Environmental Permitting in Texas

Lyndon B. Johnson School of Public Affairs
The University of Texas at Austin
Policy Research Project Report

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The University of Texas at Austin
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ABSTRACT

This study is designed to evaluate the environmental permitting system in the state of Texas and to formulate policy recommendations to improve the federal and state permitting process. The study examines environmental permitting under the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, and Safe Drinking Water Act at five different sites.

Specifically, the study attempts to determine if permits comprehensively manage the disposal of wastes into the environment. For this purpose permitting in each environmental medium (water, air, surface and subsurface waste) has been examined in order to assess the process and, in addition, to determine whether intermedia transfers of pollutants are recognized and addressed. The issue is timely because media-specific regulations and permits often ignore secondary impacts on the other media. Recent research has documented evidence of intermedia transfer (e.g., pollution of groundwater due to improperly lined landfills). Other issues addressed include the administrative efficiency and effectiveness of the permitting process.

While the research did find a generally satisfactory system in operation for the five cases studied, it does identify areas that appear problematical. The study concludes with a critical analysis and a set of recommendations.

The major recommendations are that steps should be taken by state and federal authorities to:

1. Inform and educate agency engineers about cross-media transfers.

2. Establish a special section in each agency to address cross-media issues.

3. Modify permit application forms to specifically consider cross-media issues.

4. Institute certain actions, such as surprise inspections and annual reports of cumulative emissions, to reduce opportunities for permit violations.

5. Raise permit fees so that additional resources are available for permit processing.

6. Increase interaction between agency and applicant in order to improve understanding and cooperation in areas of uncertainty.

The research was performed by a faculty-student team at the LBJ School of Public Affairs, The University of Texas at Austin, September 2, 1984 to August 31, 1985.

List of Abbreviations

AN - acrylonitrile
Be - beryllium
bbl - barrels
cfs - cubic feet per second
CO - carbon monoxide
gal - gallons
H2SO4 - sulfuric acid
Hg - mercury
hmds - hexamethyldisilizium
lb/day - pounds per day
mgd - million gallons per day
mg/l - milligrams per liter
N2O - nitrous oxide
psi - pounds per square inch
SO2 - sulfur dioxide
t/y - tons per year

List of Acronyms

AQCR - Air Quality Control Region
BACT - Best Available Control Techology
BAS - Building Automation System (at Motorola)
BAT - Best Available Technology
BOD - Biological Oxygen Demand
BSWM - Bureau of Solid Waste Management
C-1290 - Construction Permit 1290 (for Motorola)
CAA - Clean Air Act
CFP - Corporate Facilities Practice
CP - Central Plant (at Motorola)
CWA - Clean Water Act
DES - Develop-Etch-Strip (production process for making printed circuit boards at IBM)
EIAP - Environmental Impact Assessment Program (IBM)
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
EPD - Environmental Programs Department
ERMD - Environmental Resources Management Department
FEB - Flow Equalization Basin
FPP#3 - Fayette Power Project #3
GCWDA - Gulf Coast Waste Disposal Authority
HTES - Hazardous and Trace Emissions System
HVAC - Heating, Ventilation and Air Conditioning (Department at IBM)
HWDMS - Hazardous Waste Data Management System
IBM - International Business Machines, Inc.
IC - Integrated Circuit
IFDF - Industrial Facilities Discharge File
LAER - Lowest Achievable Emission Rate
LCRA - Lower Colorado River Authority
MOS - Metal Oxide Semiconductor
NAAQS - National Ambient Air Quality Standards
NEDS - National Emissions Data System
NEPA - National Environmental Protection Act
NESHAPs - National Emissions Standards for Hazardous Air Pollutants
NPDES - National Point Discharge Elimination System
NSPS - New Source Performance Standards
PSD - Prevention of Significant Deterioration
R-1290 - Operating Permit 1290 (Motorola)
RCRA - Resource Conservation and Recovery Act
RCRAR - Resource Conservation and Recovery Act Reauthorization
SDWA - Safe Drinking Water Act
SIP - State Implementation Plan
TACB - Texas Air Control Board
TCAA - Texas Clean Air Act
TDA - Texas Department of Agriculture
TDH - Texas Department of Health
TDPH - Texas Department of Public Health
TDWR - Texas Department of Water Resources
TIWA - Texas Injection Well Act

TRRC - Texas Railroad Commission
TSWDA - Texas Solid Waste Disposal Act
TWC - Texas Water Commission
TWDB - Texas Water Development Board
TWQA - Texas Water Quality Act
TWQB - Texas Water Quality Board
UIC - Underground Injection Control
VOCs - Volatile Organic Compounds
WDW - Waste Disposal Well
WWTP - Wastewater Treatment Plant

FOREWORD

The Lyndon B. Johnson School of Public Affairs has established interdisciplinary research on specific policy problems as the core of its educational program. A significant part of this program is the nine-month policy research project, in which two or three faculty members from the School of Public Affairs and on occasion from other colleges within the University of Texas at Austin direct the research of ten to twenty graduate students on a policy issue of current concern to a governmental and/or public interest organization. This client orientation puts students in direct contact with administrators, legislators, and other officials active in the policymaking process and provides "hands on" experience in the multitude of skills necessary to conduct research in a policy environment. It also introduces students to the difficulties of relating research findings to the world of political realities.

This analysis of environmental permitting in Texas is the product of a policy research project conducted at the Lyndon B. Johnson School of Public Affairs during 1984-85. Research and publication have been funded by the U.S. Environmental Protection Agency. Additional support was received from the Conservation Foundation of Washington, D.C. The research design was discussed with EPA officials. However, findings and recommendations are those of the research group only.

The curriculum of the LBJ School is intended to develop the skills required for effective public service and to produce research that will enlighten and inform those already engaged in the policy process. The project that resulted in this report has helped to accomplish the first task; we hope and expect that the report itself will contribute to the second.

It takes more than dedicated research to produce a good report. Without the help of numerous private and public officials this study would not have been possible. We would particularly like to thank James C. Caraway, James Crocker, Andrew Covar, James Cunningham, Tom Diggs, Dennis Haverlah, Louis Herrin, Arthur Kellogg, Harry Pruett, Richard Reich, George Shoop, Virginia Smith, Asanga Weerakoon, and John Young. They all serve with agencies and firms that we worked with in this study.

A special thanks should go to Susan Roush and Daniel Wattles for all their help in pulling the report together and getting it into its final form.

Finally, it should be noted that neither the LBJ School nor The University of Texas at Austin necessarily endorses the views or findings of this study.

PRP TEAM MEMBERS

Faculty

James E. Katz, Assistant Professor, LBJ School of Public Affairs, The University of Texas at Austin

Jurgen Schmandt, Professor, LBJ School of Public Affairs, The University of Texas at Austin

Students

Oscar De La Fuente, B.A. (History), University of Texas at Austin, coauthor, case study, "City of Austin: Walnut Creek Wastewater Treatment Facility"

Marilyn Hunt, B.S. (Criminal Justice), University of Wisconsin--Madison, coauthor, case study, "City of Austin: Walnut Creek Wastewater Treatment Facility"

Julie Johnson, B.A. (Political Science), Hendrix College, Conway, Arkansas, coauthor, case study, "Motorola, Inc.: Permitting the Production of Semiconductors"

Vincent Lazaro, B.A. (History), Yale University, coauthor, case study, "Monsanto Fibers and Intermediates Company, Texas City: Underground Injection Control by the Texas Department of Water Resources"

Scott McKee, B.S. (Archaeology), Brigham Young University, coauthor, case study, "IBM Austin: Permitting a Circuit Board Manufacturing Plant"

Patricia Mears, B.A. (English), University of Texas at Austin, coauthor, case study, "City of Austin: Walnut Creek Wastewater Treatment Facility"

Velma Reyes, B.A. (Political Science), Texas Lutheran College, coauthor, case study, "Motorola, Inc.: Permitting the Production of Semiconductors"

Saranna Robinson, B.A. (Economics/Government), Colby College, Waterville, Maine, coauthor, case study, "Lower Colorado River Authority Permits for Fayette Power Project Number 3"

Barbara Van Der Loop, B.A. (Political Science), Texas Tech University, coauthor, case study, "IBM Austin: Permitting a Circuit Board Manufacturing Plant"

Daniel Wattles, B.S. (Public Administration), University of Arizona, coauthor, case study, "Monsanto Fibers and Intermediates Company, Texas City: Underground Injection Control by the Texas Department of Water Resources"

Susan Wilger, B.S. (Education), University of Wisconsin--Madison, coauthor, case study, "Lower Colorado River Authority Permits for Fayette Power Project Number 3"

ENVIRONMENTAL PERMITTING IN TEXAS

INTRODUCTION

Environmental permitting is an administrative device for controlling the emissions of various pollutants into the water, air, and land. Permits translate the goals of a cleaner environment set out in various environmental statutes into specific directives for point/stationary sources of pollution operated by firms and municipal governments. The formats of permits vary from statute to statute. Generally, they include: (1) limitations on the amount of regulated pollutants that may be emitted; (2) pollution control technology that must be used by the facility; (3) pollution monitoring procedures that must be followed; and (4) administrative guidelines regarding the life of the permit, appeal procedures, record keeping, etc.

This study examines environmental permitting under the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, and Safe Drinking Water Act. Each of these statutes gives the Environmental Protection Agency (EPA) the authority to write permits for facilities emitting pollutants under specific circumstances and to control specific pollutants regulated by each act. Each of these statutes also allows transfer of permitting authority from the EPA to state environmental agencies after a state has proven to the EPA's satisfaction that its program is stringent enough to meet federal standards.

Permitting provisions differ from act to act. Additional complexity results from grandfather clauses that, for varying periods of time, exempt existing facilities from meeting environmental standards. Retrofitting control technology into existing facilities is expensive, and Congress was concerned that the cost would lead to higher levels of unemployment. However, the facilities studied in this report must meet all current standards applying to the pollutants they produce.

Generally, when a company seeks to build or modify a facility emitting pollutants, it must obtain permits to do so from the appropriate environmental agencies. Without the necessary permits the company may not begin construction or modification.

The Policy Research Project had two objectives in studying the environmental permitting process in Texas.

1. To understand how the permitting process works in a large state where most of the permitting authority is located at the state level. Part I provides an overview of the permitting provisions under the major statutes and of the organizational arrangements in agencies for writing and renewing permits. The information is based on written documents and a small number of interviews. Readers familiar with the statutes and agencies described here may want to proceed immediately to part II.

2. To examine critical issues encountered in permitting of individual facilities works. This is the main part of the report. Two questions are asked: How is permitting viewed from the perspectives of the issuing agency and of the facility applying for a permit? How do agencies and permittees deal with intermedia transfer of pollutants? There has been increased concern about these questions in recent years, in particular in regard to toxic substances in the environment. Texas, unlike Colorado, Illinois, or New York, does not have a formal mechanism for coordinating permits issued by different environmental agencies. This makes it even more important to ask if and how cross-media transfers are taken into account.

We chose a case study methodology to study these questions. Five cases were selected: (1) City of Austin--Walnut Creek Wastewater Plant (water permits); (2) Lower Colorado River Authority--Fayette Power Project #3 (air and water permits); (3) IBM--circuit board manufacturing plant in Austin (air permits); (4) Motorola--semiconductor manufacturing plant in Austin (air permits); and (5) Monsanto Fibers and Intermediates Company--Texas City facility (underground injection control permits). These cases were chosen primarily with the goals of studying a diverse group of permittees (i.e., private industry, governmental units, and quasi-governmental units) and a diverse set of permits. While we recognize that such a small and nonrandom sample is not in any sense statistically significant, we believe that it is possible to make certain types of substantive inferences about the permitting process based on what we have discovered. At this exploratory level and because of the lack of systematic knowledge about the permit implementation process, detailed case studies provide necessary information upon which broader studies can be built.

Our analysis focuses on the permitting process. We did not study enforcement. Without enforcement, obviously, pollution control will not work. However, we had to keep the focus narrow, given both time and resource constraints.

1. Executive Summary

1.1 The Study

1.1.1 Study Focus

The study is designed to evaluate the environmental permitting system in the state of Texas and to formulate policy recommendations to improve the federal and state permitting process.

Specifically, the study attempts to determine if permits comprehensively manage the disposal of wastes into the environment. For this purpose permitting in each environmental medium (water, air, surface and subsurface waste) has been examined in order to assess the process and to determine whether intermedia transfers of pollutants are recognized and addressed. The issue is timely because media-specific regulations and permits often ignore secondary impacts on the other media. Recent research has documented evidence of intermedia transfer (e.g., toxic substances, acid rain, and pollution of groundwater due to improperly lined landfills). The study attempts to document the extent and significance of media transfers in five specific cases and considers their impact on permitting. It also addresses such issues as the administrative efficiency and effectiveness of the permitting process.

1.1.2 Phase 1: Overview of Environmental Permitting in Texas

In preparing the overview of environmental permitting in the state the team:

1. Reviewed permitting requirements under federal legislation--Clean Air Act (CAA), Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA), and Safe Drinking Water Act (SDWA).

2. Reviewed state legislation and rules of primary Texas environmental agencies--Texas Air Control Board (TACB), Texas Department of Water Resources (TDWR), Texas Railroad Commission (TRRC), and Texas Department of Public Health (TDPH).

3. Interviewed permitting staff in Texas environmental agencies and studied permit applications, supporting documents, and actual permits.

4. Interviewed staff of the Environmental Services Division in the EPA's region 6 office.

1.1.3 Phase 2: Site Selection

In the second phase the study team selected five facilities for detailed analysis. This number was deemed appropriate considering the number of team personnel (eleven).

For the purposes of this study, a site was defined as a physical location where wastes are generated, stored, or disposed. While this project has examined the entire spectrum of permitting and waste disposal, sites involving only hazardous wastes were not considered due to the status of the applicable programs. No hazardous waste disposal sites in the state had been granted final authority under the RCRA at the time that sites were being chosen for the case studies. Also, sites currently involved in litigation were omitted due to potential problems with record and file acquisition.

The following criteria were considered when choosing the most feasible sites for study:

1. Economic Significance: measured by the number of personnel employed by potential study sites.
2. Extensiveness of permitting history: determined both by quantity of permits held and by length of time held.
3. Types of institutions: the goal being a mix of public and private institutions.
4. Likelihood of multimedia transfer of pollutants: the goal being to select sites with likelihood of intermedia transfer problems.
5. Proximity of location to Austin and cost of travel.
6. Good will: demonstrated by willingness to release information and to make company personnel available for interviews.
7. Record of compliance/noncompliance: the goal being to avoid extreme cases of noncompliance.
8. Permit writers' recommendation: After an initial screening of types of facilities, recommendations of specific permits meeting our criteria for study were requested.

1.1.4 Phase 3: Collection of Site-Specific Emission and Control Data

Emission and control data were collected for the five facilities chosen in phase 2 in order to evaluate the effectiveness of the permits, to assess the extent of cross-media transfers, and to examine the extent to which they were controlled by the permitting process.

Information sources consisted of the following:

1. Permit files:
    a. Federal permits
    b. State permits
    c. Application material
    d. Monitoring data

2. Applicant's files

3. EPA special reports

Originally, the project team planned to use national data bases as another source of information for our analysis. We considered the following series: (1) National Emissions Data System (NEDS)--air, (2) Hazardous and Trace Emissions System (HTES)--air, (3) Industrial Facilities Discharge File (IFDF)--water (sewage treatment plants and direct discharges), (4) Needs Survey--water (sewage treatment plants), and (5) Hazardous Waste Data Management Systems (HWDMS). However, as the study progressed, we found that we lacked the technical knowledge to make effective use of these series. This was not a problem because the state and federal permit files, the files of the permit applicants, and EPA special reports were rich in information that could be effectively utilized. From preliminary investigation we also concluded that the national data bases seemed to yield less current and site-specific information than our other sources.

1.1.5 Phase 4: Analysis of Permitting at Five Sites

The study team used the products of the first three phases in its analysis of environmental permitting at the selected sites. This analysis emphasizes extent and handling of cross-media effects; management of permit violations; present enforcement and compliance methods; and potential alternatives to present permitting procedures.

The analysis is in two parts: individual case studies on the five facilities and discussion of critical issues, drawing on site studies and comparing the results. Similarities are examined in light of the effectiveness of permitting in general. Differences in some cases point to problems specific to particular types of industrial processors.

Analysis of the effectiveness of the existing permitting process addresses such issues as the technical capability of the regulating agencies; the appropriateness of the environmental legislation; the enforcement techniques employed; and the interagency communications.

Other issues concerning the overall design of the permitting process include opportunities for public participation; assignment of environmental control to media-specific agencies instead of approaching the issue comprehensively; targeting programs on the basis of administrative feasibility instead of an underlying conceptual approach that would assess the entire dynamic pollution process; the harmful nature of the environmental impact; and the extent of interaction between state and federal agencies and the causes for varying degrees of the interaction.

Several aspects of the use of information in the permitting process were analyzed: the kinds and quality of information requested by the permitting agencies; utilization of the information; and identification of information not requested which could be of benefit to the regulatory agency in its attempts to control pollution. For an expanded view of the study design, see appendix 1.1.

1.1.6 Phase 5: Recommendations

Recommendations from each of the site research teams have been used to formulate overall recommendations concerning permitting and control of intermedia pollution. Options for handling the problem of intermedia pollution through changes in the permitting process have been explored. Considerations for change include: flexibility given to permit writers, the extent to which present regulations encourage or inhibit explicit consideration of transfers, and finally, possible statutory changes.

1.2 Overview of Environmental Permitting in Texas

1.2.1 Permitting under the Clean Water Act

Federal and state agencies obtain the authority to regulate sources of water pollution from the Clean Water Act of 1972 (as amended) and the Texas Water Quality Act (TWQA). In Texas, this regulation is accomplished via permits, effluent emission standards, water quality standards, and environmental impact statements. Since Texas has not been given full authority to issue permits under the Clean Water Act, each entity discharging wastewater into Texas water bodies must obtain two separate permits--a wastewater disposal permit from the state and a National Point Discharge Elimination System (NPDES) permit from the federal government.

Permits are issued on the basis of water quality standards that have been promulgated by the state with Environmental Protection Agency (EPA) approval. Effluent emissions must be monitored by the permittee and reports periodically sent to the Texas Department of Water Resources (TDWR). In cases where there will be a significant impact on the environment, both the EPA and/or the TDWR may require the applicant to submit an environmental impact statement.

The TDWR is the state environmental agency responsible for water control policies. It is divided along functional lines: the Texas Water

Development Board (TWDB), with legislative responsibilities, establishes and approves general policy for the department including the formulation of a state water plan; the Texas Water Commission (TWC) serves as the judicial arm, primarily holding hearings on water-related issues; and the executive director of the TDWR serves in an executive capacity for the agency.

Both the state (wastewater disposal) and federal (NPDES) permit applications are submitted to the TDWR, which prepares draft NPDES permits for the EPA. Completed applications are submitted to the Wastewater Permit Section of the TDWR for technical review by chemical and civil engineers. The engineer writes draft permits prescribing the conditions on which they are issued such as duration, location, maximum quantity of waste, character and quality of waste, and monitoring and reporting conditions. These draft permits are circulated to other departments within the TDWR for comment. The NPDES draft permit is then sent to the EPA regional office in Dallas for final approval. Final approval of the state permit is given by the TWC. Both state and federal permits are open to public comment before final approval, and if contested by legitimate parties (for example, downstream landowners) a public hearing must be held before a final decision on permit issuance can be made.

Currently, the EPA is initiating a "step-in" program in which states take on CWA authority in steps and eventually are given full authority. In Texas there are several issues that remain to be resolved by state and federal agencies before federal designation of full authority under the CWA can occur. The unresolved issues involve penalties, technology standards, and the effectiveness of regulations based on the measurement of toxic and nontoxic pollutants. Despite these disagreements, however, several reforms in the state program have taken place in an attempt to better match federal standards and to develop an efficient and coordinated system for water quality control.

1.2.2 Permitting under the Clean Air Act

The Texas Air Control Board issues permits to facilities emitting air pollutants under authority of the Texas Clean Air Act (TCAA) - subchapter C and regulation VI of the Texas Air Control Board. Further authority is derived from the U.S. Clean Air Act, which allows the EPA to authorize state air pollution control agencies to issue permits. This delegation is contingent on states proving to the EPA's satisfaction that their air pollution control regulations will be at least as stringent as federal regulations. The TACB has received authority from the EPA to issue general air permits. The board has not yet been authorized to issue prevention of significant deterioration (PSD) permits.

Nine members, appointed by the governor of the state, make up the TACB. Permit writing is carried out by the board's Permit Section, which is located in the Enforcement Division. Twelve regional offices also assist in the permit writing process (particularly for state operating permits).

The owner of a planned facility that will be emitting air pollutants must apply to the TACB for a construction permit before construction begins on the project. Applications are reviewed by engineers in the Permit Section and are also made available for public comment. Draft permits are available for public comment and may even be the subject of a public hearing if there is strong public reaction against the issuance of the permit under the terms of the draft permit. For a draft permit to become final, it must be approved by the executive director of the TACB who acts under the authority of the board.

To be eligible to receive a construction permit, the planned facility must meet various regulations and requirements of the TACB. The conditions are written into the permit and include general conditions that apply to all emitting facilities and specific conditions that apply only to the individual applicant. The construction permit writing process generally takes ninety days.

After construction and within sixty days of beginning operations, the owner or operator of the facility must apply to the TACB for an operating permit. The permit writing process is similar to the preparation of construction permits. However, the regional offices of the TACB play a greater role. This process generally takes one month. As with the construction permit, the operating permit includes general conditions that must be met by all emitters of air pollutants in the state as well as specific conditions for the individual facility. The primary purpose of the operating permit review is to aid in the enforcement of the provisions of the construction permit.

Technical review of PSD permit applications and the writing of draft PSD permits is also carried out by the TACB. This permit must be applied for along with and at the same time as the construction permit. While the permit writing process for the PSD permit is similar to that followed for the construction permit, it is different in that the PSD permit is a federal permit. While the EPA regional office in Dallas rarely makes significant changes to the draft PSD permit, this permit may not be issued without the EPA's approval. Because of the greater amount of review that takes place and the modeling that must be done, the PSD permit usually takes six months to write.

Under Texas law some emitters of air pollutants need not obtain permits to operate because their emissions fall below certain thresholds (i.e., they are emitting insignificant amounts of pollutants). The owners of these facilities must apply to the TACB for a permit exemption.

The TACB has so far not paid much attention to the cross-media effects of air pollutants. Recently the board has begun to consider the impacts of emissions of volatile organic compounds (VOCs) from surface bodies of water. However, a formal program is not yet in operation to deal with the problem.

State/federal relations seem to be good. The staff in the Permit Section of the TACB voice no major complaints about the EPA regional office in Dallas and vice-versa.

