, Matagorda, Montgomery, Nueces, Orange, Refugio, San Patricio, Victoria, Waller, Wharton, and Willacy Counties.
- ² Includes Hardin, Jefferson, and Orange Counties.
- ³ Includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Matagorda, Montgomery, Waller, and Wharton Counties.
- ⁴ Includes Calhoun, Jackson, Goliad, and Victoria Counties.
- ⁵ Includes Aransas, Bee, Brooks, Jim Wells, Kenedy, Kleberg, Nueces, Refugio, and San Patricio Counties.
- ⁶ Includes Cameron, Hidalgo, and Willacy Counties.

Source: The Coastal Economy, Texas General Land Office Coastal Management Program, October, 1975, pp. A-37 - A-42.

Figure A-14

Water Use Projections

<u>Coastal Basin</u>	<u>% Increase in Manufacturing Water Use, 1974-2030</u>	<u>County With Highest Demand¹</u>	<u>Manufacturing Type With Highest Demand²</u>
Neches-Trinity	135%	NA	Refining (60) Petrochemical (39)
Trinity-San Jacinto	625%	Harris (95%)	Refining (32)
San Jacinto-Brazos	623%	Galveston (64%)	Petrochemical (56%) Refining (41%)
Brazos-Colorado	1265%	Brazoria (95%)	Petrochemical (96%)
Colorado-Lavaca	468%	Calhoun (97%)	Petrochemical (97%)
Lavaca-Guadalupe	693%	Calhoun (100%)	Petrochemical (97%)
San Antonio-Nueces	210%	San Patricio (75%)	Petrochemical (84%)
Nueces-Rio Grande	248%	Nueces (79%)	Refining (52%) Petrochemical (36%)

¹ Percent of basin's manufacturing water use in 2030.

² Percent of county's manufacturing water use in 2030.

Source: Continuing Water Resource Planning and Development for Texas, Texas Water Development Board, May, 1977.

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List of Comments

Laurence M. Brickman, Ph.D.
Chief Ecologist
Ecology and Environment, Inc.

Donald C. Dobel, Field Supervisor
U.S. Fish and Wildlife Service

C.L. Green
Texas Area Environmental Coordinator
Alcoa

T.R. Jones
Chairman
Port of Harlingen

Bob Maurer
Environmental Maintenance Coordinator
Celanese Chemical

Joe A. Moss
Vice President and General Counsel
American Petrofina, Inc.

Barbara J. Neal
La Porte, Texas

Harry I. Newman
Acting Secretarial Representative
Region VI
U.S. Department of Transportation

Alex D. Opiela, Jr., P.E.
Deputy Director, Control and Prevention Program
Texas Air Control Board

Barry G. Rought, P.E.
Chief, Planning Division
Department of the Army
Corps of Engineers

William H. Stevenson
Regional Director
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Bill Thompson
Physical Scientist
Federal Energy Regulatory Commission

Don Wynn
Port Director
Port of Port Arthur

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