1.2.3 Permitting under the Resource Conservation and Recovery Act

The state of Texas issues permits for industrial and municipal hazardous and nonhazardous waste under the Resource Conservation and Recovery Act and the Texas Solid Waste Disposal Act (TSWDA). Texas received final authorization for issuing permits under RCRA in December 1984. In November 1984 the Resource Conservation and Recovery Act Reauthorization (RCRAR) was signed into law. This act reauthorized RCRA and strengthened many of its provisions. Texas is making plans to obtain authorization to issue permits under RCRAR, but for the time being a dual (state/federal) permitting procedure exists.

The TDWR and the Texas Department of Health (TDH) issue RCRA permits for the state. The Permits Division of the TDWR handles industrial hazardous and nonhazardous waste. The Bureau of Solid Waste Management (BSWM) handles the permitting of municipal hazardous and nonhazardous waste. The TDWR employs approximately thirty permit writers while the TDH employs five permit writers.

Under the TSWDA, waste material is classified according to its degree of hazard. Class I wastes are industrial hazardous wastes. Class II wastes carry a low level of hazard with respect to acute toxic characteristics and are generally degradable. Class III wastes are inert or insoluble materials that are not readily decomposable.

Industries are required to register with the TDWR when they plan to commence generation of class I or class II wastes. Class I wastes are to be manifested once the firm completes a solid waste management inventory form containing pertinent information. The generator is responsible for notifying the regulatory agency of any changes.

Monthly summaries and other reports are maintained by the regulating agency for class I wastes kept on-site and class II wastes shipped off-site. Postclosure monitoring must be conducted for thirty years by the applicant and the results forwarded to the agency.

Permit writers use EPA guidelines and technical guidelines in their analysis of applications. Modeling is used as an analytic tool in estimating consequences of pollutants in soil and water, specifically their movement. Individuals from the TDWR also perform fieldwork as part of their analysis.

The TDWR, the TDH, and the TACB occasionally coordinate with one another in the permitting process. Usually applications are reviewed by both the TDWR and the TDH no matter which agency receives the application.

Public participation is being sought prior to the formal public hearings through the Keystone Siting Process, which provides the opportunity for the generator, agency, and public to discuss their concerns regarding the proposed site. A committee with membership from these various groups presents its findings along with the application to the permitting agency. This process is new and is expected to be utilized mostly by new facilities rather than existing ones. The TDWR intends to monitor the effects of this process.

1.2.4 Permitting under the Safe Drinking Water Act

Texas leads the nation in numbers of injection wells with approximately 48,000 wells associated with oil and gas production. In addition, the state regulates over 500 underground hydrocarbon storage wells, approximately 20,000 solution mining wells, over 100 municipal and industrial waste disposal wells, almost as many recharge wells, and an unknown number of miscellaneous injection wells. The adaptability of underground injection wells for disposal purposes has resulted in a variety of liquid wastes being injected into deep wells. Such wastes include sewage, low-level radioactive materials, petroleum brines, chemical residues, stormwater runoff, natural gas, and petroleum products.

The SDWA establishes a permitting process for the regulation of underground injection. The state of Texas issues permits under the SDWA, the underground injection control (UIC) rules established by the EPA, the Texas Injection Well Act (TIWA) of 1981, and UIC rules promulgated by the TDWR.

The EPA's UIC regulations divide injection wells into five categories according to type and function: industrial and municipal wells injecting hazardous wastes below underground sources of drinking water (class I); disposal, injection, and storage wells used in connection with oil and gas production (class II); certain mineral and mining operations (class III); hazardous or radioactive disposal wells injecting into or above underground sources of drinking water (class IV); and all other subsurface injection wells (class V).

The TDWR and the TRRC jointly administer the state UIC program. Both agencies are authorized by the EPA to issue permits under the SDWA. Generally, the TRRC has jurisdiction over all class II wells, class III wells used for in situ coal gasification, class III wells used for recovery of geothermal energy, and class V geothermal wells used in heating and aquaculture. The TDWR is responsible for all other wells.

The TDWR and the TRRC must consider statutory prerequisites before issuing a permit for underground injection. The Texas Administrative Code sets permitting guidelines for the TDWR while the TRRC must abide by the directives of the Texas Water Code.

Permit applications must be submitted to the TDWR or the TRRC depending on the classification of the injection well. The applications are subjected to intensive administrative and technical review by both TDWR and TRRC engineers. Applications must be complete before they can be processed by either agency. The permits are open to the public record before final approval. If a permit is contested, a public hearing must be held. The TWC, the judicial arm of TDWR, ultimately issues or denies department permits. The UIC Section of the TRRC, not being divided along such functional lines, issues permits directly.

Both agencies report relatively good relations with the EPA. The TDWR, however, feels the EPA requires an excessive number of reports which divert valuable time from other projects. There is a considerable amount of communication between the TDWR and the EPA. The amount of money the respective UIC programs receive seems to be an important influence in agency/EPA relations.

1.3 Case Studies of Permitting at Five Facilities

1.3.1 City of Austin: Walnut Creek Wastewater Treatment Facility

1.3.1.1 Overview

The Walnut Creek Wastewater Treatment Facility serves the city of Austin, Texas, and currently has a flow capacity of 25 million gallons per day (mgd). Completed in 1977, the Walnut Creek facility handles a major portion of Austin's sewage treatment requirements (for approximately 180,000 out of 415,000 citizens).

The treatment process involves primary treatment and secondary treatment. Primary treatment consists of filtering raw sewage through screens to remove large floating objects such as sticks. Later, small materials (dirt, sand, and organic material), which have settled to the bottom, are removed in the grit chamber. Secondary treatment uses bacteria to remove dissolved organic matter in wastewater. The bacteria process is enhanced by bringing air and bacteria-laden sludge into contact with the wastewater in a flocculation basin. Afterwards, the water is chlorinated and passed through a sand and anthracite coal filter, which removes more than 90 percent of the remaining organic matter before being discharged into Walnut Creek. While the treatment discussed above is typical, the Walnut Creek facility is unique because the entire primary treatment takes place underground. All of the air used within the system is purified by activated carbon filters before being released into the atmosphere, preventing emission of air toxics in this phase.

1.3.1.2 Permit History

The Walnut Creek Wastewater Treatment Facility has been issued a discharge permit by the TDWR under the authority of the Texas Water Code. Because the EPA has granted the TDWR the authority to draft municipal wastewater permits, the TDWR is the primary permitting agency. The EPA, however, is responsible for giving final approval and issuing the permit. The permitting process at the TDWR involves four steps: (1) review for completeness; (2) assignment of application to an engineer who writes the draft permit; (3) internal review; and (4) public notice.

Emission standards in the city's permit are based on considerations of water quality at the time of issuance, population projections, and state and federal water standards. The permit regulates the following aspects of the effluent: total discharge allowed per day, daily average discharge allowed, concentrations of total suspended solids (TSS) and biological oxygen demand (BOD), chlorine residual, and pH level.

The city of Austin must comply with permit standards or be subject to civil and/or criminal penalties. Provisions are also made in the permits for inspections by federal, state, or local government and for submission of compliance reports. The city of Austin is required to submit a compliance report to the TDWR every month. The nature and circumstances of permit violations determine which agency officials must become involved in resolving the problem.

Cross-media pollution is only marginally addressed by the treatment facility, in part due to the narrow scope of environmental statutes. The Clean Water Act does not require municipal wastewater discharge facilities to be monitored in any way for the possible emission of air toxics or other air pollutants. Air quality in the vicinity of the plant is totally ignored by environmental agencies. Furthermore, seepage of pollutants into the ground and/or groundwater from Walnut Creek facilities is not monitored by the EPA, the state, or the city.

1.3.1.3 Conclusions

Based on interviews with state and city engineers and review of relevant data, two critical questions emerge: Are agencies adequately enforcing environmental permits? Does the permitting process maintain and improve environmental quality, especially in regard to cross-media pollutants?

In general, permitting is viewed by state and city officials as an appropriate tool for controlling wastewater pollutants because it sets definite guidelines. The permit system requires the city to submit monthly self-monitored emission reports to the state which include information on the quality and quantity of the effluent. Violations of permit standards and proposed corrective action are also self-reported by the city. When the city's plan for corrective action fails, enforcement proceedings are initiated. Still, state agencies are more interested in a "reasonable" effort on behalf of the city and not in the strict enforcement of boilerplate permit provisions. While recent studies have pointed to the inadequacy of current environmental law in addressing cross-media pollutants, most engineers agree that the current permit system does not allow for greater control of pollutants.

1.3.2 Lower Colorado River Authority: Permitting Fayette Power Project Number 3

1.3.2.1 Overview

This case study examines the permitting history of the Lower Colorado River Authority's (LCRA) Fayette Power Project number 3 (FPP #3), a 415-megawatt electricity generating plant located just outside of La Grange, Texas. It covers five air permits and two water permits that are current for this site. The air permits include four state-issued construction permits and an EPA-issued PSD permit, which is required because the area where the plant is being built is designated as a class II clean air area. The TACB has issued permits for the lignite mine loading system, lignite storage and handling system, lignite-powered steam generator, and the limestone and ash handling system. Because the plant is still under construction, no operating permits have been applied for or issued. Water permits include an EPA-issued National Point Discharge Emission System (NPDES) permit and a state-issued wastewater disposal permit.

1.3.2.2 Air Permits

Fayette Power Project number 3 is defined as a major source of pollution under current statutes (i.e., emitting more than 100,000 tons of regulated pollutants per year). Thus, it is subject to stringent emissions, monitoring, and compliance regulations. Regulated air emissions from the FPP #3 include sulfur dioxide ($SO2$), nitrous oxide ($N2O$), carbon monoxide (CO), particulate matter, sulfuric acid ($H2SO4$) mist, volatile organic compounds, beryllium (Be), and mercury (Hg). The LCRA is installing various pollution control devices: sulfur dioxide scrubber, electrostatic precipitator, sulfuric acid mist eliminator, wet sprays, covers, etc.) to reduce emissions. These devices have been determined by the TACB, the EPA, and the LCRA to be best available control technology (BACT) for each of the emissions involved.

The state permitting process proceeded relatively smoothly in this case. The LCRA engineer responsible for preparing the permit applications had previously worked for the TACB and was familiar with the various regulations that the FPP #3 would have to comply with. He was able to make the necessary adjustments to the building plans before problems actually arose.

The PSD permitting process, however, was not free of conflict. The TACB engineers performed the initial review and submitted a draft PSD permit to the EPA region VI office in Dallas, Texas, for approval. During this process the EPA decided that the LCRA should be required to conduct its SO_2 monitoring based on three-hour rolling averages instead of the more lenient twenty-four-hour rolling average. The LCRA felt that this decision was overly harsh and discretionary. The EPA's response was that other power plants in the region were subject to the same regulation, so it was not unreasonable for the LCRA to do so as well.

Generally speaking, both state and federal air permitting processes appear to be efficient and effective at controlling emissions within the limits of the applicable statutes. Problems arise due to the limited scope of the CAA and the TCAA. Neither act allows permit engineers to write any permit conditions for the purpose of controlling emissions which contribute to cross-media or long-distance pollution (such as acid rain). It is also possible for some hazardous air pollutants to go unregulated by a permit because of gaps in the National Emissions Standards for Hazardous Air Pollutants (NESHAPS). Unfortunately, no data is available to analyze the seriousness of this problem on a national level. However, Texas is one of the few states that look at all potential contaminants, and the permit review process considers all contaminants, including those that don't have a specific federal restriction.

1.3.2.3 Water Permits

The LCRA water permits for this site include an EPA-issued NPDES permit and a state-issued wastewater disposal permit. Both permits control emissions from the plant's six outfalls. Wastewater is emitted via these outfalls into the Colorado River. Additional wastewater is contained in a closed water system and eventually buried in an aboveground, on-site landfill.

The water permits regulate water release rates, amounts of suspended solids, water temperature, chlorine, pH level, and emissions of oil and grease from each of the six outfalls. The LCRA utilizes various pollution control devices at FPP #3, including an oil waste treatment system and an on-site water treatment plant. Both facilities meet EPA-determined best available technology (BAT) standards and water quality standards. The landfills that are part of the closed water system are controlled by TDWR solid waste disposal regulations.

The NPDES permitting process initially went smoothly and a permit was issued in the spring of 1984. However, several months later, after construction had begun, the EPA recalled the NPDES permit. In response to a third-party request the EPA reversed itself, declaring that the environmental impacts of the entire lignite operation (the mining operation, the power plant operation, and the transportation operation) must be considered as a whole, rather than separately as it had done. This changed the status of FPP #3 from a minor to a major source, thus requiring that an environmental impact statement (EIS) be filed. The LCRA was allowed to continue construction, under the provision that, if changes were required based on the EIS, they would make them. The results of the EIS are expected to be released in 1985.

The state permitting process was uneventful. The LCRA engaged in early negotiations with the TDWR in order to overcome any misunderstandings or barriers which could have caused delay once the permitting process had formally begun. The state permits were uncontested.

The state permitting process appears to have been both efficient and effective at controlling water pollutants. With respect to the national permitting process, it is too early to draw conclusions because the process is not yet complete. Initially, it seems that while the EPA may be effective at pursuing reduced environmental impacts from FPP #3, it is not very efficient in its methods of doing so. While it is not yet known whether or not the LCRA will have to make any changes in its construction plans to accommodate a new NPDES permit, it is likely that such changes will be more costly now than they would have been before construction had actually started. Any extra costs that may be required because of the EPA's change of mind will be borne by the LCRA's electrical customers through increased rates.

1.3.2.4 Conclusions

In most respects the LCRA case is a model case of how the permitting process should work. The LCRA puts extensive resources into their pollution control efforts and attempts to meet all federal and state air and water pollution regulations. Moreover, they seem to make this effort willingly--going as far as putting their environmental staff and their production and design engineers to work together on designing power generation projects.

It seems that the LCRA's joint responsibility for energy production and environmental protection combined with their nonprofit, quasi-governmental status works to further the goal of efficient energy production with minimum environmental damage.

In many other parts of the country environmentalists and utility companies are at odds because the utilities' goals of generating a profit clash with the environmentalists' goals. Many utility executives and shareholders feel that every dollar spent on pollution control is a dollar less of profit. It appears that the LCRA's nonprofit status and environmental responsibilities motivate the agency to seek acceptable solutions to the cheap energy/clean environment tradeoff, and this is beneficial for all.

1.3.3 Monsanto Fibers and Intermediates Company, Texas City: Underground Injection Control by the Texas Department of Water Resources

1.3.3.1 Overview

This case study examines permitting of Monsanto's chemical processing facility in Texas City by the UIC Section of the TDWR. The section is responsible for controlling and managing the subsurface injection of wastes. The use of permits as an administrative technique to account for known and unknown cross-media problems is also considered.

1.3.3.2 The Underground Injection Process

Underground injection is a waste management technology in which a fluid is forced beneath the surface of the ground by injection down a well. The technology was first used in Texas over seventy years ago in conjunction with sulfur mining. About fifty years ago, the petroleum industry employed the method to increase oil production. In the 1930s, underground injection was widely used to dispose of saltwater that normally accompanies oil and gas production. From this initial use, deep well disposal technology has been adopted by different industries for a variety of purposes. Beginning in the 1950s, deep well disposal of industrial wastes came into use and later was more widely adopted with the enactment of environmental laws designed to protect surface waters from pollution. Municipalities sometimes use subsurface injection to dispose of effluents from municipal sewage treatment plants. The mining industry utilizes underground injection to assist in recovering substances such as sulfur, uranium, phosphate, and sodium sulfate.

1.3.3.3 Characteristics of Waste Disposal Well Number 91

Waste disposal well number 91 (WDW-91), the focus of this study, is located on the southwest corner of the Monsanto plant adjacent to waste disposal well number 196 (WDW-196). The Monsanto Company obtained a permit for subsurface disposal of industrial waste composed of "organic and inorganic constituents resulting from the operation of Monsanto's Texas City plant." Consequently, the permit addresses combined and cumulative injection rates and volumes for both wells.

1.3.3.4 Permit History

Monsanto was issued its original permit in April 1971 by the Texas Water Quality Board (TWQB) (forerunner of TDWR). On January 6, 1982, the TDWR attained primary governmental responsibility (primacy), which allowed the department to administer the UIC program with the EPA providing oversight. This gives the TDWR control over permitting, operating, monitoring, and construction of various class I, III, IV, and V underground injection wells throughout Texas and requires considerable contact with the EPA. Thus, UIC program requirements included a review of WDW-91 and all other injection wells under the TDWR's jurisdiction. WDW-91 is likely to be repermitted by May 1985, with few major alterations. All injection wells must be reviewed and, if acceptable, repermitted by July 1987.

In 1981 to satisfy the condition that class I injection wells be repermitted every ten years, the TDWR set out to renew WDW-91. This same year, the Texas City plant was granted permission to construct an additional injection well, WDW-196, to act as a substitute when WDW-91 was out of service. The amended version of the WDW-91 permit stipulates more detailed operating parameters and injection rates, as well as reporting, maintenance, and record-keeping requirements.

Monsanto's UIC permit appears to address cross-media issues--especially those related to pollution leaks into the ground or groundwater. Efforts focus on ensuring that wells are properly constructed and monitored.

1.3.3.5 Conclusions

This case study draws three conclusions. First, if indiscriminate permitting of injection wells were to take place, cross-media occurrences would most likely become more commonplace. Specific and enforceable provisions in permits may help to reduce the instances of noncompliance and subsequently reduce the potential frequency of cross-media problems. The importance of including specific provisions in permits is highlighted.

Second, large companies can comply more easily with permit provisions because of the availability of resources. This conclusion aptly describes Monsanto's situation but may not apply to smaller industries. Permittees that do not have adequate resources and cannot make a serious commitment to compliance may increase the risk of cross-media problems.

Finally, more information needs to be disseminated in a form that is easily understandable by the public. Public involvement in the permitting of underground injection wells is important because many people are directly and indirectly affected by their use.

1.3.4 Motorola Austin: Permitting a Semiconductor Manufacturing Plant

1.3.4.1 Overview

Motorola, Inc., a high-technology company, produces semiconductors in its Austin plant. It applied to the TACB in 1973 for permits for its Austin production facilities.

Motorola is considered by state and federal definitions to be a minor source of pollution (i.e., emitting less than 100,000 tons of any regulated air pollutants). Emissions from the site include acid vapor fumes and organic solvent fumes.

1.3.4.2 Permit History

One permit is studied in this chapter. This is the TACB permit R-1290 which was issued for Motorola's building A, the building with the greatest amount of emissions on the site. The building contains two production lines, both of which produce integrated circuits. The only pollution abatement device in use at the site is a catalytic incinerator at building A. The incinerator is used to reduce hydrocarbon emissions.

Motorola has also received several permits not issued by the TACB. Nonhazardous organic waste at the site is regulated by the TDWR. There are two five-thousand-gallon tanks and one one-thousand-gallon tank in which organic wastes are stored. The tanks, which are composed of carbon steel and stainless steel and sit in secondary containers, are emptied once every three weeks and the contents are sent to Midland-Odessa, Texas, or to Louisiana for disposal. Until 1981, several of the tanks were kept underground. Motorola voluntarily placed them aboveground after a leak was discovered in the piping at the junction with the tank. According to Motorola officials, no citations were issued.

Under the city of Austin permit, Motorola is required to operate a pretreatment plant through which all liquid-process water wastes are routed before being sent into city wastewater systems. Mandated by city ordinances, these pretreatment requirements are applied to many firms in the city so that hazardous chemicals or other wastes can be filtered out before they reach the city system, which is not designed to handle them.

1.3.4.3 Conclusions

This case study finds that the permitting process in Texas appears successful in accomplishing the goals stated in the TCAA. The study draws five conclusions:

1. The permit document contains few site-specific provisions. Instead the document is composed of general regulations that apply to all permitted facilities in Texas. While a permit often includes provisions that are specific to a facility, in this case the special provisions do not constitute the bulk of air permit R-1290.

2. Recently, the TACB experienced substantial budget reductions. The case study reveals problems caused by these financial constraints. One of the most significant problems faced by the agency is that reduced allocations have caused delays in the permit application review process, ultimately affecting the timeliness of the TACB's efforts to regulate air pollution. In

addition, the budget cutbacks have decreased the amount and types of services the TACB provides its clients.

3. Very little interaction takes place between Motorola and the permits division at the TACB once a permit has been issued. Permitted facilities are required by law to keep a record of the contaminants they emit and compliance efforts they undertake, but this information, at least in the case of Motorola, is not shared often with the permits division at the TACB.

4. Air contaminants released from various points at the Motorola site were not considered collectively when establishing permit conditions. Therefore, in granting permits and exemptions to Motorola, the permits division at the TACB considered the quantity of emissions for each building separately. Consequently, many of these buildings were not required to install abatement equipment.

5. Neither Motorola nor the TACB considered the issue of cross-media effects of pollutants in writing the permits. The TACB's authority is based on the CAA and the TCAA; therefore, it views its sole responsibility to be the regulation of air pollution. The Motorola firm in Austin, on its part, has not actively incorporated cross-media considerations into its environmental approach because it experienced difficulty in pinpointing actual problems that it can control.

1.3.5 IBM Austin: Permitting a Circuit Board Manufacturing Plant

1.3.5.1 Overview

This case study examines the environmental permitting process for IBM's circuit board manufacturing plant in Austin, Texas. This plant was selected for study because it is a major employer in the area and is part of the expanding high-technology sector of the Austin economy. The plant manufactures printed circuit boards for use in computers, office machines, and other high-technology equipment. The production process entails the use of many chemicals, some of them hazardous. Permit #7382 was chosen for study because it is the major permit issued for the plant.

This study illustrates how a large company with a sophisticated and chemically intensive manufacturing process can effectively interact with a state agency to meet regulatory requirements. The permit history shows to what degree permitting can be a negotiating process. The study also demonstrates IBM's commitment to environmental quality, through its functional organizational structure and its internal management controls.

IBM began construction of its Austin plant in the summer of 1979 and full production began in 1982. Emissions from the plant include particulate matter, volatile organic compounds, inorganic gases, nitrous oxides, sulfur dioxide, and carbon monoxide. Abatement devices at the site include two scrubbers and three filters.

1.3.5.2 Permit History

1.3.5.3 Development of the Permit: Negotiation

IBM applied to the TACB for a construction permit in February 1979. The permitting process was characterized by negotiation. For example, during the application process, IBM decided to put up shorter stacks than had originally been designed and submitted for approval. They wanted more but shorter stacks for aesthetic purposes. Another consideration was the expense of the ductwork leading to the stacks--with more stacks, there was less need for costly ductwork. The permit engineer had no complaints about these changes because the amount of emissions would not change. IBM subsequently found that under certain atmospheric conditions these shorter stacks caused emissions to linger in the vicinity of the plant, so the stacks were later heightened.

Cross-media pollution was not a major consideration in the permitting process. Without greater technical knowledge, it is difficult to know the significance of any intermedia transfers at this site. Thus it is not possible to determine whether cross-media-related pollution issues were ignored because they simply didn't exist or because of an oversight.

1.3.5.4 IBM's Approach to Permitting: Corporate Facilities Practices

IBM has developed corporate facilities practices to reduce health and environmental risks in its plants. Many company standards may be more stringent than the laws of the states or countries where plants are sited. These company standards are based on the most strict legal standards that IBM has encountered at its various plant locations. Plant managers may request exemptions for their sites only under special circumstances. Therefore, depending on the substance to be controlled, IBM's regulations may exceed Texas or EPA requirements for controlling emissions.

1.3.5.5 Conclusions

The IBM case study suggests that the attitude and practices of private industry can play a positive role in the effectiveness of the permitting process. Because IBM is an active and willing participant, there have been few difficulties at the Austin plant. So far, IBM's compliance record has been superior.

It was evident throughout the case study interviews that motivation for this apparently high-quality environmental performance is more a matter of internal than external pressures. Management commitment to maintaining a good reputation makes itself felt through IBM's Environmental Program

Department and into other areas of the plant.

Motivation for management to adhere strictly to these policies probably comes from interest in controlling all aspects of the enterprise. As the company fulfills and even exceeds its legal obligations, it is less vulnerable to regulatory interference and control. It is clear that IBM prefers to run its environmental programs as it sees fit, that is, according to its own high standards, rather than just responding to governmental regulation.

1.4 Analysis and Recommendations

1.4.1 Analysis

Five critical issues were identified:

(1) Effectiveness of agency procedures to control emissions and to dispose of pollutants safely. Administrative procedures implemented at the TDWR and the TACB seem to promote effective control of point sources of pollution. The five case studies suggest that state and federal agencies are efficient and effective in carrying out their mandate. The cases support the view that flexibility in the permitting process aids in solving environmental problems encountered in individual cases. Permit-writing engineers seemed to make a substantial effort to work with permit applicants and staff at the permitted sites. This posture fosters increased efficiency in environmental control. The LCRA case study attributes increased efficiency in the permitting process to the flexibility allowed each permit writer. However, the studies also point out that differences in opinion between agency engineers and applicants lead to delay due to requests for evidentiary hearings.

Permit duration affects administrative efficiency and effectiveness. Fixed duration permits can improve the quality of the environment as plants are forced to adopt more advanced pollution control technologies in order to meet the requirements necessary to retain their permits. However, renewable permits may negatively influence administrative efficiency by increasing the workloads of already overworked agency staffs.

(2) Effectiveness of agency procedures to encourage compliance and to enforce standards. The importance of compliance and enforcement efforts is obvious. Even the most stringent permits will have no environmental impact unless compliance with their conditions can be assured. The five case studies depict permittees with minimal or negligible compliance problems. All the permittees evidence a serious attitude toward compliance by taking steps to reduce the possibilities of noncompliance. In the few instances where circumstances of noncompliance arose the sources studied took immediate steps to correct the problems.

(3) Effectiveness of communications between agency and permittee. Interaction is important because good communication can facilitate solving difficulties encountered during the permitting process before they become major problems. The amount of communication between agency and permittee varies from case to case; however, all permittees report good relationships with the state regulatory agencies (TACB and TDWR). Most of the problems in this area related to communications between permittees and the EPA or between the state agencies and the EPA. Complaints focus on what is perceived as the EPA's authoritarian and bureaucratic behavior.

(4) Consideration of cross-media pollution and attempts to regulate it. While cross-media issues were considered in some of the cases, environmental agencies are not yet fully able to handle the problem. For the most part this inability to handle cross-media issues is due to the narrow scope of state and federal legislation. Permit writers may only regulate pollutants over which they have specifically been given authority. Permits, therefore, will not be able to effectively address cross-media pollution problems until the statutes are changed.

(5) Various uses of permits in regulation process. Permits can serve roles other than setting stipulations on emissions and disposal of pollutants. Permits are a source of information on the sites involved. They may help to improve the links between government and industry in attacking the problem of environmental pollution, and they provide an opportunity for citizen participation.

1.4.2 Recommendations

This report is based on five case studies and may reflect bias due to the nature of the industries and sites chosen or due to the small sample size. Nevertheless, we believe the findings allow some general conclusions to be drawn about the state of environmental permitting in Texas and may also be applicable elsewhere. This chapter presents recommendations in five major areas of concern: administrative efficiency and effectiveness, compliance and enforcement, public participation, communication, and cross-media effects.

1.4.2.1 Increasing Effectiveness

To increase the effectiveness of environmental permitting and to reduce some of the difficulties with discretionary decisionmaking, the project team suggests that the following options be considered:

1. When the permit is written, the engineer should include in an appendix or separate document the information upon which he is basing his decisions. This system is presently used by the water permit sections of the EPA and the TDWR and by the TACB in its technical review of PSD permit applications. It has the advantage of explicitly stating the decisionmaking criteria and

should result in greater consistency.

2. Increased interaction between the agency and the applicant could improve understanding and cooperation in areas of uncertainty. This increased interaction could also reduce the disagreements later in the permitting process.

3. Action should be taken to address the regulatory gap that currently inhibits the promulgation of standards for some hazardous pollutants (i.e., organic chemicals, hazardous air pollutants, toxic chemicals, pesticides).

The project team recognizes that action along these lines will have some resource cost. Yet all of the options could help ensure more consistency and predictability in setting permit limitations.

1.4.2.2 The Availability of Resources

The TDWR and the TACB have been subject to a hiring freeze and budget cuts. Permit writers at the TACB have been given heavier workloads. With an increasing amount of permit requests, the ability of state and federal agencies to effectively handle additional workloads is questionable. Therefore, we recommend that action be taken to make these agencies more self-supporting. The following options are suggested:

1. Increase permit fees so that additional resources are available for permit processing.

2. Encourage the process of allocating NPDES and NSPS authority to the state of Texas. The EPA has already recognized Texas as competent to take on partial authority in these two areas, but delegation of full authority has been extremely slow. Allocating permit authority to the state would eliminate duplicate processing and bottlenecks that occur at the federal level. This suggestion is based on the premise that more federal funds for environmental permitting would be released to the states.

3. Redesign compliance programs to have more incentives that could be added to the already extant sanctions and disincentives. Incentives could be offered to companies that demonstrate a commitment to go beyond mandated standards and seek not only to minimize their negative environmental impact, but also to create ways of addressing pollution problems. Many firms increasingly recognize that commitment to environmental quality is good business practice. These firms should be encouraged to make a positive contribution to the environmental situation and to take an active role in understanding the effects of pollution (including those of intermedia transfers).

1.4.2.3 Cross-Media Pollution

One of the difficulties in the permitting process with regard to cross-media pollutants is the lack of technical and scientific information on the nature of the problem. We recommend:

1. Informing and educating agency engineers about cross-media transfers. Such a process could involve placing materials on cross-media pollutants in agency libraries, beginning a system of formal training sessions, and accessing national data bases with specific information sources.

2. Establishing a special section in each agency to address cross-media issues.

3. Modifying permit application forms to specifically consider cross-media issues. For instance, a checklist that would include references to cross-media problems could be used when issuing permits. Of course, such modifications must recognize limitations imposed by current environmental statutes.

In our analysis of the case studies, we found problems resulting from inconsistencies in the compliance and enforcement requirements of the self-monitoring system utilized by the TDWR. Under current operations the system leaves too many gaps that allow instances of noncompliance to occur. Action needs to be taken to reduce opportunities for permit violations. Specifically, the following actions should be considered:

1. Frequent audits of the permitting site should be conducted.

2. Unannounced or surprise inspections should take place a minimum of once each year at all permit sites.

3. All facilities (major and minor) should submit reports to allow regulatory agencies to record the accumulated emissions.

4. Strict fines should be imposed on industries that intentionally violate their permits without informing the regulatory agency.

1.4.2.4 Communication

Relatively good communication appears to exist between the regulatory agencies and the permittee and between the regulatory agencies and the EPA (although communication in the latter case may involve excessive reporting requirements). However, communication with the public, particularly in the form of public participation in the permitting process, appears to be a problem. In some cases, such as those related to underground injection, this lack of public participation may reflect the highly technical nature of the issues involved. The public does not participate because the issues are too complex for people to understand exactly what is being considered.

Sometimes public participation is actually a hindrance to the efficiency of the permitting process. For example, an unfounded complaint may trigger an investigation or public hearing and attendant delay.

The project team recommends that regulatory agencies take steps to assure that public participation is encouraged and that it is integrated in a positive manner, so that it will be an asset rather than a hindrance. Public awareness programs such as the Keystone Siting Process, which is used by the TDWR in the siting of hazardous waste facilities, are a good step in this direction.

ENVIRONMENTAL PERMITTING IN TEXAS

PART I: OVERVIEW

Chapters two through five present an overview of environmental permitting under federal and state laws in Texas. The chapters cover the following federal and corresponding state statutes: Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, and Safe Drinking Water Act. The material presented is based on published sources and interviews with agency staff. No attempt was made to evaluate agency performance or the permitting. The overview is designed to provide background information for the case studies of individual permits in part II.

2. Permitting Under the Clean Water Act

2.1 Legal Authority

The Clean Water Act as passed in 1972 and amended in 1977 seeks to protect surface water quality. To accomplish this goal the EPA and the states issue discharge permits that set forth effluent limitations for discharge from a point source. Under the CWA, the EPA region 6 office has the authority to issue federal NPDES permits to water dischargers in Texas. The effluent limitations indicated in the permit are based on best available technology (BAT) standards and water quality standards. The NPDES permit is usually a mixture of both with the more stringent standard taking precedence.

2.1.1 Best Available Technology Standards

The 1972 the CWA emphasized development of technology-based uniform effluent limitations that are applied to individual dischargers. The BAT standards control three classes of pollutants: conventional, nonconventional and toxics.

Conventional sources of pollution, some of which are occur naturally, include biodegradable materials, oil and grease, suspended solids, and fecal coliform bacteria. Regulations apply to all industrial categories covered by the act. Costs of pollution control must be incorporated in the EPA's process of prescribing effluent limitations for industries.

Nonconventional pollutants include pollutants that are not otherwise designated as toxic or conventional (exclusive of thermal pollution).

The CWA contains two special programs for regulating toxic water pollutants. Section 307 provides authority for controlling toxics in regular effluent discharges, and section 311 provides authority for cleaning up spills of oil and hazardous substances.

Section 307 of the CWA authorizes the EPA to issue effluent standards or prohibitions, if necessary, for toxic pollutants. The EPA has issued water quality criteria for 65 classes of toxics or "priority pollutants" that actually represent 129 specific chemical substances. These criteria form the basis for setting the pollutant standards requiring the use of best available technology economically achievable. The act allows the EPA to add to or subtract from the list of toxic pollutants as appropriate. For any substance that is added to the list, standards are to be established as soon as practicable and must be met by the regulatees within three years after limitations are issued.[1]

Section 311 regulates oil spills and hazardous substance spills or accidental releases. This section establishes a national contingency plan for responding to spills, assesses civil and criminal penalties, and defines cleanup and liability provisions for oil spills and spills of hazardous substances.

2.1.2 Water Quality Standards

Texas utilizes EPA-approved ambient water quality standards that apply to all water bodies in or adjacent to water bodies within the state. The water quality standards place each water segment within the state into one of various classifications of use, such as drinking, swimming, industrial cooling, navigation. Dischargers of wastewater are regulated so that surface waters will not be allowed to degrade past a certain quality level. Along with BAT standards, water quality standards are one of the major criteria considered in determining limitations in state and federal permits.

2.1.3 Section 404 of the Clean Water Act

Section 404 of the CWA requires plants to obtain a permit to discharge dredged or fill material into navigable waters. The lead agency for permitting in this case is the Army Corps of Engineers. To avoid duplication of this type of permit by the state, section 26.027 of the Texas State Water Code prohibits the TWC from requiring any permit for the placing of dredged or fill materials into or adjacent to water in the state. However, the commission may adopt rules and regulations to govern and control the discharge of such materials with the purpose of controlling water quality.

2.1.4 Environmental Impact Statements

Any new plants applying to the EPA for a permit may also be required to submit an environmental impact statement (EIS) before a permit is issued. Under the National Environmental Protection Act (NEPA), "major federal actions significantly affecting the quality of the environment" may not be taken without the preparation of an environmental impact statement.[2] Under the CWA, to issue a permit to a source whose discharges would significantly affect the quality of the environment constitutes such an action and thus requires the preparation of an EIS.

When the EPA receives the permit application, it is classified as having either major or minor impact based on a process of numerical determination. An engineer reviews each application and assigns a number according to certain characteristics such as the kind of industry, how much water is discharged, the type of pollutants emitted, and the quality of the water segment the waste will be discharged into. Applications with high numbers are considered to have a significant impact on the environment. If additional information is needed, the EPA may request that the applicant submit an EIS.

At the state level, the TDWR may also request that an applicant prepare an EIS, if the permit writer feels that the discharge will have a significant impact on the environment. Each case is reviewed on an individual basis, and much discretion is left to the executive director to determine which situation requires an EIS.

2.1.5 The Delegation of Clean Water Act Authority to States

In order to receive full CWA authority, and state, including Texas, needs to adopt a program that is equivalent to the federal program.[3] As of 1985, the EPA has not delegated authority for issuing NPDES permits to the TDWR. Therefore, any person that will be discharging any substances into water bodies in Texas must obtain two permits before beginning construction--a federal permit (NPDES) and a state permit (wastewater disposal permit).

In Texas two state agencies issue water permits: the TDWR and the TRRC, which also regulates oil and gas related activities. For many years the TRRC was not interested in NPDES permitting. Since responsibility for NPDES permits is an all or nothing delegation (no partial authority is given), Texas was denied authority. Recently, however, the TRRC has shown an interest in receiving NPDES authority. The TRRC has fulfilled the legislative requirements by drafting the necessary rules and regulations for authority. In order for Texas to be granted full authority, several narrow legal matters need to be resolved.[4]

2.2 Organization of the Texas Department of Water Resources

The TDWR was created by the state legislature in 1977 in an act that combined the three pre-existing water-related agencies (the Texas Water Development Board, the Texas Water Quality Board, and the Texas Water Rights Commission). The TDWR is divided along functional lines with the Texas Water Development Board performing a legislative function, the executive director performing an executive function, and the Texas Water Commission performing a judicial function. See appendix 2.1.

The TWDB establishes and approves general policy for the TDWR. Specifically, the board is responsible for establishing criteria, in the form of the State Water Quality Plan, governing the discharge of wastewater into or adjacent to the waters of the state. In addition, the board administers grants allocated to the state under the CWA and funds appropriated by the state legislature for the planning and construction of sewage treatment facilities. The board acts as coordinator of federal, state, and local agencies; makes rules necessary to carry out provisions of the Texas Water Code; and responsible for enforcing the rules and regulations of the TDWR.

The executive director of the TDWR conducts all studies, investigations, surveys, etc., required by the board or commission. He is responsible for planning and technical functions, processing applications for permits, collecting application fees, and enforcing the terms and conditions of any permits.

The Texas Water Commission serves as the judicial arm of the department. The commission issues water-related permits (including wastewater disposal permits); holds hearings; oversees contested permit applications; handles all water rights; creates water districts and oversees water district bond issues; and fixes water rates for raw or treated sewage.

2.3 The Permitting Process

2.3.1 Federal Permits

As mentioned, the EPA has not given the TDWR approval to issue an NPDES permit. When a source owner applies to the EPA for an NPDES permit, he is instructed to send a copy of the application to the TDWR as well.

When the region VI EPA office receives the application, copies are distributed to relevant state and federal agencies as mandated by the coordination requirement in the CWA. A copy of the application is also sent to the New Source Review Section at the EPA to determine if an EIS is required. Comments and responses are then channeled back to the Water Section.

Each application is assigned a priority to determine the order in which it will be processed. An application is classified according to a numerical system that takes into account factors such as the type of industry, type of pollutants, and location. If the application is determined to be a major new source, it will get the highest priority, and it will be processed right away--concurrently with writing the EIS.

Usually, the schedule for drafting permits is set up on a yearly basis. This schedule reflects, to a certain extent, the policy and priorities of the federal government. For example, for the past two years Washington has given high priority to permitting major toxic dischargers such as organic and inorganic chemical plants and oil refineries. About 80 percent of the industries in region VI fall in this category.[5] Municipal permits are also accorded high priority. Some discretion is left in the hands of the EPA regional offices to work with the states in setting priorities.

In accordance with the tentative permit schedule, the application is assigned to an engineer. He drafts the permit based on BAT and water quality standards. Information necessary to determine these standards is obtained from the application, monitoring reports, guidance documents, and industry-specific national effluent guidelines. A permit rationale sheet is attached to the draft permit explaining how each effluent limit was determined.

After the draft permit is completed, copies are distributed to various state and federal agencies, to the applicant, and to anyone requesting such information. A thirty-day period is allowed to submit comments. Requests can be made for an extension of the comment period. If no comments are received, the permit is automatically issued.

If the draft permit is questioned, engineers consider the questions and decide if the proposed permit should be changed. If so, a second permit is drafted. A formal "Response to Comments" statement, explaining the EPA's position on the permit conditions and the final permit, is issued to all participants in the permitting process. This action is then followed by another thirty-day comment period. At the end of this period, the final NPDES permit is issued unless someone requests a hearing.

A hearing is granted only if facts are disputed. The hearing addresses only the specific item(s) being disputed. In most cases, the issue of disputed fact involves a discharge limit on a toxic waste.

A hearing is rarely requested for a municipal NPDES permit. Out of 100 major and 200 minor municipal permits issued, only one has required a hearing. The number of hearing requests is much higher for industrial NPDES permits. Of 450 major industrial permits (75 to 125 issued per year), 25 active hearings are proceeding at the present time.[6] The time necessary for these proceedings may range from a few months to several years.

2.3.2 State Permits

The TDWR obtains most of its authority to control water pollution from the Texas Water Quality Act. Originally passed in 1967, the act was amended and recodified by the 65th Legislature as title 2, chapter 26, State Water Code. The revised statute delegates power and duties to the TDWR and to other state agencies whose activities relate to water quality. One of the major powers given the department is the authority to issue permits to regulate any discharge or disposal of waste that it determines is a threat to water quality.[7]

The TDWR issues three types of wastewater disposal permits: municipal or domestic water disposal permits, industrial waste permits, and agricultural waste permits. The permitting process is essentially the same for each type of permit. The first step in the process of a wastewater permit is submission by the discharger (applicant) of a detailed application that includes both general and technical information describing the nature of the operation and the waste to be discharged.[8] For an example of a permit, see appendix 2.2.

Although the technical information required for each type of permit is somewhat different, the application generally requires the following information: (1) background information describing the nature of the waste-generating operation; (2) information describing how and where waste materials are to be discharged; (3) detailed information on facilities (such as ponds, landfills, or wastewater treatment plants) used for waste disposal; (4) detailed information on the nature and amount of waste to be discharged; (5) geologic, hydraulic, or other physical characteristics of the waste disposal site; (6) a description of possible hazards to ground and surface waters and of measures taken to minimize such hazards; and (7) a list of persons who may be affected by the activity of the applicant (landowners, persons downstream, etc.).

The completed application is logged in and assigned to one of sixteen engineers, who makes sure that the technical material is complete and accurate. The engineer writes a draft permit prescribing the conditions under which it may be issued: the duration of the permit; the location of the point of discharge of the waste; the maximum quantity of waste to be discharged under the permit at any time and time period (including volume limitations of biochemical oxygen discharges, suspended solids, toxic chemicals, etc.); the character and quality of waste to be discharged under the permit; and monitoring and re porting requirements prescribed by the commission.[9] Municipal permits are usually assigned to civil engineers, and industrial permits are usually assigned to chemical engineers.

After the draft permit is completed, it is circulated to other groups within the TDWR, including department attorneys, the enforcement section, planning section (which models the waste discharges into "stream segments " to avoid overloading any given segment's ability to handle waste), and a department hydrologist (who considers ground water and surface water effects of the discharge). This phase of the process allows for consideration of cross-media impacts because sections handling other forms of pollution are encouraged to comment.

A draft copy of the state permit is sent to the applicant and to the regional EPA office as a matter of courtesy. All comments received in this process are considered in the formulation of the final draft of the permit. This final draft is sent to the executive director of the TDWR. If the executive director approves the draft, the TWC notifies the applicant to publish notice of the agency's intent to issue the permit in a newspaper serving the area of the proposed source. The TWC takes responsibility for notifying anyone who would be directly affected by the permit and any local pollution control agencies. A comment period is established for thirty days. If the permit is uncontested, it will be approved during a TWC open meeting (scheduled every Tuesday morning).[10] Approximately 90 percent of state permit applications are uncontested.[11]

If the permit is contested by someone with a legitimate interest (e.g., downstream landowner, county government), a public hearing is held. Lawyers usually represent the interested parties in a case. Testimony is given by the engineer responsible for writing the permit and by the applicant. An attorney from the TWC acts as the hearings examiner for the case. Other TDWR representatives include the public interest advocate and the executive director. After all testimony has been presented, the hearing examiner makes a recommendation to the TWC, which then decides whether or not to issue the permit. Contested permits are not considered in open meetings on Tuesdays; they are considered in closed meetings of the TWC.

An operating permit from the TDWR must be issued to an applicant before construction may begin on a source. The operating permit is valid for five years. Seven months before the permit is due to expire, the TDWR sends out a permit renewal form to the source owner, who must then apply for a new permit. About 700 permits, including renewals, are issued by the TDWR per year for water discharges.[12] Municipal permits make up the majority of the permits issued.

2.4 State-Federal Relations

Although delegation of CWA authority is currently an all-or-nothing obligation, the EPA is proposing a "step-in" program in which a state may take on CWA authority in steps and eventually may be given full authority. For the past five years several amendments to the CWA have been introduced to allow the designation of partial authority to a state. The goal of the legislation is to delegate permitting authority to the state level where knowledge of local environmental issues is greatest. The EPA would act in a supervisory capacity. In Texas several issues remain to be resolved by state and federal agencies before federal delegation to the state of full authority for the CWA can occur.

State flexibility versus national uniformity is one unresolved issue. A case in point is the federal emphasis on technology standards. The CWA has been called a technology-forcing statute because its strict requirements force dischargers to incorporate state-of-the-art pollution control technology. Industry representatives have been arguing that strict technology requirements often yield small environmental benefits at a very large cost.[13] The TWC does not utilize technology standards; instead it emphasizes water quality standards.

In Texas each case is reviewed and permit conditions are set that meet state and federal standards for effluents and water quality. The discharger is required to install pollution control technology only if he exceeds state and federal limits. If the number of dischargers on a specific water segment are few and the water quality is not threatened, the dischargers may be allowed to use less efficient and less expensive pollution control devices. On the other hand, if many dischargers are on one water segment and the standard of water quality is in danger of being degraded, all dischargers may have their effluent limits raised, and advanced treatment facilities may be required.

However, there are problems associated with the use of water quality standards. It is not possible to establish with any accuracy exact levels of toxic pollutants and nontoxic pollutants that can be released into a given stream segment and still maintain the water quality standard of that segment. This is especially true in the case of petrochemicals, because no standards exist and decisions involving the discharge of petrochemicals are made on an arbitrary basis.

Another discrepancy between the EPA and the state guidelines involves the civil and criminal penalties in cases of violation. When the EPA brings a civil suit against a discharger who violates a permit or against someone who discharges without a permit, it may seek up to $10,000 per day of violation. Under the TWC, the civil penalty is not less than $50 nor more than $1000 for each act of violation and for each day of violation.[14] In criminal cases federal penalties include fines of up to $25,000 per day or one year in prison or both, while state criminal penalties include a fine of not more than $25,000 and no prison term.[15]

Although these discrepancies have so far prevented full delegation of federal authority to the state level, attempts have been made to coordinate the two programs. The permitting program in Texas was in place for ten years before the current national program was adopted. Since the passage of the federal water quality acts, several reforms in the state program have taken place in an attempt to better match federal standards and to develop a more efficient system for water quality control. Reform measures have included the establishment of a Public Interest Office, consolidated permitting, preapplication consultations with prospective dischargers, the transfer of agency-based monitoring responsibilities to an industry-based self-monitoring program, and introduction of deadlines governing the permitting process.

2.5 Conclusion

Since the passage of the federal CWA in 1972, both the state and federal authorities have come a long way in streamlining the regulatory process. The regulatory controls--permitting, standard setting, monitoring, etc.--employed by the TDWR and the EPA seem adequate to implement and to enforce statutory requirements for water control. However, little is known about the effectiveness of these programs in actually controlling the harmful effects of pollutants.

Notes

[1]Claudia Copeland, Water Quality: Implementing the Clean Water Act (Washington, D.C.: Congressional Research Service, 1984).

[2]Saranna Robinson, "Environmental Permits," (research report, University of Texas at Austin, LBJ School of Public Affairs, 1984), p. 15.

[3]For specific requirements for state qualifications, see section 40C part 1 of the Clean Water Act.

[4]Interview with Bob Hammeschlager, Chief of the Water Section, Environmental Protection Agency region VI office, Dallas, Texas, February 8, 1985.

[5]Ibid.

[6]Ibid.

[7]Mark Sayer, "Protection of Groundwater in Texas" (professional report, University of Texas at Austin, LBJ School of Public Affairs, 1978), p. 46.

[8]Ibid., p. 48.

[9]Texas Water Code, Section 26.029.

[10]Robinson, "Environmental Permits," pp. 16-17.

[11]Interview with Robert Silbus, Engineer, Wastewater Section, Permits Division, Texas Department of Water Resources, Austin, Texas, September 17, 1984.

[12]Ibid.

[13]Robinson, "Environmental Permits," p. 18.

[14]Texas Water Code, Section 26.122.

[15]Texas Water Code, Section 26.213.

3. Permitting Under the Clean Air Act

3.1 Legal Authority

The TACB is the state agency authorized to issue general permits under the CAA. This authority was granted in April 1981 after Texas demonstrated to the EPA's satisfaction that its state implementation plan (SIP) meets National Ambient Air Quality Standards (NAAQS).[1] The TACB also obtains general permitting authority from the TCAA - subchapter C and from regulation VI of the TACB.

In 1981 parts of the PSD program were delegated to the state. The entire program was not delegated because Texas did not revise its SIP to incorporate the PSD program in a manner prescribed by the EPA. However, the Texas SIP was rigorous enough for the EPA to give the TACB the authority to carry out technical review of PSD permits. Officially, though, the PSD program remains a federal program. Thus, the EPA is responsible for implementing PSD regulations and for issuing and enforcing the PSD permit. Currently, Texas is working on modifying its SIP in order to obtain authority to administer the program.

3.2 Organization of the Texas Air Control Board

The main office of the TACB is located in Austin, and twelve regional offices are located throughout Texas. A nine-member board, appointed by the governor, directs the agency (see appendix 3.1 for organizational breakdown). Serving under the board is the executive director who is responsible for the regional offices, central regulatory operations (including Monitoring, Enforcement, and Technical Support divisions), and the administrative offices. Permit writing responsibility rests with the Permit Section, which is under the jurisdiction of the Enforcement Division. The Permit Section is broken down into the Chemical Group, which writes permits for oil, gas, or chemical industry sources of air pollution; the Combustion Group, which writes permits for power plants, incinerators, and sources that have large boilers; and the Mechanical Group, which writes permits for cement plants, rock crushers, cotton gins, grain elevators, and paper mills.

3.3 The Permitting Process

3.3.1 Construction Permits

Sections 3.27 and 3.28 of the TCAA and regulation VI of the TACB require any person planning construction of or modifications to a facility emitting air pollutants to obtain both a construction and an operating permit. Construction or modifications may not begin until the applicant receives a construction permit from the board.

When a general application form (as opposed to a PSD application form) for a construction permit is received by the TACB, it is referred to the appropriate group within the Permit Section. The main office in Austin is responsible for writing all construction permits. The group leader then assigns the permit application to an engineer on his staff, who reviews the application and requests any necessary additional information from the applicant. For a general permit application, see appendix 3.2.

Within thirty days of the receipt of a completed application, the TACB requires the applicant to make public notification of the proposed construction and the pollutants that will be emitted. The notification must be published in a newspaper serving the locality where the plant is to be built (or modified). The notice must state the name of the company applying for the permit, the proposed site, and the type of plant to be built. Information about where materials relevant to the permit application may be inspected and where written comment may be submitted for consideration must also be included. See appendix 3.3 for an example of public notification.

Permit applicants are required to pay a fee for processing and writing the construction permit. The fee is to be 0.1 percent of the estimated capital costs of the project with a minimum of $300 and a maximum of $7,500. (This maximum amount increases to $15,000 before the end of 1985.)[2]

To qualify for a construction permit the owner or operator of the facility must show that:

1. emissions from the proposed facility comply with all rules and regulations of the TACB and the TCAA, including protection of the health and physical property of people;

2. the facility has monitoring devices for measuring emissions of significant air pollutants;

3. the facility incorporates best available control technology (BACT);

4. the facility meets any applicable NESHAPs;

5. engineering data show that the facility will meet standards specified in the application for the construction permit;

6. the facility meets any special requirements for sources of volatile organic compounds.[3]

After the application has been reviewed, the engineer writes up a draft permit. At this point the applicant must again make public notice specifying information about the facility and where the draft permit may be inspected and where comments may be submitted.

In most cases no complaints are registered. However, if complaints are filed, a public hearing is held in or near the town(s) of proposed construction. A TACB hearing examiner takes the testimony of the engineer responsible for writing the draft permit, the complaining party or parties, and the company applying for the permit. Hearings have lasted from two days to almost one year. Generally, they take between one and two weeks.[4] After all testimony is heard, the hearing examiner makes a recommendation to the board about whether the permit should be issued, denied, or altered in some way. Appeals to the board's decision go to state court for settlement.

If no complaints are received regarding the draft permit, it is sent to the executive director of the TACB, who makes a decision (under the authority of the board) whether to grant or to deny the permit. The executive director may deny the permit if he believes that it fails to meet the requirements of the TCAA or regulation VI. Usually, by the time the draft permit reaches the executive director, it has been reviewed by the permit-writing engineer, by the leader of the group responsible for the applicant's permit, and by the chief of the Permit Section. Problems are usually found during this review process. Therefore, it is rare that the executive director denies a permit.[5]

Any deficiencies resulting in denial of the permit must be reported in written form to the applicant, who then has the option to appeal the decision to the TACB. If the board agrees with the executive director, no further applications will be accepted from that source until the applicant clears up all the objections made in the written notice.

All construction permits contain certain general conditions and specifications. The permits are nontransferable from person to person and from place to place. They are automatically void if construction does not begin within one year of the date of issuance. The construction permit is also void if an operating permit is issued or denied. The permit holder may be required to monitor emissions upon commencement of plant operations, and progress reports may also be required by the permit. The TACB must be notified of the start-up date of the plant so that a staff member may be present at the start-up. Permits also contain specific conditions and specifications relating to the emissions of individual plants. These include the exact conditions under which pollutants may be emitted, and the emission rates acceptable for each pollutant.

3.3.2 Operating Permits

After completion of construction and before the sixtieth day of operation, the applicant must apply for an operating permit from the TACB. The facility may continue operating under a construction permit until final action is taken on the operating permit.

TACB regional offices are primarily responsible for writing the operating permit. After the application for an operating permit is received, copies are sent to local air pollution agencies which have ten days to comment.

The purpose of the operating permit review is to determine which plant complies with TACB rules and regulations and with the TCAA, to ensure that the facility complies with any applicable New Source Performance Standards (NSPS) and NESHAPS, and to make sure the source has adhered to conditions in the construction permit (see appendix 3.4 for a listing of NSPS). The operating permit is essentially an enforcement device for the construction permit and for other TACB regulations. The Permit Section of the TACB retains overall responsibility for the operating permit. After the regional TACB office completes review of the operating permit, they forward their findings to Austin. The Permit Section then makes a recommendation to the executive director as to whether or not the operating permit should be granted. The executive director's decision may be appealed to the board. The operating permit review process usually takes about one month.[6]

Like construction permits, operating permits are nontransferable from person to person and from place to place. Operating permits may also include provisions requiring monitoring of emissions and reporting of the findings to the TACB. Furthermore, the operating permit provides that the facility is not to be operated unless all required pollution control equipment is maintained in good working order.[7]

3.3.3 Prevention of Significant Deterioration Permits

Application for a PSD permit is similar to the process described above (for an example of a PSD application, see appendix 3.5). However, the owner or operator of the source must apply for the PSD permit at the same time and in addition to the construction permit. The PSD review is carried out by the technical services division of the TACB. However, the board has now switched to a procedure in which the engineer assigned to write the state permit also works on the PSD permit. Input to this technical review is received from the Air Quality Modeling Section (which evaluates the available increment against the source's proposed total emission). In the case of toxic emissions the emission effects group will also contribute.

Once a draft permit (PSD) has been written, it must be sent to the EPA regional office in Dallas for approval. The TACB also sends the PSD permit application, a copy of the public notice, and the preliminary determination summary, which is prepared by the TACB engineer conducting the review and is an analysis of all issues considered in the writing of the draft permit. At the region VI office in Dallas, engineers in the Technical Section of the Air Branch review these documents. The review consists primarily of an evaluation of the draft permit and the technical data regarding emissions, increments, etc. The EPA engineers try to get their comments back to the TACB within thirty days. In most cases the EPA suggests minor changes to the permit.[8]

Upon receiving the EPA's comments, the TACB engineers review them and prepare a response. Because the EPA's comments are usually minor, the TACB's response usually consists of making the changes that were requested by the EPA. However, should the TACB and the EPA disagree, the changes may be negotiated. However, the EPA has the final word.[9]

After the comments are incorporated into the draft permit, it is sent to the EPA regional office for final approval. The EPA then tries to issue the approved final permit within ten days of receipt.[10]

In most cases PSD permits take six months to write because more information must be analyzed, because of the complicated atmospheric modeling that must be done, and because of the necessity of the EPA review.

3.3.4 Texas Air Control Board Offset Rules

Firms seeking permits in nonattainment areas must provide the documentation necessary to prove that there will be a reduction elsewhere in the area to offset the new release. Under TACB rules there is no definition of the minimum net decrease in emissions that qualifies as an offset.[11] If a company, in its permit application, proposes an offset smaller than the TACB determines is obtainable, the company will be told to make changes in its construction plans to obtain the larger offset--or to forgo the permit.

3.3.5 Permit Exemptions

The TACB also issues permit exemptions for plants producing insignificant emissions. The TACB maintains a list entitled "Exemptions from Permit Procedures," which lists types of facilities automatically exempt from the permit process. Owners of facilities not listed who seek exemption must apply to the TACB for an exemption. The application must include information regarding the type of facility to be built, the quantity of pollutants that will be emitted, the type of emissions to be emitted, and the type of pollution control equipment that will be used.

Exemption requests are reviewed by an engineer in the TACB's Permit Section. If the exemption is denied, the owner must either apply for a construction permit or appeal to the board.

3.3.6 Attention to Cross-Media Issues

Although the TACB has not aggressively addressed cross-media issues, the agency has recently taken some steps in this direction. For example, when the owner of a proposed incinerator applies to the TDWR for a RCRA permit, the TDWR sends a copy of the application to the Combustion Group in the Permit Section of the TACB. The Combustion Group reviews the application to ensure that the facility will comply with BACT. The results of this review are then sent back to the TDWR to be evaluated in their (RCRA) permitting process.

A second example of the TACB's attention to cross-media issues is their recent concern with the emissions of air pollutants from surface bodies of water. Specifically, the TACB is beginning to develop controls for the emissions of volatile organic compounds (VOCs) from surface bodies of water.

Finally, the TACB has begun to pay attention to the issue of acid rain in reviewing construction permit applications. However, concern is limited solely to the possibility of acid deposition in Texas. The likelihood of acid rain developing from the emissions of plants located in Texas and falling on other states is not considered. This is in part due to the fact that permit section engineers have no statutory authority to do so. The concern over the impact of local acid rainfall is small because the soil in most of the state is highly alkaline. In fact, it has been claimed that acid rainfall in Texas may be beneficial.

With respect to PSD permits, the EPA region VI office is also not aggressively pursuing the issue of cross-media pollution. PSD regulations, through their requirements to evaluate the effects of emissions on plant life, soil conditions, and human habitations, provide an opportunity for consideration of cross-media effects. However, not much is made of the opportunity. Because there are no explicit regulations in the CAA to allow for the consideration of acid rain or other cross-media effects when writing permit conditions, the EPA engineers shy away from doing so. Their concern is that permits that incorporated such conditions would be appealed by the applicant as being overly discretionary.[12]

3.4 Federal/State Relations

According to the staff in the Permit Section of the TACB, the relations between their section and the regional EPA office in Dallas are relatively good. The only complaints made were about "sometimes excessive" demands for paperwork associated with the writing and approval of a PSD permit.

Notes

[1]Interview with Jennifer Sinefeld, Engineer, Permit Section, Enforcement Division, Texas Air Control Board, Austin, Texas, September 27, 1984.

[2]*Ibid.*, August 8, 1984.

[3]Texas Air Control Board (TACB), *Control of Air Pollution by Permits for New Construction or Modification* (Austin, June 10, 1983), pp. 2-6.

[4]Interview with Jennifer Sinefeld, September 27, 1984.

[5]*Ibid.*

[6]*Ibid.*, August 8, 1984.

[7]Texas Air Control Board, *Control of Air Pollution*, pp. 7-8.

[8]Interview with Tom Diggs, Environmental Engineer, Technical Section, Environmental Protection Agency region VI office, Dallas, Texas, February 8, 1985.

[9]*Ibid.*

[10]*Ibid.*

[11]*Ibid.*, August 8, 1984.

[12]*Ibid.*, February 8, 1985.

4. Permitting Under the Resource Conservation and Recovery Act

4.1 Legal Authority

The RCRA as amended and the TSWDA[1] provide the state of Texas with the legal authority to issue state permits for industrial and municipal hazardous and nonhazardous waste. Texas Administrative Code sections 335.451-335.479 address permitting standards.

The RCRAR was signed into law in November 1984. This act extended RCRA and strengthened its regulations. Thus, while the TDWR is authorized to issue final permits under the RCRA, the EPA must write permits for the RCRAR. The effect is that any owner or operator of a hazardous waste treatment, storage, or disposal facility must now obtain two permits; one from the state and one from the EPA. Texas intends to obtain authority to issue permits under the RCRAR, but at this date no timetable exists for when that authority might be granted.

4.2 Organization

The TDWR is responsible for regulating industrial solid waste and the TDH regulates municipal waste disposal. In the event that municipal and industrial wastes are generated, stored, treated, or disposed of at the same facility, the TDH is to be the lead permitting agency.

Within the TDWR, the Industrial Solid Waste Section writes permits for both new and existing facilities, including both on- and off-site facilities. Organizational charts are provided for each regulatory agency along with permit application processing charts for both hazardous waste and nonhazardous wastes. The TDWR and the TDH follow essentially the same permitting procedures. To avoid duplication, permitting will be presented in terms of TDWR's procedures except where it serves a purpose to show differences between the two agencies.

4.3 Permit Writing Process

4.3.1 Classification and Registration

The TSWDA defines municipal solid waste as solid waste resulting from or incidental to municipal, community, commercial, and recreational activities including all solid waste other than industrial solid waste. It defines industrial solid waste as including those solid wastes that result from or are incidental to any process of industry, manufacturing, mining, or agricultural operations. Food-processing industries are also included in this definition. Waste materials that result from activities associated with exploration, development, or production of oil or gas are subject to control by the TRRC.

The TSWDA has classified waste materials according to their degree of hazard. Class I waste is any industrial solid waste or mixture of industrial solid waste that, because of its concentration or physical or chemical characteristics, is a toxic; a corrosive; a flammable substance; a strong irritant; or a generator of sudden pressure by decomposition, heat, or other means and that may pose a substantial present or potential danger to human health or the environment when improperly processed, stored, transported, disposed of, or otherwise managed, including hazardous industrial waste.

Class II wastes are those that present a relatively low level of hazard with respect to acute toxic characteristics and are generally degradable.

Class III wastes are inert and essentially insoluble materials that are not readily decomposable.

There are eight major criteria used to evaluate disposal facilities of nonhazardous waste. They are flood plains, endangered species, surface water, groundwater, food chain crops, air, disease, and safety considerations.

The regulatory process begins with the requirement that firms notify the TDWR when they plan to commence generation of industrial solid waste.[2] Waste materials classified as Class I must be manifested. A manifest is a cradle-to-grave waste-tracking system for waste transported off-site. The manifest includes the EPA identification number, a description of the waste to be shipped, the quantity of the waste to be shipped, and the type and numbers of containers to be transported.[3] The department registers all firms that generate class I or class II wastes; employ more than 100 people; dispose of waste off-site; or have on-site storage, processing, or disposal facilities.

Violations of these regulations are said to be uncommon and are usually committed by small facilities. Large facilities have large staffs that are able to keep up with changing state regulations.

Each facility completes a solid waste management inventory form, which includes pertinent information such as facility location, owner, a general description of products manufactured, waste compositions, and management methods. The generator is responsible for notifying the department of any changes. The information obtained from generators provides a data base for solid waste management planning, especially in assessing facility needs and predicting amounts of wastes generated.

The TDWR requires that monthly summaries, annual reports, exception reports, and unmanifested waste reports (class I waste kept on-site or class II waste shipped off-site) be submitted by firms handling wastes. In addition, off-site commercial facility owners/operators must submit an annual report that includes closure and postclosure cost estimates. Postclosure groundwater monitoring must be conducted for thirty years at the expense of the applicant. The applicant is to perform the monitoring and send the results to the TDWR for review. The execution and maintenance of a surety bond or other financial assurance acceptable to the executive director of the TDWR in the amount specified in the permit is required as part of the application procedure and is used to guarantee that proper postclosure procedures will be followed.

4.3.2 Permit Application Process

The TDWR currently employs approximately thirty individuals to process waste disposal permits; twenty of whom actually write and review permits. Permit writers are engineers (chemical, civil, and environmental), geologists, and chemists. The TDH employs five people to review and write permits with equivalent qualifications.[4]

The TDWR has developed technical guidelines that are available to the applicants to assist them in the development of facility design to ensure that the design is consistent with the objectives of the TSWDA. Permit writers must judge a facility's ability to release pollutants below levels set by the EPA. An official with the TDH stated that the EPA standards are rather vague and that the state's technical guidelines are more useful in writing permits because they are more specific.[5]

One analytic technique presently in use is mathematical modeling. Models are used in decisionmaking associated with cross-media effects of pollutants. They most frequently provide information on how contaminants move in the groundwater. A number of models have been developed by the TDWR to predict how wastes move from landfills or surface impoundments based on characteristics of the groundwater (how fast the water moves and the permeability of the sediments of the soil). Modelling is used mostly in the permitting of landfills which is the most frequent type of permit issued under the TSWDA.

TDWR engineers claim to take into consideration the cross-media effects associated with hazardous waste disposal during the permit-writing process.[6] They claim to look at not only the contaminants disposed of in a landfill, but also at emissions into the air. They are primarily concerned about the migration of pollutants into aquifers. It should be noted that all permit applications for treating, storing, or disposing of hazardous waste and nonhazardous waste are reviewed by the TDWR, the TDH, and sometimes the TACB.

Fieldwork performed by the applicant generally involves testing soil at a proposed site. The applicant must show that the waste to be placed in a landfill is compatible with the liner used in the landfill. The TDWR performs a lecheate compatibility test along with chemical laboratory analysis of the waste. Conferences are held between the applicant and the TDWR to increase understanding of critical issues. In the case of incineration of waste, the TDWR conducts a trial burn, although most fieldwork revolves around testing the soil.

Based on interviews with TDWR staff, analysis of the permit application seems to allow the permit writers to use a reasonable amount of discretion.[7] EPA formal guidelines, such as program implementation guidance, regulatory interpretation memorandum, and technical amendment to the regulations are considered. However, these provisions may be superseded by more stringent state standards. One example is the state's definition of a <u>small generator</u>, which had previously been exempt from EPA manifest regulations when generating one thousand kilograms of waste per month or less. The TDWR (but not the TDH) requires that <u>all</u> generators of hazardous waste in Texas follow the regulations of the manifest program.

State regulatory agencies are informed of the most recent federal regulations under an agreement with the EPA. The EPA sends all new regulations (which are voluminous) to the appropriate agency.

The TDWR and the TDH routinely coordinate with one another during the permitting process. By law, copies of the permit applications are forwarded from one agency to the other. Each agency analyzes the permit according to its jurisdiction. Within the TDH, the Division of Solid Waste Management performs the function of providing educational, advisory, and technical assistance to other agencies of the state, regional planning agencies, local governments, special districts and authorities, institutions, and individuals with respect to solid waste management.[8] At times, it is necessary for the two agencies to determine whether waste is within an industrial or municipal jurisdiction. The Texas Department of Agriculture (TDA) is consulted with regard to pesticide disposal. The TRRC has jurisdiction over wastes resulting from surface mining of lignite and uranium resources. As previously mentioned, wastes associated with the exploration and development of oil, natural gas, and geothermal energy resources are not defined as solid wastes in the TSWDA and are regulated by the TRRC. This exemption has led to some confusion within the industry and the TDWR as to when these wastes become solid wastes.

The TSWDA delegates solid waste management powers,including development of plans and coordination among state and local governments and regional planning agencies to county governments.[9] Usually, the entities receiving copies of the application have thirty days in which to present comments and recommendations to the TDWR.

4.3.3 Public Participation in the Permitting Process: The Keystone Siting Process

The state of Texas has endorsed the Keystone Siting Process for hazardous waste and has published a handbook to explain the process to the public, local governments, and permit applicants. The Keystone process requires these three groups to meet and discuss their concerns regarding a proposed site prior to any public hearings. This meeting takes place outside of the established regulatory framework--before the developer applies for the permit.[10] The applicant should notify the TDWR of his intent to participate in the Keystone process ninety days before actually applying for the permit.

The first step in the Keystone process is to appoint a local review committee of approximately twelve members. The handbook suggests that eight members be appointed by regional government entities. These members should possess various backgrounds with environmental, scientific, industrial, and public interests. Four members should have local interests and should be appointed by a judge or mayor. The applicant is to provide to the committee the same resource people at all its meetings. These resource people should include a technical advisor and one representative, but not an attorney. The committee is to be appointed within the first fifteen days of the beginning of the process.

For the next three to ten weeks, the committee meets to discuss storage and/or treatment and/or disposal of hazardous waste at a particular site. Alternative sites may not be considered. The meetings are open to the public.

The Keystone process ends after ninety days, at which time the committee submits a report detailing its work and summarizing its findings. The report is submitted to the permitting agency along with the permit application. This report is not a recommendation of approval or disapproval of a proposed facility. It is a means of documenting fact-finding work. At present, the Keystone process has been officially used only by the Low-Level Radioactive Waste Disposal Authority (not under the jurisdiction of the RCRA or the TSWDA). When the process is used more widely, the State plans to monitor results. It is expected that the Keystone Siting Process will be used mostly by applicants planning to build new facilities rather than those seeking permits for already existing facilities.

4.3.4 The Contested Permit

Upon receipt of the permit application, the regulatory agency forwards a notice of filing of application to the applicant. The applicant, at his own expense, publishes this notice in a newspaper of general circulation in the county in which the solid waste activity is to occur. The notice must be field at least once within fifteen days of receipt of the notice by the applicant.[11] The TDWR is required to send a summary of the notice to local radio stations, which are asked to air the notice as a public service. At least forty-five days must be allowed for public comment before a public hearing. Notices must contain minimum information as specified by law. Normally, the final decision on the permit is made within sixty days after the closing of the hearing, which may last from several months to three or four years.

A motion for a rehearing may be filed within fifteen days of the commissioner's decision under the Administrative Procedures and Texas Register acts. Public hearings are conducted in accordance with the rules of the Texas Water Commission or Board of Health. The motion for rehearing may be requested by any of the participating parties.

The commission has forty-five days from the time of the final decision to rule on this motion. Anyone who has filed a motion for rehearing may appeal the commissioner's final decision to the district court in Travis County within thirty days after a motion for rehearing has been overruled.

4.3.5 The Uncontested Permit

The uncontested permit is referred to the TWC for approval. The commission makes a decision to approve or deny the permit. It usually approves these permits. Most hazardous waste permits for commercial facilities are contested, whereas permits for on-site facilities are not.

4.4 State/Federal Relations

The TDWR made no major complaints regarding state-federal relations. The only complaint registered was that the EPA's requirements for paperwork consumed considerable time, which the engineers felt could have been better spent working on permits.

Notes

[1]Vernon's Texas Civil Statutes, Appendix A, Article 4477-7, as amended.

[2]Texas Department of Water Resources (TDWR), "Solid Waste Management Plan for Texas 1980-1986, Industrial Solid Waste," vol. II (Austin, January 1981), p. 29.

[3]*Ibid*.

[4]Interview with Dan Eden, Planner, Texas Department of Water Resources, September 19, 1984.

[5]Interview with Hector Mendietta, Engineer, Texas Department of Health, September 21, 1984.

[6]Interview with Dan Eden, September 19, 1984.

[7]*Ibid*.

[8]Texas Department of Health, "Solid Waste Management Plan for Texas 1980-1986, Municipal Solid Wastes," vol. 1 (Austin, January 1981), p. 60.

[9]*Ibid*.

[10]*The Keystone Siting Process Handbook*, (Austin, Texas: The Keystone Siting Process Group, January 1984), p. 6.

[11]*Ibid*.

5. Permitting under the Safe Drinking Water Act

5.1 Introduction

Texas leads the nation in numbers of injection wells with approximately 48,000 wells associated with oil and gas production.[1] In addition, the state regulates over 500 underground hydrocarbon storage wells, approximately 20,000 solution mining wells, over 100 municipal and industrial waste disposal wells, almost as many recharge wells, and an unknown number of miscellaneous injection wells.[2] The adaptability of underground injection wells, for disposal purposes, has resulted in a variety of liquid wastes being injected into deep wells. Such wastes include sewage, low-level radioactive materials, petroleum brines, chemical residues, stormwater runoff, natural gas, and oil products.[3]

Underground injection, although practiced since the early twentieth century, began to be widely used as a method of waste disposal in the 1970s when the enactment of several environmental laws restricted the disposal of hazardous wastes into water, air, and landfills. As existing legislation becomes increasingly stringent, subsurface injection is viewed as an inexpensive and effective means of waste disposal.[4]

The state of Texas has determined permitting criteria for underground injection and is responsible for its enforcement. With its long history of oil and gas production and the experience gained during years of regulation, the state has set forth detailed requirements for underground injection. In fact, Texas was the first state to enact a law controlling underground injection--the Injection Well Act of 1961. The law was subsequently amended and is now part of the Texas Water Code.[5]

5.2 Legal Authority

5.2.1 National Regulation

Part C of the Safe Drinking Water Act (P.L. 93-523) established, for the first time, provisions for regulating underground injection. The main purpose of part C was to establish a federal-state system of controls to insure that underground injection practices would not endanger drinking water sources.[6] The UIC section of the SDWA is composed of several sections. Section 1421 requires the EPA to propose and promulgate minimum requirements for state underground injection programs to protect underground sources of drinking water. This section also prohibits any underground injection which is not authorized by a state permit. As soon as the EPA has promulgated the minimum requirements regulations, each state has the opportunity to develop an enforceable underground injection control program under Section 1422. If approved by the EPA, the state is delegated primary governmental responsibility (primacy). As long as the state continues to meet its responsibilities, no federal UIC enforcement actions are taken in that state.

All owners or operators of injection wells must be authorized by permit. In carrying out the mandate of the SDWA, no injection shall be authorized by permit if it results in the movement of fluid containing any contaminant into underground sources of drinking water.

The UIC permit program regulates underground injection by defining five classes of wells and setting various standards for each. These classes include industrial and municipal wells injecting hazardous wastes below underground sources of drinking water (class I); disposal wells used in connection with oil and gas production (class II); certain mineral mining and energy operations (class III); hazardous or radioactive disposal wells injecting into or above underground sources or drinking water (class IV); and all other injection wells (class V).[7]

All injection wells must meet certain standards before permit applications are approved. Requirements have been established by the EPA for siting, construction, testing, operation, and abandonment of engineered wells. The technical requirements are designed to assure that injected fluids stay in the approved injection zone.[8]

The main points that EPA regulations seek to promote are to identify underground sources of drinking water and define what constitutes endangerment of these sources; to set up their own underground injection control programs to protect these drinking water sources; to describe the requirements of such programs and permit systems; to set forth procedures to assure enforcement of these requirements by the states or by the federal government if the states fail to do so; and to list construction, permitting, operating, monitoring, and reporting requirements for specific types of wells.

5.2.2 State Regulation

The state UIC program is jointly administered by the TDWR and the TRRC. Both state agencies are authorized by the EPA to issue UIC permits under the SDWA. The TDWR's UIC program was granted primacy beginning January 6, 1982.[9] The UIC section of the TRRC, established on January 2, 1980, was granted primacy on April 23, 1982.[10]

State provisions governing injection wells in Texas center on chapter 27 of the Texas Water Code.[11] This chapter incorporates the Injection Well Act of 1981, which provides the statutory authority for regulation of all subsurface injection in Texas. The TDWR also regulates underground injection control through the Texas Administrative Code which directly governs injection well permitting and operation.[12]

Generally, the TRRC administers the UIC program for wells associated with oil and gas production (class II). The jurisdiction of this agency also includes wells used for in situ coal gasification, wells used for recovery of geothermal energy, and geothermal wells used in heating and aquaculture.[13] Thus, the TRRC regulates class II wells injecting oil and gas waste, including the disposal associated with underground storage of hydrocarbons, and injection arising out of, or incidental to, the operation of gasoline plants, natural gas processing plants, and pressure maintenance or repressuring plants. The TRRC also has permitting authority over class II wells used for the enhanced recovery of oil and gas and underground hydrocarbon storage wells.

The TDWR administers the UIC program for all class I and IV injection wells and all class III and V wells not under the jurisdiction of the TRRC (see table 5.1).

Because the division of responsibility between the TDWR and the TRRC is clear, there is little need for interagency coordination. Occasionally, questions have arisen as to which agency has regulatory authority over specific wells, or in some cases, classifications of wells. These problems are resolved by joint agreement of appropriate representatives of both agencies. Other matters are routinely coordinated by the directors of the UIC for the two agencies.

5.3 Organization of Texas Agencies

5.3.1 Texas Department of Water Resources

The central TDWR office is located in Austin, Texas, with fourteen district offices located throughout Texas as well as two Rio Grande watermaster offices. The permit writing responsibilities of the TDWR UIC program are administered by the Texas Water Development Board, the Texas Water Commission and the executive director. The executive director's office evaluates permit applications for consideration by the Texas Water Commission (see table 5.2).

The UIC Section of the Permits Division reviews applications for underground injection permits. In addition, the UIC Section prepares draft underground injection permits and makes recommendations to the Texas Water Commission. The three units that comprise the UIC Section each represent particular program concerns: the Disposal Well Unit regulates class I wells; the Solution Mining Unit regulates all class III wells; and the Surface Discharge Emissions Unit provides technical support to the other units. The UIC Section has a director, three unit heads, and a technical staff (see table 5.3).

The permit writers are either engineers or geologists. To supplement their formal training, the TDWR provides new permit writers with on-the-job training including field work under the supervision of an experienced permit writer. The TDWR feels that this procedure allows new personnel to assimilate rules and procedures more easily.[14]

Table 5-1: State UIC Program Regulatory Responsibilities

Chapter 27 of the Texas Water Code, the 1981 Injection Well Act, provides the statutory authority for regulation of all underground injections in Texas. In addition, the Act divides the regulatory responsibilities between the Railroad Commission of Texas and the Texas Department of Water Resources. Each agency will regulate underground injections within its jurisdiction as defined by the Act.

The Texas Department of Water Resources has regulatory responsibility for the following activities:

(1) Class I.

(A) Wells used by generators of hazardous wastes or owners or operators of hazardous waste management facilities to inject hazardous waste, other than Class IV wells.

(B) Other industrial and municipal waste disposal wells which inject fluids beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water. This category includes disposal wells operated in conjunction with uranium mining activities.

(2) Class III. Wells which inject for extraction of minerals, including:

(A) Mining of sulfur by the Frasch process.

(B) Solution mining of minerals which includes sodium chloride, potash, phosphate, copper, uranium, and any other mineral which can be mined by the process.

(3) Class IV. Wells used by generators of hazardous wastes or of radioactive wastes, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous wastes or radioactive wastes into or above a formation which, within one quarter mile of the well, contains an underground source of drinking water. Class IV injection activities, generally prohibited under the previous State program, are prohibited under the Underground Injection Control program.

(4) Class V. Injection wells not included in Class I, II, III, or IV. Class V wells include:

(A) Air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump.

(B) Cesspools, or other devices that receive wastes, which have an open bottom and sometimes have perforated sides

(C) Cooling water return flow wells used to inject water previously used for cooling.

(D) Drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation.

(E) Dry wells used for the injection of wastes into a subsurface formation.

(F) Recharge wells used to replenish the water in an aquifer.

(G) Salt water intrusion barrier wells used to inject water into a fresh water aquifer to prevent the intrusion of salt water into the fresh water.

(H) Sand backfill wells used to inject a mixture of water and sand, mill tailings, or other solids into mined out portions of subsurface mines.

(I) Septic system wells used

(i) to inject the waste or effluent from a multiple dwelling, business establishment, community, or regional business establishment septic tank; or

(ii) for a multiple dwelling, community, or regional cesspool.

(J) Subsidence control wells used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with the overdraft of fresh water. These are wells not used for the purpose of producing oil or gas.

The Railroad Commission of Texas will, under its own Underground Injection Control program, regulate the following activities:

(1) Class II injection operations.

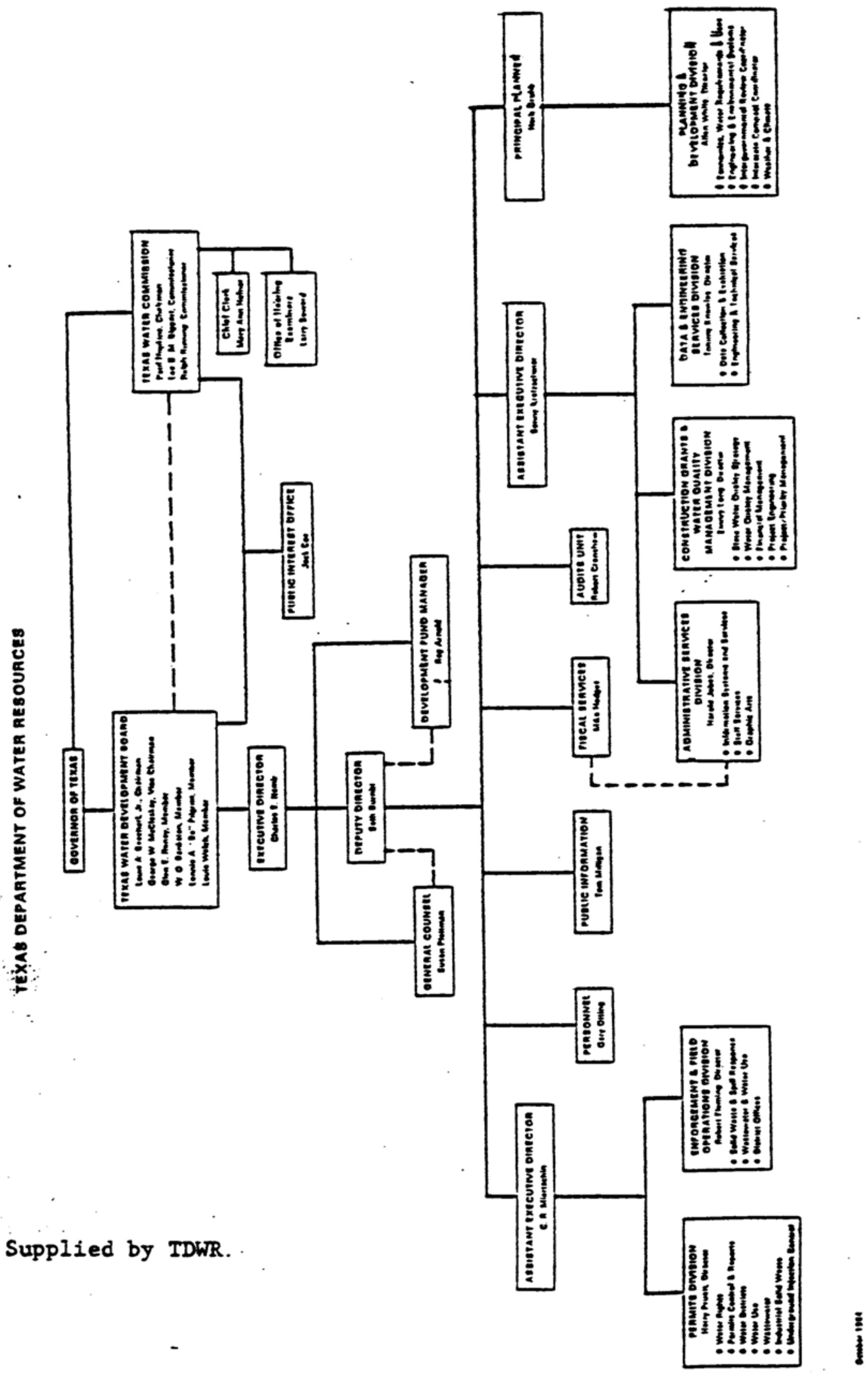
(2) Class III wells used for in situ coal gasification.

(3) Class III wells used for recovery of geothermal energy.

(4) Class V geothermal wells used in heating and aquaculture.

SOURCE: Greene, Underground Injection Control Technical Assistance Manual, pp. 59, 60.

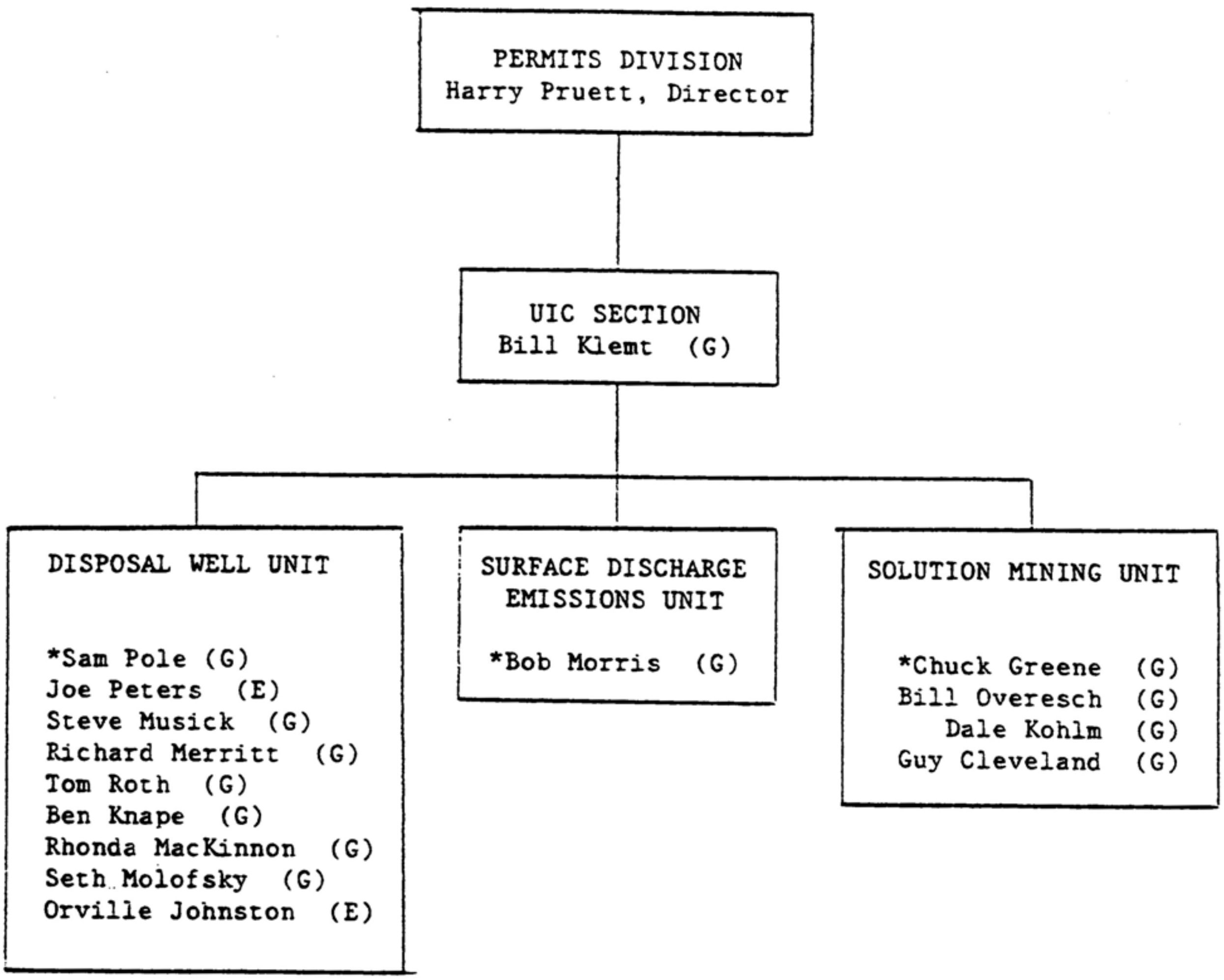
Table 5-2: TDWR Organizational Chart



Supplied by TDWR.

Table 5-3: Texas Department of Water Resources
UIC Section Organizational Chart

(4/15/85)



* Unit head
(E) - Engineer
(G) - Geologist

5.3.2 Texas Railroad Commission

The central office of the TRRC is located in Austin, Texas. Ten district offices are located throughout the state and maintained by field operations of the Oil and Gas Division. The UIC program represents a section of the Oil and Gas Division. The UIC Section coordinates underground injection activities according to administrative function and is responsible for the processing and issuing of new injection well permits as well as oversight of permits already issued (see table 5.4).

The TRRC utilizes a two-tier permit-writing procedure. The first stage requires an administrative review by a well analyst who may or may not have a college degree. The second tier in the permit-writing process requires final review by a geologist or an engineer.[15]

5.4 The Permitting Process

The Injection Well Act of 1981 requires the TDWR and the TRRC to determine that existing permit rights, including mineral rights, will not be infringed upon; that both ground and surface water be adequately protected from pollution; that the permit applicant demonstrate financial responsibility sufficient to close and abandon the well; and that the injection well is in the public interest.[16]

5.5 Permitting by the Texas Department of Water Resources

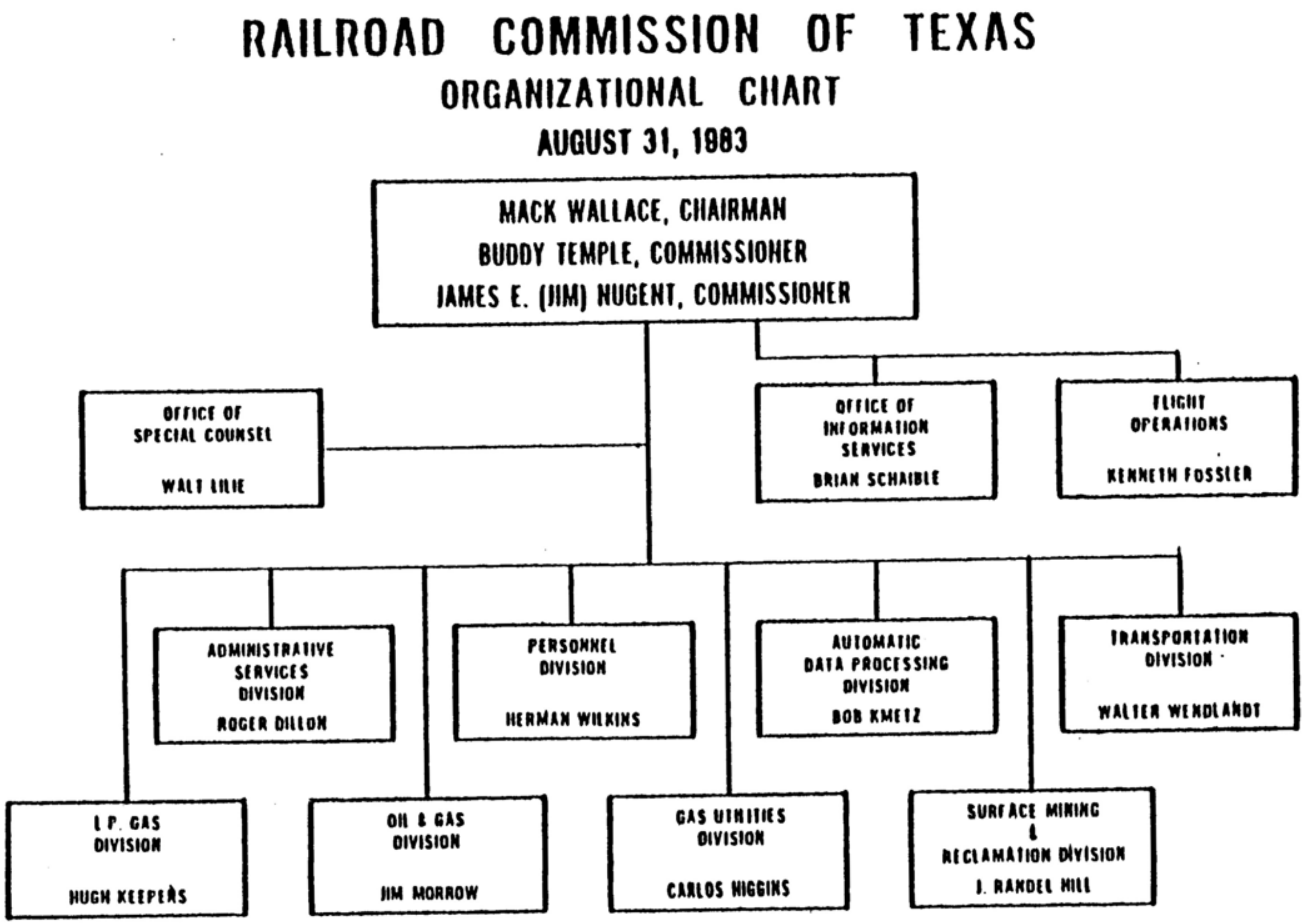
Section 353.10 of the Texas Administrative Code requires all injection wells and related activities to be authorized by a permit. Permits for new injection wells must be obtained before construction begins.[17] Owners of existing wells must apply for either a new permit or a permit amendment to meet the requirements of TDWR rules.

When an application for a permit to dispose of waste by well injection is received by the TDWR, it is referred to the Permit Control and Reports Section of the Permits Division. (The application must be sent to the TDWR in Austin). The applicant must submit the permit application, a technical report, and a map showing "the general character of the areas adjacent to the facility, including . . . the nature of development."[18] When the complete application and required materials are received, the Permits Control and Records Section makes up a file for the application and reviews it for completeness. The completed application is then placed on a worklist.

The permit applicant must also pay an application fee of $30.00 to the TDWR. The application cost includes a $25.00 statutory filing fee plus a $5.00 minimum fee for providing notice of application to affected persons.

The application is then sent to the technical staff of the UIC Section

Table 5-4: TRRC Organizational Chart



SOURCE: Railroad Commission of Texas, Annual Financial Operating Report, (Administrative Services: August 31, 1983), p. 49.

of the Permits Division where an engineer or geologist reviews the application and drafts a technical report, draft permit, and a technical summary. These drafts are reviewed by both the unit head and the section chief of the UIC Section. If they are approved, the assigned engineer or geologist on the technical staff sends a copy of the draft permit to the applicant. This letter must also be reviewed by the unit head and section chief. If the UIC section chief approves, it is mailed out along with the draft permit.

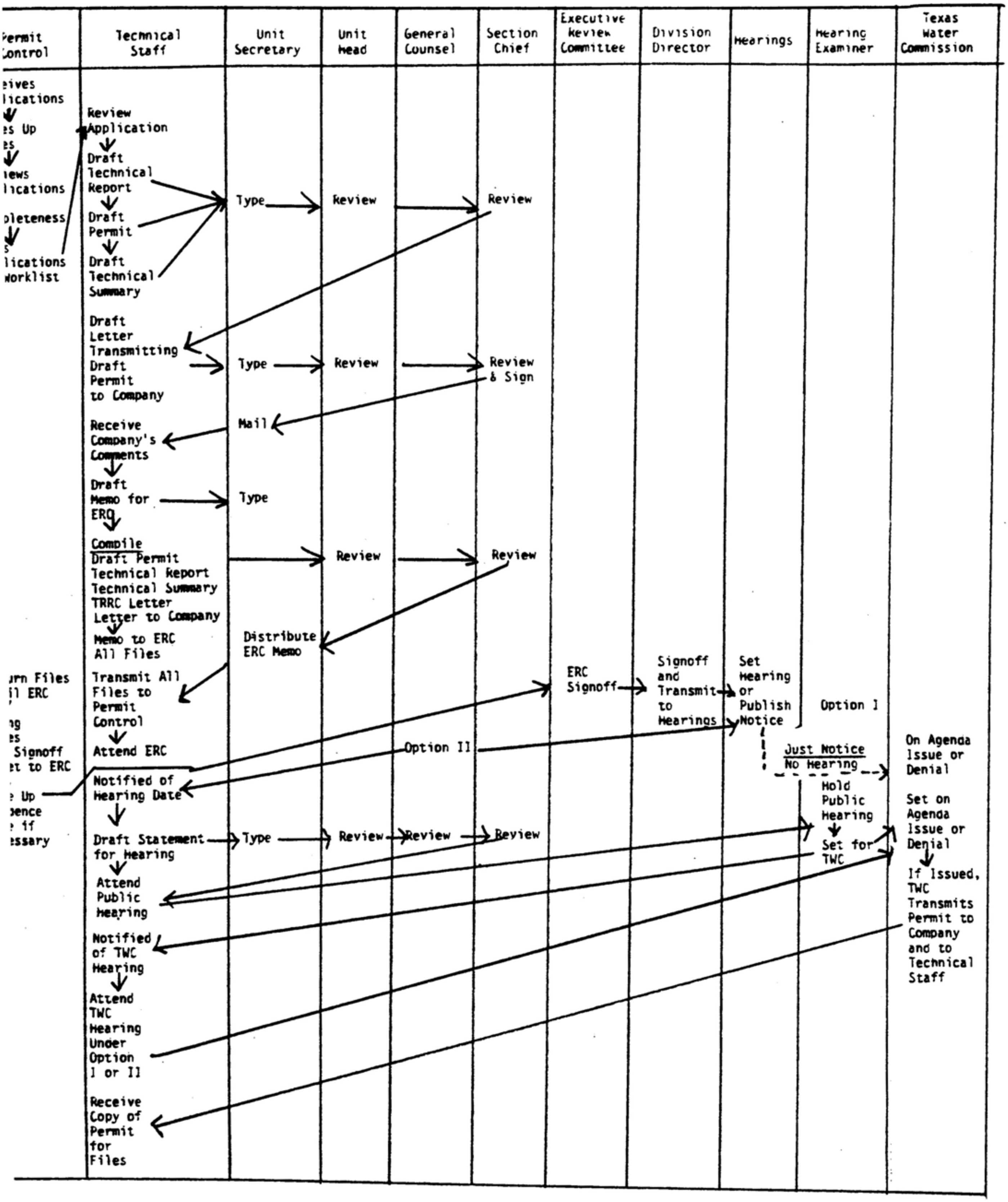
While waiting for comments from the permit applicant, the technical staff must compile the draft permit, technical report, technical summary, and a letter from the TRRC. The TRRC letter indicates whether or not the proposed injection well will endanger oil or gas formations. Because the provision of existing rights has frequently been applied to mineral rights in oil and gas production, the Injection Well Act specifically requires that the applicant obtain this letter.[19]

All files must be sent to the Executive Review Committee. Once again, the files must be reviewed and approved by the UIC section chief. All files are then sent by the technical staff member to the Permits Control and Records Section, which retains the file until the Executive Review Committee is scheduled to meet. The technical staff person must attend the Executive Review Committee meeting to answer any questions which may arise. The Permit Controls and Records Section representative is responsible for bringing all files to the Executive Review Committee meeting.

A maximum of seventy-five calendar days is allowed from the time an application arrives to the time a permit is issued or refused. The Permits Control and Records Section and the UIC Section technical staff representatives are sent to the Executive Review Committee meetings to sign off to insure the permit application was processed under the seventy-five-day limit. The Permits Division director must officially sign off the process and post the results of the hearings.

The permit application process then follows one of two options depending on the public's interest. The first option--no public interest--permits a notice to be published without a hearing. The applicant file is simply placed on the Texas Water Commission agenda, and the permit is either issued or denied. The second option requires that the UIC technical staff be notified of a hearing date. The staff representative is responsible for drafting a statement for the hearing. The statement must be reviewed by the UIC section chief and unit head as well as the TDWR's general counsel. If approved, the draft statement is sent back to the technical staff. The staff representative then attends a public hearing held by a TWC hearing examiner. If no problems are encountered at the hearing, the permit application is placed on the TWC agenda. The TWC issues or denies the permit. If the TWC issues a permit, a copy must be sent to the applicant and to the UIC Section technical staff. A copy of the permit is then placed in UIC Section files (see table 5.5).

Table 5-5: TDWR's Permit Process



5.6 Permitting by the Texas Railroad Commission

State rules 9, 46, and 74 and chapter 27 of the Texas Water Code require all operators of injection, disposal, and storage wells associated with oil and gas production to obtain a permit from the TRRC. All injection wells under the jurisdiction of the TRRC must be permitted before operations can legally begin. Pursuant to state rules, permit applications will only be approved after the operator satisfies the burden of demonstrating that all reasonable efforts have been made to assure the protection of ground and surface water.

The TRRC does not charge a fee for either permit applications or services rendered. The commission does, however, collect a $100.00 drilling fee which is placed in a well plugging fund. The TRRC has an estimated balance of $1.8 million in the fund to date.[20]

After the TRRC receives a permit application for subsurface injection, it is stamped by the secretarial staff and is forwarded to a well analyst according to district office jurisdiction. The well analyst performs an administrative review by compiling a file for the permit application and reviewing this file for completeness. The application must include a letter from the TDWR attesting that the permit application meets criteria for protection of ground and surface waters.

A member of the UIC Section technical staff must then provide an overview of the engineering of the permit application. When convinced of the integrity of the application, the complete file is sent to the assistant director of the UIC Section for complete review. If the application is incomplete, the file is sent back to the well analyst. The analyst is responsible for contacting the permit applicant for the required data. Meanwhile, the file is pending until complete. If the required data arrives within fifteen days, the file is considered administratively complete. If at the end of the fifteen-day period the file is incomplete, it is placed on administrative hold until all required material has been turned in.

The technical review must demonstrate adequate compliance with well requirements before the technical staff writes a draft permit. The draft permit involves filling out a form and altering the permit due to any special conditions. The draft permit is reviewed by the secretarial staff for editing purposes. The draft permit and the application file are then forwarded to the assistant director of the UIC program. Once the permit is granted, the applicant is bound by all applicable rules and permit conditions set forth by the TRRC.

If a permit application is denied, the technical staff must explain to the applicant the grounds for denial. The applicant may request a hearing to challenge and reexamine the decision. However, the burden of proof rests upon the operator (applicant) to demonstrate that compliance will be attained under his proposed changes. Permit conditions and statewide rules must be examined in order to ascertain what actions are necessary for compliance. Furthermore, the statutes allow the TRRC to include other permit conditions to protect ground and surface water from contamination. The operator may bring in experts to substantiate his position (see table 5.6).

The permit applicant must certify that he is authorized to submit the application on behalf of the operator and that the information provided is accurate. Penalties are outlined in chapter 91.143 of the Texas Natural Resources Code. The application forms require the applicant to provide his title and give the operator's name, address, and operator number, which is prescribed after the organization report has been filed. This report is the initial and principal instrument required of organization permit applicants and requires the operator to specify the nature of his business and the names and addresses of the corporate officers and partners.

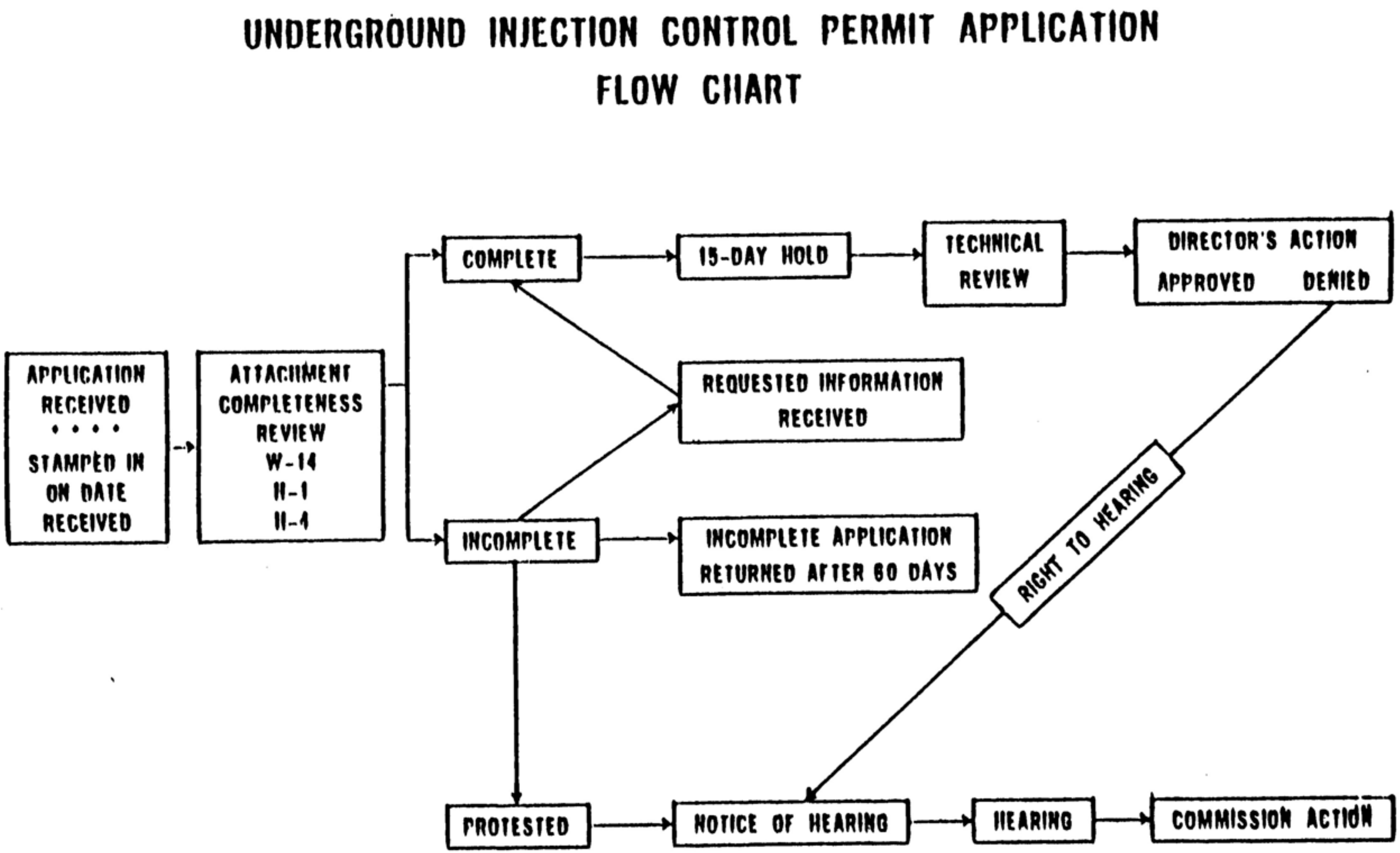
5.7 Federal/State Relations

The UIC sections of the TDWR and the TRRC expressed differing views concerning their relationship with the EPA. The SDWA authorizes grants to assist states in managing drinking water programs. Thus, the EPA may specifically subsidize state underground water source protection programs with 75 percent federal grants.[21] The amount of grant money the respective UIC programs receive appears to be an important factor in state/federal relations.

The TDWR receives the full 75 percent grant from the EPA to implement and maintain its UIC section.[22] The TDWR's UIC Section is required to stay in constant communication with the EPA. The EPA requires the TDWR UIC Section to make available four yearly reports including a quarterly report, two semiannual reports, and an annual report. The staff feels that the EPA is overly concerned with numbers and places too much emphasis on reports that detract valuable time from ongoing projects. The constant communication maintained between the TDWR and the EPA may be excessive and repetitive.

The TRRC's UIC Section reports good relations with the EPA. The TRRC's relations with the EPA may be somewhat different due to a smaller percentage of program funding. EPA funds approximately 10 to 25 percent of the TRRC's UIC program.[23] The EPA requires only one annual report written in free form from the TRRC. The commission, however, corroborated the EPA's tendency to stress numbers and details over substance. However, good relations between agencies were reported.[24]

Table 5-6: TRRC's Permit Process



SOURCE: Railroad Commission of Texas, Underground Injection Control Seminar Reference Manual, (Oil and Gas Division: June 1983) p. 10.

Notes

[1]The Railroad Commission of Texas estimates 44,500 injection wells under its regulatory jurisdiction. However, a more recent Texas Department of Water Resources report places that number closer to 48,000. See Texas Railroad Commission, Underground Injection Control Seminar Reference Manual (Austin, June 1983), p. 2; and Ben K. Knape, comp., Underground Injection Operations in Texas: A Classification and Assessment of Underground Injection Activities (Austin: Texas Department of Water Resources, December 1984), Report 291, p. 1-1.

[2]Texas Department of Water Resources, Underground Injection Control Technical Assistance Manual: Subsurface Disposal and Solution Mining, comp. Charles J. Greene (Austin, April 1983), Report 274, p. 2.

[3]*Ibid*., pp. 1, 2.

[4]The cost breakdowns calculated for one dollar per one thousand wet kilograms were landfilling, \$100-\$400; chemical treatment, \$100-\$500; and underground injection, \$50-\$100. See Environmental Protection Agency, Solid Waste Data: A Compilation of Statistics on Solid Waste Management Within the United States, prepared by JRB Associates, EPA contract no. 68-01-6000 (Washington, August 1981), p. 66.

[5]Texas Water Code Ann., Ch. 27.001 *et seq*. (Vernon 1984 Supp.).

[6]Public Law 93-523, Safe Drinking Water Act, December 16, 1974, 42 U.S.C. Subchapter 300(f) *et seq*.

[7]*Ibid*., Subchapter 144.6.

[8]Texas Administrative Code, Title 31, Ch. 353.62.

[9]Texas Department of Water Resources, Underground Injection Control, p. 2.

[10]Texas Railroad Commission, Underground Injection Control Seminar, p. 2.

[11]Texas Water Code Ann., Ch. 27.001 *et seq*.

[12]Texas Administrative Code, Title 31, Ch. 341.191 *et seq*., Ch. 353 *et seq*.

[13]Texas Department of Water Resources, Underground Injection Control, Appendix.

[14]Interview with Tom Roth, Geologist, Underground Injection Control Section, Texas Department of Water Resources, Austin, Texas, September 17, 1984.

[15]Interview with Larry Borque, Assistant Director, Underground Injection Control Section, Texas Railroad Commission, Austin, Texas, September 21, 1984.

[16]Texas Water Code Ann., Ch. 27.051(a).

[17]Texas Administrative Code, Title 31, Ch. 353.15.

[18]Texas Administrative Code, Title 31, Ch. 341.153(7)(B).

[19]Texas Water Code Ann., Ch. 27.015.

[20]Interview with Larry Borque, October 19, 1984.

[21]Public Law 93-523, Safe Drinking Water Act, December 16, 1974, 42 U.S.C. Subchapter 300(f).

[22]Interview with Tom Roth, September 17, 1984.

[23]In 1983 and 1984 total Underground Injection Control activities funded by the state of Texas were 51 percent and 65 percent respectively. See Texas Railroad Commission, Legislative Budget Estimates for the 1986-87 Biennium: Submitted to the 69th Texas Legislature by the Legislative Budget Board (Austin, January 1984), p. 149.

[24]Interview with Larry Borque, September 21, 1984.

PART II: CASE STUDIES OF PERMITTING AT FIVE FACILITIES

ENVIRONMENTAL PERMITTING IN TEXAS

In order to analyze environmental permitting in Texas the project team investigated the permitting process for five facilities: (1) the city of Austin's Walnut Creek wastewater treatment plant, (2) the Lower Colorado River Authority's Fayette Power Project number 3, (3) Monsanto's underground injection well at its Texas City plant, (4) Motorola's Austin semiconductor plant, and (5) IBM's circuit board plant in Austin. Five facilities were chosen because this was considered the maximum number feasible for the project team to cover.

Several criteria were used in selecting these sites. They include:

1. Economic significance -- Sites that are major employers in their locations were used because it was felt these sites would add to the significance of the conclusions.

2. Extensiveness of permitting history -- an extensive permitting history (i.e., a large number of permits held or a few held for a long period of time) was thought to add to the significance of our conclusions.

3. Types of institutions -- A mix of public and private institutions was used to broaden the base of the case study and to allow for more significant results.

4. Likelihood of multimedia transfer of pollutants -- Sites with the potential for intermedia transfer problems were studied to enable the project team to draw conclusions about how cross-media pollution problems are handled.

5. Convenience of location -- Sites close to the Austin area were given favorable consideration in order to reduce travel time and expenses.

6. Good will -- Since we had no way to compel plant management to cooperate with us by releasing information and making themselves available for interviews, sites were chosen whose management showed a willingness to work with us.

7. Record of compliance/noncompliance -- Sites where permit violations were serious enough to make them objects of litigation were avoided to reduce potential problems with record and file acquisition.

8. Permit writers' recommendations.

6. City of Austin: Walnut Creek Wastewater Treatment Facility

6.1 Introduction

This case study examines how cross-media transfers of pollutants from a municipal wastewater treatment facility are controlled. Three different but integral components of the permitted sewage treatment process were considered. First, the physical characteristics of the facility and operational procedures employed at the facility were investigated. Second, the permitting process implemented by the TDWR and the EPA was reviewed, focusing on questions of efficiency, effectiveness, and the extent to which federal and state statutes enable regulatory agencies to regulate cross-media transfers and to enforce those regulations. Compliance by the permittee and enforcement efforts by the regulator were also considered in this case study.

The study is based on interviews with regulatory officials, municipal officials, and treatment plant personnel, and on a review of the permit file.

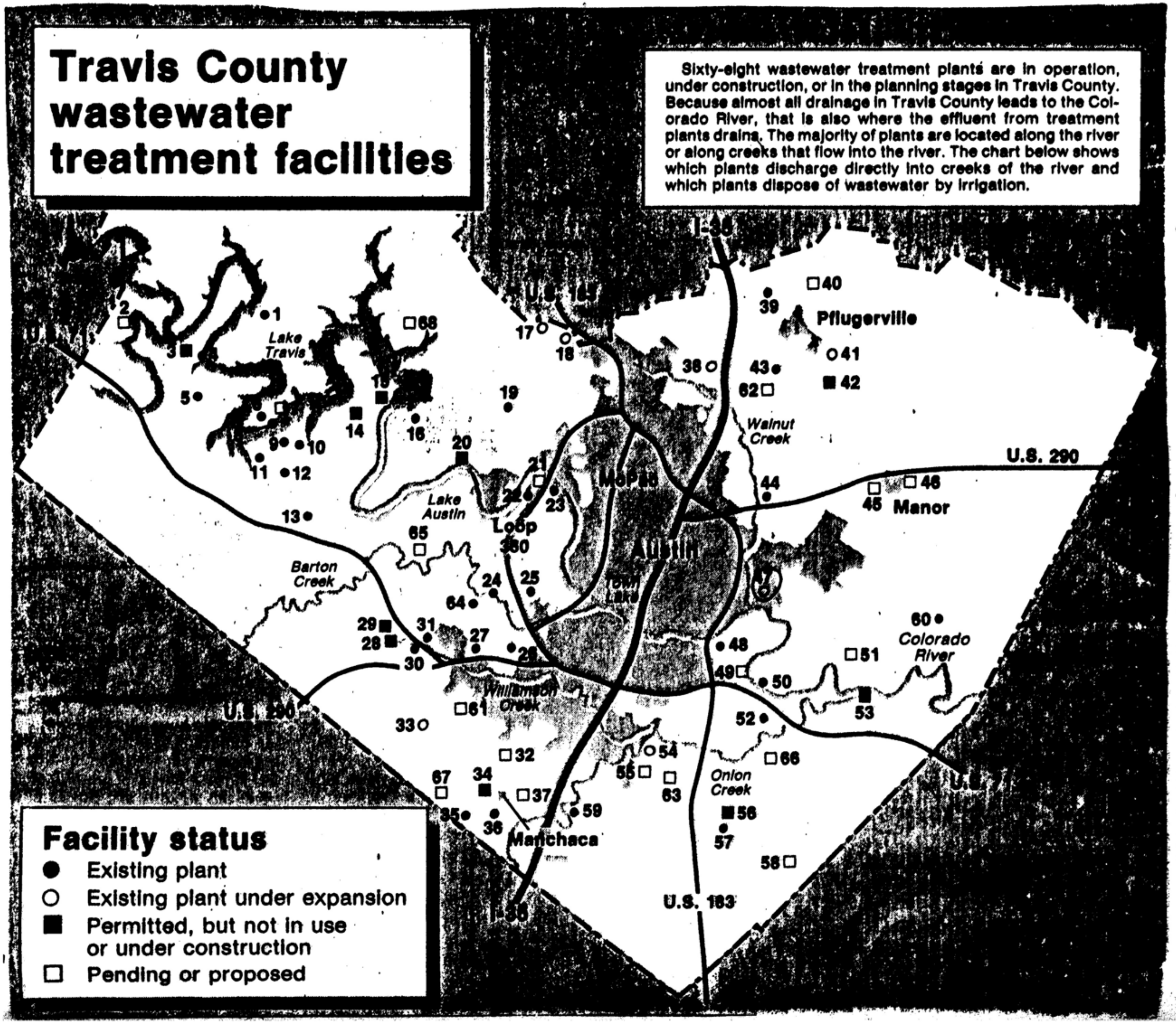
6.2 Site Characteristics

The Walnut Creek Plant site is located at 7113 Martin Luther King Boulevard (FM 969) in Travis County, Texas. The effluent is discharged into Walnut Creek and is carried into the Colorado River in segment no. 1428 of the Colorado River basin. The receiving water is used for contact and noncontact recreation, propagation of fish and wildlife, and the discharge of domestic raw sewage. The TDWR issues the permit under number 10543-11; NPDES permit number TX0046981.

The city of Austin's Walnut Creek wastewater treatment facility was placed in service in 1977. The first permit was issued to the plant in 1964 and was amended in 1974. Walnut Creek is the largest sewage treatment plant in Austin. It presently treats 25 million gallons per day (mgd). Austin operates four other city-owned facilities. These are Govalle plant, which treats 26 mgd; Onion Creek plant, which is under construction and will be able to treat 18 mgd; (3) Williamson Creek plant, which treats 12 mgd; and Hornsby Bend plant, which treats 2 mgd.[1] The <u>Austin American-Statesman</u> indicates that thirty-nine plants are currently in operation in Travis County, and another twenty-nine are under construction or in the planning stages (figure 6.1).

Travis County has experienced rapid growth in the past fifteen years. As a result, the city of Austin's treatment facilities have been pushed beyond their original capacities. The Williamson Creek plant is currently undergoing expansion after a history of violating permit discharge standards. All of the city's treatment facilities are being expanded or have amendments to their original permits pending.

Figure 6-1: Travis County Wastewater Treatment Facilities



SOURCE: Austin American-Statesman, December 1984.

1.	Travis County MUD No. 1 - Lago Vista Plant	300,000 gpd	I & D	●
2.	Treasure Resorts Inc.	20,000 gpd	I	□
3.	Buddy W. Gregory	17,000 gpd	I	■
4.	Whitecliff Services - Lake Travis Town House	4,000 gpd	I	●
5.	Pedernales Country Club - Briarcliff	15,000 gpd	I	●
6.	Travis County Water Control and Improvement District - Point Venture Plant 2	70,000 gpd	I	●
7.	Mitchell Development Corporation of the Southwest	350,000 gpd	I	□
8.	Travis County WCID Point Venture 1	36,000 gpd	I	●
9.	Lakeway MUD No. 1 - Lakeway Inn & Marina	65,000 gpd	I & D	●
10.	Lakeway MUD No. 1 - Central Plant	250,000 gpd	I	●
11.	Lakeway MUD No. 1 - Lakeway World of Tennis	105,000 gpd	I & D	●
12.	Lakeway Development Company - Hurst Creek	250,000 gpd	I & D	●
13.	Lake Travis Independent School District High School	20,000 gpd	I	●
14.	Villa on Lake Travis	42,000 gpd	D	■
15.	Allan R. Klein - Commander's Point	90,000 gpd	D	■
16.	Travis Vista Subdivision Section II	6,000 gpd	D	●
17 & 18.	Spicewood Development Corp. Balcones Village	expansion to 285,000 gpd	I	○
19.	Texas Tumbleweed Restaurant	5,000 gpd	I	●
20.	River Development Corporation Wilding Plant	400,000 gpd	I	■
21.	Doyle Wilson Co. Hermosa Office Park	1,400 gpd	I	□
22.	Davenport Ranch	386,000 gpd	I	●
23.	St. Stephens Episcopal School	25,000 gpd	I	●
24.	Lost Creek MUD	120,000 gpd	I	●
25.	Eanes School District	24,000 gpd	I	●
26.	Travis Country	225,000 gpd	I	●
27.	Austin School District - Oak Hill School	7,500 gpd	I	●
28.	Aaron Investments Inc.	80,000 gpd	D	■
29.	Janz, Martin & Devoe Treadwell	23,000 gpd	I	■
30.	Glenn Neans - Valley View Acres	35,000 gpd	D	●
31.	Bud Johnson - Country Air Mobile Home Park	60,000 gpd	D	●
32.	South Austin Growth Corridor MUD No. 1	750,000 gpd	D	□
33.	Southwest Travis County MUD No. 1	500,000 gpd	D	○
34.	Dr. Paul Goetz	8,000 gpd	I	■
35.	Marbridge Foundation Inc. School	26,000 gpd	I	●
36.	Austin School District - Manchaca School	5,400 gpd	I	●
37.	Bill Milburn Inc. - Texas Oaks Three	300,000 gpd	D	□
38.	Robert A. Morris - Lamplight Village	1,000,000 gpd	D	○
39.	Doyle Hickerson - Windermere	2,000,000 gpd	D	●
40.	John Lloyd Development Co. North Travis County MUD No. 5	3,200,000 gpd	D	□
41.	City of Pflugerville	570,000 gpd	D	○
42.	Doyle Hickerson	2,500,000 gpd	D	■
43.	Leon Parker - Silverado Mobile Home Park	450,000 gpd	D	●
44.	Northeast Austin Venture LTD. - Chimneyhill	150,000 gpd	D	●
45.	City of Manor	192,000 gpd	D	□
46.	Travis County MUD No. 2 Austin-Manor Investments	1,580,000 gpd	I	□
47.	City of Austin - Walnut Creek Plant	30,000,000 gpd	D	○
48.	City of Austin - Govalle Plant.	26,000,000 gpd	D	●
49.	Ken Burge - Carson Creek	250,000 gpd	D	□
50.	City of Austin - Hornsby Bend	2,000,000 gpd	I & D	●
51.	Morris K. Gully - Hunters Bend	950,000 gpd	I	□
52.	Travis County Rehabilitation Center	15,000 gpd	I	●
53.	City of Austin - Onion Creek Plant	18,000,000 gpd	D	■
54.	City of Austin - Williamson Creek Plant	6,000,000 gpd	I & D	○
55.	Douglas Lewis - Janes Ranch Plant	200,000 gpd	I	□
56.	Landmark Construction and Development Southcrest Park	70,000 gpd	D	■
57.	Adrian Coleman Thoroughbred Farms	65,000 gpd	D	●
58.	James C. Rogers	26,000 gpd	D	□
59.	Onion Creek Development Co.	345,000 gpd	I	●
60.	W. L. Gore and Associates	8,000 gpd	I & D	●
61.	Bill Milburn Inc. Austin MUD No. 1	200,000 gpd	I	□
62.	Storm Development Inc. Desau Plant	1,540,000 gpd	D	□
63.	Texas Commercial Investments	5,000,000 gpd	D	□
64.	Austin Sunbelt Inc. - St. Micheal's Academy	32,000 gpd	I	●
65.	Lexington Development Co. - Uplands Plant	150,000 gpd	I	□
66.	Randy Morine Development Co. - Fincher Road	2,980,000 gpd	D	□
67.	Randy Morine Development Co. - Bear Creek	540,000 gpd	D	□
68.	Doyle Wilson Co. - The Parke	1,270,000 gpd	I	□

Notes: gpd-Treatment capacity in gallons per day I-irrigation D-discharge

The initial construction of the Walnut Creek plant provided for one 27 mgd primary treatment unit and one 18 mgd secondary unit. Under the original design, the plant would have a cumulative capacity of 54 mgd, consisting of two primary treatment modules able to treat 27 mgd each and three secondary treatment modules with a capacity of 18 mgd each. Figure 6.2 provides a sketch of the plant's layout before and after construction was completed. The current discharge permit allows a monthly average flow of 25 mgd, which may contain up to 20 milligrams per liter (mg/l) of biochemical oxygen demand (BOD) and 20 mg/l of total suspended solids (TSS). However, a maximum of 30,000,000 gallons can be treated due to problems at the Williamson Creek treatment plant. Influent flows to the Walnut Creek plant are currently averaging 23 mgd and have been consistently below the 20/20 BOD/TSS permit limits since the facility came on line. The plant has had relatively little difficulty keeping the pH within permit limits. A pH of between 6.0 and 9.0 is the established permit limit for effluent. Due to the unusually large chlorine demand during the summer months, the chlorine residual infrequently drops below the minimum permit parameter of 1 mg/l. The chlorine residual has been lower than permit minimum requirements for effluent standards on several occasions in 1984. Chlorine is added to disinfect the treated effluent before it is released into Walnut Creek.

Secondary treatment units have been bypassed during high-flow periods caused by heavy spring rains to protect the activated sludge process. In all known instances, bypassed flows received full primary treatment and were chlorinated and mixed with the fully treated portion of the flow before being discharged. In spite of these high wet-weather flows the effluent quality has always met permit requirements. The Walnut Creek plant has an excellent compliance record and promptly reports any permit violations to the city Water and Wastewater Department.

The city has proposed expanding the facility to handle increasing influent flows, and construction is expected to be completed by 1987. Plant expansion is taking place in two stages. The construction of one additional primary and two secondary units, similar to the existing design, will raise the facility's capacity to 38 mgd before further modifications to enlarge the plant capacity to 54 mgd are begun.

The City plans interim improvements, consisting of adding polymer feed facilities and improved flocculation methods to enhance the final settling of sludge, before the full expansion comes on line. These improvements will improve plant performance during the period when the secondary clarifiers are being built. Polymers cause the dispersed activated sludge particles to agglomerate into a larger mass which will, by its weight and mass, settle faster. Polymers are injected ahead of the secondary clarifiers to enhance capture of solids. Floc are small clumps of bacteria that digest suspended wastes during secondary treatment.

Figure 6-2: Walnut Creek Wastewater Treatment Plant

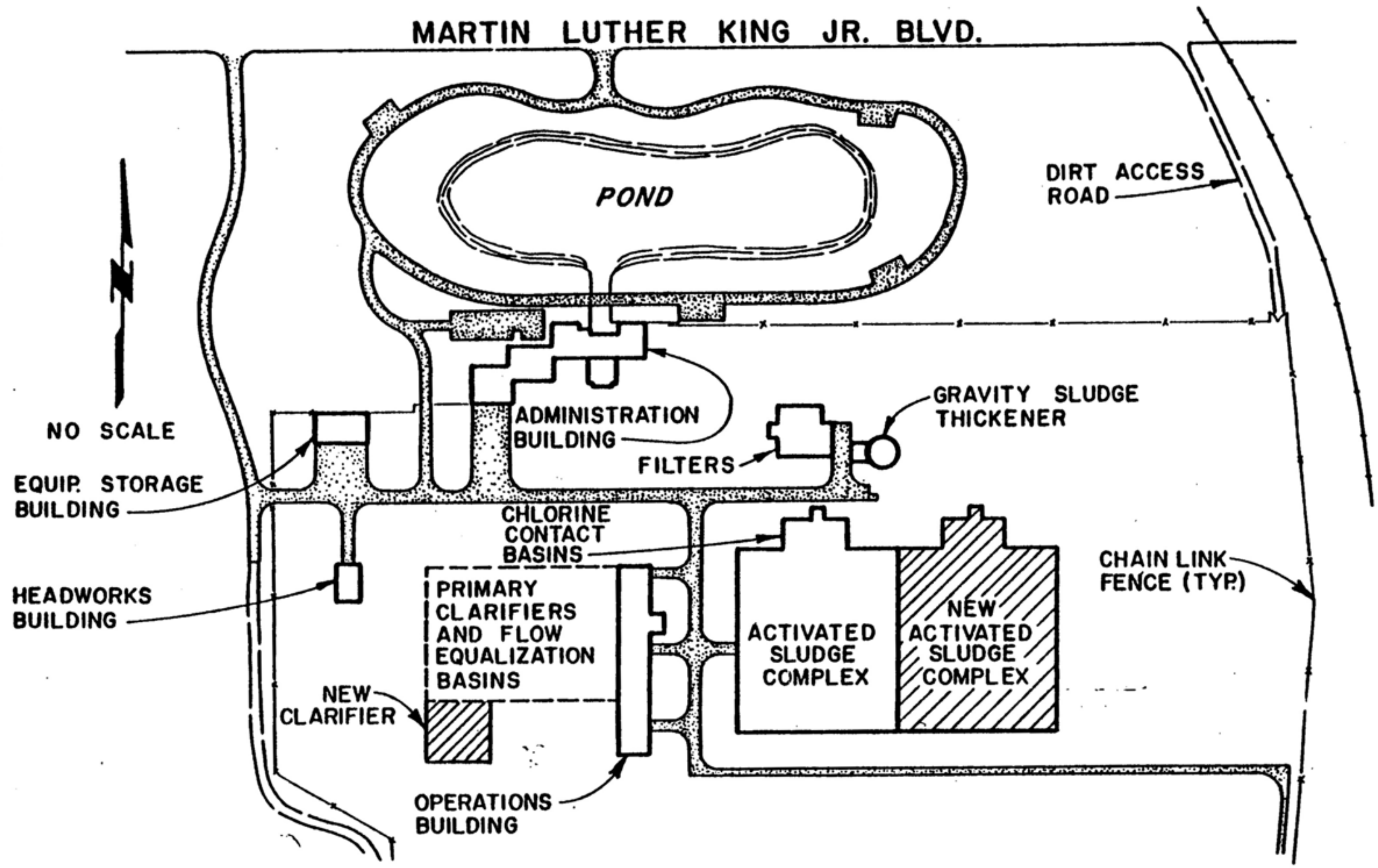


FIG. 2 WALNUT CREEK WASTEWATER TREATMENT PLANT

6.2.1 Existing Walnut Creek Facilities

6.2.1.1 Description of the Wastewater Treatment System

An important aspect of the Walnut Creek facility is that the entire primary treatment process is confined to an underground area, restricting the level of volatile and odoriferous gases released into the air. This design was used to avoid the possibility of annoying odors drifting into residential and commercial areas in the vicinity. The enclosed underground area of the plant is under a slight vacuum to prevent the escape of odors, and the air used within the system is purified by activated carbon filters before being released into the atmosphere. Figure 6.3 provides a simplified flow diagram of the Walnut Creek plant.

6.2.1.2 Primary Treatment

Incoming raw sewage receives preliminary treatment in the form of screening and aerated grit removal in the headworks. The grit and solid debris collected in the bar screens is rinsed before it is disposed of in an on-site landfill.

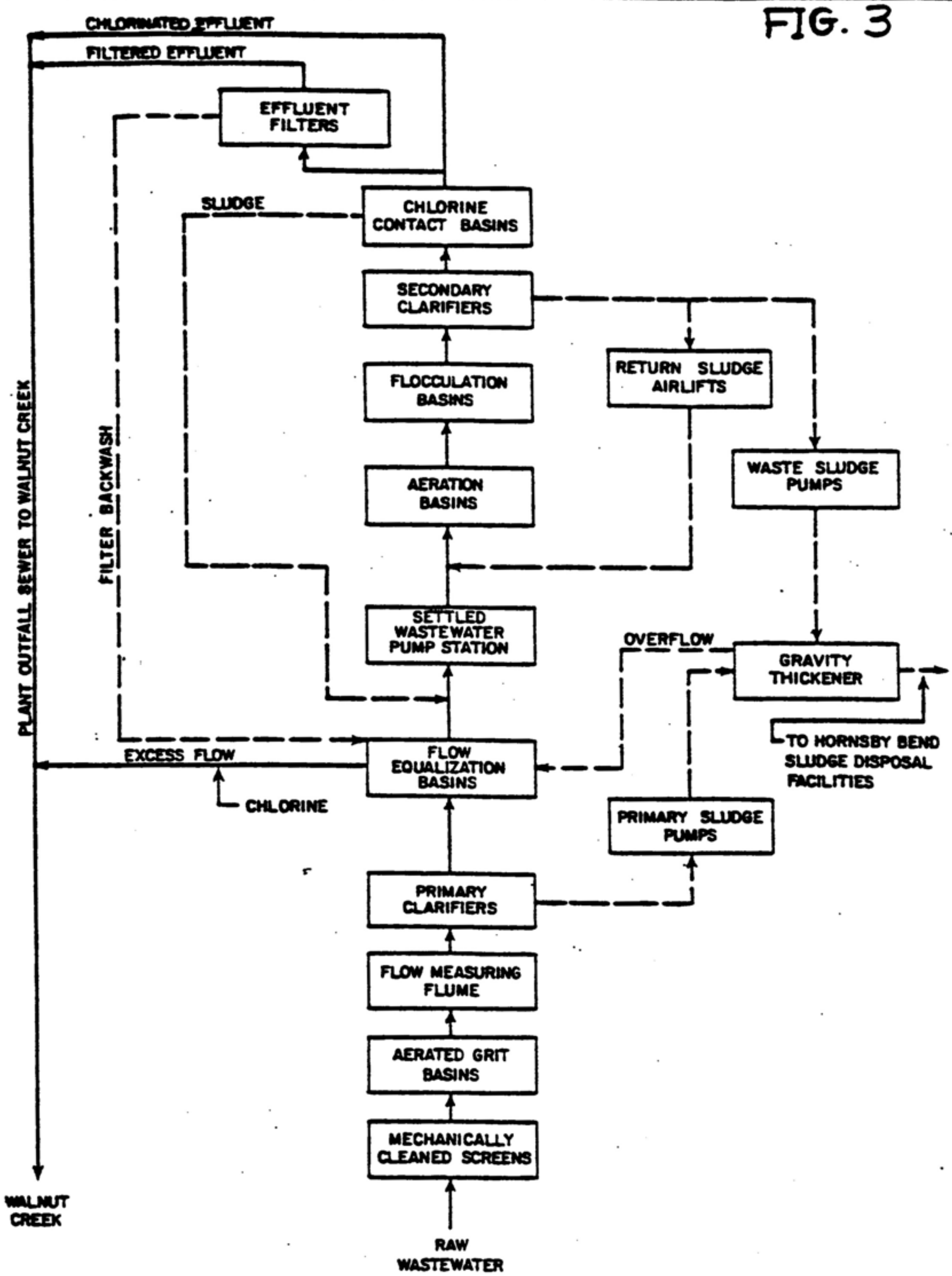
The flow is measured while passing through a measuring device known as a Parshall flume and is split between two primary clarifiers. The clarifiers are 120 feet square with circular sludge collector mechanisms equipped with corner sweeps and scum skimmers. The primary sludge and scum transfer is removed by positive displacement, progressive cavity pumps. The plant's primary clarifiers remove an average of 70 percent suspended solids and 39 percent biological oxygen demand (BOD).

After primary sedimentation and clarification, the flow enters the flow equalization basins (FEBs). These large basins serve to even out the extremes in daily flow variations and to permit the wastewater flow to be pumped to the secondary portion of the plant at a constant rate. The FEBs also even out the organic loading on the aeration tanks and provide more efficient and stable activated sludge systems operation. Gravity moves the wastewater through the tunnel and primary treatment so that secondary treatment operates at a constant rate for 24 hours a day.

Each rectangular FEB is equipped with two circular sludge collectors with corner sweeps, and air diffusion piping is provided around the periphery and between the sludge collectors. This equipment ensures that solids do not accumulate in the FEBs but are pumped to the aeration tanks with the basin effluent. Flow rates of up to 36 mgd are pumped to the secondary portion of the plant by settled wastewater pumps. Any flow in excess of 36 mgd is stored temporarily in the equalization basins. If the basin overflows, the excess flow is chlorinated and discharged to the plant's discharge point, also known as the <u>outfall line</u>. The total storage capacity of the FEBs is 5.4 million gallons.

Figure 6-3: Walnut Creek Wastewater Treatment Plant
Simplified Flow Diagram

FIG. 3



SIMPLIFIED FLOW DIAGRAM

Primary treatment ends and secondary treatment begins when the flow from the FEBs is pumped to two outside aeration basins.

6.2.1.3 Effects of Secondary Treatment

The secondary treatment uses aerobic bacteria to remove dissolved organic matter in wastewater. The activated sludge process speeds the work of the bacteria by bringing air and bacteria-laden sludge into close contact with the wastewater through a diffused air process. Secondary treatment consists of aeration, flocculation, and secondary clarification.

The activated sludge process involves the following steps. Wastewater is added to and then dispersed in the activated sludge, called mixed liquor. Mixed liquor is a term used to describe the mixture of bacteria-laden sludge after it has had time to multiply in the primary phase of sewage treatment. The mixed liquor is aerated and suspended for the necessary time period in the aeration basins, then gently agitated in the flocculation tanks. This process stimulates agglomeration of the finely divided floc into large, heavy solids that will sink to the bottom of the tanks. (Floc are clumps of aerobic bacteria that digest the organic wastes suspended in the wastewater.) The activated sludge is separated by settling. Part of the settled activated sludge is returned to the aeration basins, where the excess is removed through controlled wasting to the sludge treatment facility at Hornsby Bend. The recycled sludge is stored and maintained at certain levels to ensure an adequate bacteria supply for aeration.

The two secondary clarifiers are 140 feet square and 15 feet deep and are equipped with circular sludge collector mechanisms with corner sweeps. Six airlift return sludge pumps and three progressive cavity waste sludge pumps are provided for solids transfer.

6.2.1.4 Chlorination, Filtration, and Effluent Discharge Complete the Process

Following secondary clarification, the flow is chlorinated as it enters the chlorine contact basins. These are two basins, each fifty-three feet square and 14.5 feet deep. They are equipped with a rotating circular sludge collector, similar to those used in secondary clarifiers. After chlorination, most of the effluent is filtered through dual media (sand and anthracite) filters and is then discharged into Walnut Creek. Chlorinated effluent in excess of 18 mgd is discharged directly into Walnut Creek. Design flow requires that chlorination last a minimum of twenty minutes before the water is discharged. The entire treatment process removes more than 90 percent of the organic matter before the wastewater is released into Walnut Creek and the Colorado River.

The filters are cleaned by a pumped backwash system, supplied by filter influent. Filter washing is accompanied by a surface scouring of rotating agitators using nonpotable plant water.

Effluent is conveyed into Walnut Creek through a ninety-six-inch on-site line to the headwall discharge structure on Walnut Creek. The facility's proposed expansion to 38 mgd by 1987 will cause interim permit standards to come into effect when the permit is amended, increasing the quantity of discharged effluent to 30 mgd from the original standard of 25 mgd after polymers are in use. After polymerization is introduced, construction on the additional units will begin. The polymer units are supposed to reduce the amount of time required for the treatment process to take place so that the clarifiers can continue to perform up to permit discharge standards during the construction period.

The maximum discharge on any given day for both the original and interim effluent limitations does not exceed 62.5 mgd. This is also the case for the final permit discharge limitations.

After construction of additional primary and secondary treatment units, the flow will be limited to an average daily flow based on a monthly average of 38 mgd, not to exceed a daily maximum flow of 100 mgd. Although the quantity of effluent was increased, the BOD/TSS levels were not changed from the initial permit limitations.

6.2.1.5 Sludge Processing Facilities Handle Remaining Wastes

The Hornsby Bend plant is the city's activated sludge processing facility. The present system relies primarily on lagoons and water hyacinth ponds to treat sludge from the Govalle and Walnut Creek plants, and wastewater from Bergstrom Air Force Base. A total of eight aerobic digesters are under construction at the Hornsby Bend plant. Originally, sludge was pumped directly from Walnut Creek to the existing 190-acre Hornsby Bend facility via a 6.5-mile, 12-inch sludge transfer force main. The last phase of the Walnut Creek initial construction included a sludge thickener at Walnut Creek and digesters at Hornsby Bend to aerobically digest thickened Walnut Creek sludges prior to land disposal at Hornsby Bend. These additions began in 1984.

The thickener is a single circular gravity unit, with rotary sludge collectors and scum removal mechanisms, wholly enclosed within a separate superstructure for odor control. The unit receives waste-activated sludge at 0.5 percent solids for thickening and subsequent discharge to the sludge transfer force main. The two Walnut Creek digesters at Hornsby Bend are high-rate anaerobic units, heated with recovered methane gas, and capable of operation as a single- or two-stage system.

6.2.2 Permit Requirements for the Walnut Creek Plant

The plant's water permit was issued by the TDWR and approved by the EPA regional office in Dallas. Furthermore, the city issues permits to industrial users of its wastewater treatment systems and requires them to pretreat their wastes before discharging into the main municipal sewers.

The proposed draft amendment to permit number 10543-11 is to increase the volume of discharged effluent from 25 mgd to 38 mgd by 1987.[2] However, the final amendment may differ in the number of gallons per day it will allow to be discharged. The city of Austin has increased in population so rapidly that it has become necessary to devise interim effluent limitations so that the facility may continue to operate in compliance with its permit requirements. Amendments to the original permit have been made in the past to accommodate construction activity and the plant's capacity to adequately treat wastewater. Interim effluent limitations I, II, and final standards take into account different phases of construction. Interim standards must comply with the following considerations:

1. The time period for which the discharge permit will be valid must be stated.

    a. The interim effluent limitation I is valid from the date the permit is issued until the completion of polymer units.

    b. The interim effluent limitation II applies from the time the polymer units are completed until the facility has been completely expanded and construction is finished.

    c. The final effluent limitation is valid from the time the 38 mgd facility is finished until further expansion is begun.

2. Restrictions are placed on the average daily amount of effluent released from the treatment facility during any consecutive twelve-month period. In addition, a limit is placed on the maximum discharge allowed on any given day.

    a. The interim effluent limitation I states that the daily average will not exceed 25 mgd, and the maximum discharge will not exceed 62.5 mgd.

    b. The interim effluent limitation II states that the daily average will not exceed 30 mgd, and the maximum discharge will not exceed 62.5 mgd.

    c. The final effluent limitation states that the daily average will not exceed 38 mgd, and the maximum discharge will not exceed 100 mgd.

3. The required BOD/TSS effluent concentrations and the thirty-day average for effluent loading (kg or lbs/day) are provided for each effluent standard.

4. The effluent is required to contain a chlorine residual of at least 1.0 mg/l after a detention time of at least twenty minutes (based on peak flow). This standard is applied to the quality of all discharged wastewater in order to comply with Department of Health standards for disinfection of harmful bacteria.

5. The pH level of the effluent is specified to be not less than 6.0 nor greater than 9.0 at any time. The pH test is not an average of samples and relies on the results of each grab sample.[3]

6.2.2.1 Definitions of Tests Performed on Effluent

Effluent tests are the primary methods used to monitor the plant's day-to-day performance. Because plant inspections by the EPA occur infrequently, self-monitoring is heavily relied upon to provide the information used to judge overall compliance. The tests used to monitor operational performance are the biological oxygen demand, the total suspended solids, the chlorine residual, the pH, and the fecal coliform tests. Each test, except for the fecal coliform, is specified precisely in the permit as to how often and by what methods it shall be done.

The biochemical oxygen demand test is a five-day test, performed daily, to determine the oxygen demand, or organic load of the wastewater after it has been discharged from the plant for five days. Different types of bacteria are tested for, including fecal coliform bacteria. The obvious drawback of this laboratory test is that considerable time (five days) is spent before confirming whether the facility has been operating within its permit limitations.

The total suspended solids test measures the total number of solids suspended in the wastewater effluent. The solids consist primarily of floc, which are small clusters of bacteria. The test is performed daily.

The chlorine residual test and the fecal coliform tests are made in grab samples performed daily. Both tests are done to ensure that a sufficient amount of bacteria are killed during disinfection.

The pH level of the effluent is measured as it is being discharged and determines the degree of its acidity or alkalinity.

Table 6-1: Established Guidelines for BOD/TSS Effluent Concentrations and Loading

	BOD mg/l 7 day/30 day Average	TSS mg/l 7 day/30 day Average	Effluent Loadings lbs/day 30 day average BOD	TSS
a. Interim I	30/20	30/20	4170	4170
b. Interim II	30/20	30/20	5000	5000
c. Final	30/20	30/20	6338	6338

BOD = Biochemical Oxygen Demand
TSS = Total Suspended Solids

The thirty-day and seven-day averages, other than for fecal coliform bacteria, are the arithmetic mean of the values for all effluent samples collected in a thirty-day and seven-day consecutive period. The thirty-day and seven-day averages for fecal coliform bacteria are the geometric mean of the values of the samples collected within a consecutive thirty-day and seven-day period.

The twenty-four-hour composite sample consists of several effluent portions collected over equally spaced intervals in a twenty-four-hour period and composited according to flow. For fecal coliform bacteria, a sample consists of one effluent grab sample during a twenty-four-hour period at peak loads.

6.2.2.2 Consideration of Cross-Media Transfers within the Permit

The TDWR discharge permit for Walnut Creek considers all aspects of possible water pollution. The threat to groundwater quality was considered before the permit was issued, and was reviewed in light of the "geohydrologic data available in the files relevant to the applicant's disposal site area."[4] It was determined that the proposed facilities would present "no significant hazard to the groundwater in the area."

The permit (part II, section 6) makes reference to the disposal of "collected screenings, slurries, sludges, and other solids," and states that they "shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into navigable waters or their tributaries." There is no specific directive as to what should be done with the waste products. The only stipulation is that they cannot pollute the state waters.

The existence of an on-site landfill releases the permit applicant from providing information about the dump's contents or whether it has a lining. Since the landfill operations take place within the Walnut Creek plant's operating area, a separate permit is not required to operate it. The solid wastes and grit deposited in Walnut Creek's landfill have been rinsed to remove any bacteria-producing substances. The landfill is also located in a heavy clay soil which has been determined not to threaten groundwater. This was confirmed by both the plant supervisor and TDWR engineers, although the permit did not show evidence of a groundwater survey having been conducted.

The fact that the plant is partially enclosed is an acknowledgement that air pollution may be a problem in a heavily populated area. Air quality tests are not required by the permit and are performed infrequently. The filtration of gases formed during primary treatment will be doubled in the future to accommodate the primary treatment expansion, but it is unclear how this will affect the degree to which air pollution from secondary treatment will become a problem. The permit does not address the possibility of any air pollution byproducts of municipal sewage treatment being produced in secondary treatment.

6.3 The Permitting Process

6.3.1 The Administrative Process at the Texas Department of Water Resources

6.3.1.1 Background and Overview of Regulatory Authority

The city of Austin has been issued a permit to discharge municipal and pretreated industrial wastewater into Walnut Creek under the authority of the Clean Water Act passed in 1972 and amended in 1977. The EPA has provided the TDWR with the authority to draft municipal wastewater permits with the EPA retaining the authority of final approval.

The Texas Water Code, sections 5.131 and 5.132 and various sections of the Texas Administrative Code also provide legal authority to issue municipal wastewater permits within the state of Texas. The city of Austin obtained this particular permit in 1964 which was amended in 1974.

The TDWR receives approximately five hundred applications per year for wastewater discharge permits. Renewals comprise about 50 percent of these applications. A permit expires after five years. Of the five hundred applications about 0.1 percent are denied. Of the total applications, 12 to 15 percent result in a public hearing. This figure is increasing due to the growing attitude of the public, which was described by one official as, "I don't want that in my backyard."[5]

6.3.1.2 Four Stages of the Permitting Process

An application received at the TDWR is processed in the following manner:

<u>Step 1</u>. The Permit Control Section reviews the application for administrative completeness assuring that all of the requested information is presented by the applicant. An incomplete application is returned to the applicant who then has thirty days to respond. The agency has seven days to respond to a refiled application. If the original application is found to be complete, the agency has ten days to refer the application to the Wastewater Section.

<u>Step 2.</u> The application is assigned to an engineer in the Wastewater Section. The Wastewater Section has two units: municipal and industrial. Because of the topic, we will be concerned only with the former, which performs the technical review. The assignment of an application to an engineer is based on workload since the engineers do not specialize. Essentially, the engineer has two tasks. The first is to prepare a file

sheet that is used to notify other departments of the TDWR and other agencies of the existence of the application. Other state agencies, if interested, may then review the application. Second, the engineer writes a letter of recommendation in the form of a technical summary or draft permit. Seventy-five days are allowed for this task.

Step 3. The draft permit is routed through five different groups and individuals for an internal review. These include the general counsel, enforcement director, Construction Grant Section, a geologist, and the director of permits. All sections must be in agreement to issue the permit before it is sent to the TWC for final decision. The internal review is completed within forty-five days.

Step 4. The TWC prepares the public notice and also notifies adjacent land owners. If no hearing is requested, a permit is issued (which is the situation in most cases). Should a hearing be necessary, the TWC issues a decision within thirty days, although this deadline is not written into law. The complete permit process usually takes 120 days.

6.3.1.3 Establishment of Permit Parameters

An essential component of the permit is the engineer's technical summary, which establishes standards or conditions under which the permit may be issued. Each permit writer attends at least one continuing education seminar per year. The seminar informs the writer of technological advances (e.g., modeling procedures) that are used in setting standards. The TDWR generally verifies information on an application by visiting the site and gathering data on the conditions downstream from the proposed sewage treatment site, a practice that also contributes information in standard setting. This investigation is usually performed at a prehearing conference so that both sides can agree to the circumstances of the application.

In the case of the Walnut Creek facility, the Colorado River eventually receives the discharged wastewater. Several towns north of Austin use more lenient effluent standards because they emit smaller quantities of effluent into the river. Permit writers take this into consideration in setting standards (and in the models) for Austin plants.[6]

Mr. Louis Herrin, a TDWR engineer, cautioned that he was not sure if methods designed to test sites were environmentally accurate or to what degree the state considers cumulative effects from other effluent in the river. He said, "Models are only as good as the assumptions they are based on." Mr. John Young, supervisor of the district 14 field office of the TDWR, added that the department uses some modeling, but that they sometimes run two years behind before they can get new information for the model. A considerable amount of data is needed for the models to provide accurate results. Consequently, modeling is time consuming and complicated but has the potential for positive results.

An engineer will generally set permissible totals for levels of biochemical oxygen demands and total suspended solids by considering current water quality, population projections, and state and federal water standards. Biochemical oxygen demand/total suspended solids limits can be as lax as 30/90 or as stringent as 5/5. Area Water Quality Management Section 333.11-333.21 provides Texas surface water quality standards. The Walnut Creek facility discharges its effluent into segment number 1402 of the Colorado River. The uses and criteria for discharge are listed in figure 1.1.

6.3.1.4 Lack of Interaction Between Agencies

The Clean Water Act does not require municipal wastewater discharge facilities to be monitored in any way for the possible emission of air toxics at the plant.[7] In addition, there are no provisions in the permit to monitor the air quality in the immediate vicinity of the Walnut Creek wastewater treatment plant. Some secondary treatment and chlorination takes place out of doors and the odor is easily detected by anyone visiting the plant. Dr. Harry Pruett, director of permits at the TDWR said he did not recall the TACB ever becoming involved in a wastewater permit. "Foul odors" are not currently a NSPS-regulated air pollutant.

The EPA, state, and city do not monitor possible seepage of pollutants into the ground or groundwater from the on-site landfill at the Walnut Creek facility or the sludge ponds at Hornsby Bend. Dr. Pruett said that there is generally little if any discussion of a permit with the EPA regional office although the EPA may change some of the conditions of the permit. There has not been substantial need for coordination because state regulations are more stringent than the EPA's. However, TDWR officials reported that there is better coordination between the TDWR and the EPA when they are dealing with industrial waste permits (which is beyond the scope of this chapter).

The city of Austin issues permits for pretreated industrial sewage independently of state oversight. Currently, the state is seeking "formal delegation" of the pretreatment permit program.[8] The state has never performed this function in the past.

6.3.1.5 Compliance Activities: The Self-Monitoring System And Inspections

The TDWR receives funding from the EPA, which sets guidelines for monitoring. The state monitors water samples taken outside the sewage treatment plant, in Walnut Creek, and the Colorado river. The Enforcement Section of the TDWR conducts unannounced inspections in addition to the EPA requirements. The EPA is generally more interested in the self-reporting procedure, including lab equipment and testing methods.[9] EPA inspections are conducted approximately once per year and are more time consuming than state inspections, which are conducted on the basis of necessity (i.e., possible or known violations).

Wastewater discharge reports (self-reports) are provided to the state on a monthly basis. The reports are received by the state one month after the testing is conducted by the city and are not usually read by state officials for another two or three months. Mr. Young said that this is not a problem because these reports are used for comparison purposes only. They are compared to test results obtained through state testing. If the state notes a violation in their test results, they will read the city reports earlier. Self-reports may also be received by telephone from treatment plant officials within seventy-two hours of a major violation.

When the city does not comply with its permit standards, a compliance agreement is drawn up which becomes a contract between the city and the state. The agreement usually provides for less stringent standards than the permit, with specific conditions for corrective action. These conditions are presented in a timetable with completion dates. If there is noncompliance with the compliance agreement, then the TDWR uses its judgment to decide whether or not to refer the case to the state attorney general's office for prosecution. The state is basically interested in whether or not the city officials and plant managers are putting forth a good faith effort to achieve compliance.

On November 9, 1984, the Austin American-Statesman reported that the Williamson Creek sewage treatment plant, which serves Austin residents, had been ordered to pay a fine of $100,000 to the state of Texas for violations of its permit. This is the largest fine ever imposed by the state against a municipality for this type of violation. Furthermore, the lawsuit was completed in six months, which is a relatively short time for this type of case. Presently, three of the four sewage treatment plants are operating under compliance agreements. These problems are mostly due to Austin's rapid population growth and poor planning by the city officials.

The Compliance Section of the TDWR is required to respond to citizen complaints. When complaints are made, a section staff person will usually visit the actual site. Responses to violations vary. The supervisor of the Austin district field office may verbally tell a plant administrator that the plant operations are in violation, send an official letter, or issue a citation. If a private entity is involved, criminal misdemeanor charges may be filed and fines imposed. It is rare for violations to be referred to the attorney general because of time constraints. The attorney general, however, puts priority on any case where people (as opposed to just the environment) would be affected or harmed.

The Enforcement Section at the TDWR may be encountering some changes soon. The Texas Sunset Commission has proposed an administrative change allowing the TDWR to levy administrative penalties (fines). This would be a positive change in that fines could be levied without drawn-out court proceedings. However, due process would have to be considered, which could lead to hearings and appeals and, therefore, an increase in responsibilities for an already understaffed Enforcement Section.

Another aspect of compliance is monitoring bypasses. Monitoring may be legally conducted by plant personnel if there is a threat to life, major damage to the plant operations, or by the order of the executive director of the TDWR. Bypasses tend to occur when heavy precipitation causes the inflow of wastewater to exceed plant specifications.

A bypass must be reported by the plant manager to the state agency within seventy-two hours of its occurrence. The amount of time allowed for bacteria to digest most of the organic materials in the wastewater is reduced by approximately 40 percent. It normally takes about eighteen hours for wastewater to be fully treated, but during a bypass it may only take ten to twelve hours because not all of the secondary treatment is completed. However, even during a bypass, all wastewater must be chlorinated for twenty minutes.

Further compliance problems result from the potential for heavy metals and other nonorganic matter to enter the treatment system. Current technology and processes are unable to prevent these substances from entering the treatment facility. Presently, no devices are in use that can filter out the heavy metals and pesticides, allowing them to enter Walnut Creek and the Colorado River. Usually, no notice is given by the polluter that these emissions will be arriving at the plant. The supervisor of the Austin district field office did say, however, that most Austin industries such as Motorola and IBM are so image conscious that they are quite willing to cooperate with the state in these matters.

Nonetheless, nonorganic substances or substances not easily digestible by bacteria can render a treatment facility useless if introduced in great quantity. For instance, oatmeal (approximately a truck full) was once dumped into the city sewer system, bringing the Govalle plant (which also serves Austin) to a temporary halt.[10] On another occasion Motorola had a six-thousand-gallon spill (of an unidentified substance). A plant operator was routinely monitoring the pH level and noticed that it was beyond standards. Motorola, however, did call to inform the TDWR of the spill.

The introduction of toxics by industries in Austin poses a problem. The city of Austin has an industrial waste ordinance under which it issues permits to local industries. The city sets guidelines and monitors pretreatment systems belonging to these industries. Small amounts of diluted toxics are accepted in the municipal system. Industries that do not have pretreatment systems of their own must haul their waste to one that does. Generally, however, most industries would rather have the city treat their wastes than deal with the problems (e.g., obtaining a permit) of emitting the wastes directly into creeks and rivers.

6.3.1.6 The Need to Consider Other Possible Cross-Media Transfers Affecting the Environment

Based on the study of site characteristics of the Walnut Creek plant's (and subsequently Hornsby Bend) processes for treatment of municipal wastewater, the permit itself, and statutes that dictate what should be monitored in this process, certain situations appear as opportunities for cross-media transfer of pollutants.

First, the primary treatment stage at the Walnut Creek plant entails the separation of large solids. These are objects such as branches, cloth, plastic, metal, and paper. They are separated from the wastewater by a bar screen with bars three-fourths inches apart. This "trash and rag", as it is spoken of, is then rinsed with water and buried on site in a landfill without a liner. Mr. Herrin spoke of this situation saying that the clay native to the Austin area is sufficient to prevent the chemical pollutants remaining in contact with this buried material from migrating to the surrounding soil or groundwater. He qualified his statement by adding the caveat of heavy rains. Dr. Pruett said he did not believe that the unlined sludge pond at Hornsby Bend (which receives sludge from the Walnut Creek facility) is a problem because the sludge keeps the water from seeping through the clay liner. Herrin thought it was possible for these pollutants to travel "perhaps one foot in twenty years". The sludge pond is 28 years old. He added that it was possible that gases from nonmunicipal wastes affect air quality in the surrounding area of the pond.

6.3.2 Permittee

6.3.2.1 Walnut Creek's Compliance Record

The Walnut Creek plant has a superior compliance record. By law, the city of Austin must comply with the reporting requirements listed in the rules of the TDWR, rules 156.19.05.001-010. Chapter 26 of the Texas Water Code provides for civil and/or criminal penalties in cases of violation of the permit standards. General conditions are placed on municipal wastewater discharges. These include the necessity to report any new significant discharge or significant changes in the quantity or quality of existing discharges to the treatment system that will result in new or increased discharges of pollutants. Modifications to the permit may be made to reflect any necessary changes in permit conditions. Provisions are made in the contents of the permits for inspections by federal, state, and local governments when the laws provide them with such rights.

The city submits a compliance report to the TDWR every month. The nature and circumstances of any permit violations determines how far up the hierarchy a report travels (i.e., a pH level of 9.1 is not cause for alarm, but an illegal bypass is reported to the executive director of the TDWR). The supervisor of the Austin district field office stated that monthly compliance reports may be two months old before his section reviews them, but that any significant changes are reported immediately by city personnel. The Walnut Creek facility is ranked first in the state in regards to the quality of discharge based on the amount of water that it treats (25 mgd) according to Mr. Andrew Covar, from the city of Austin.[11]

The response from Mr. Covar indicated that there was no immediate danger to the groundwater as a result of the sludge pond at Hornsby Bend, but added that the city is planning to install monitoring wells as a part of an improvement project even if state or federal officials don't require it. He said that the pond was built between 1940 and 1950 and that if it were to be built today that it would be built with a liner.

6.3.2.2 Improvements Currently Being Planned by the City of Austin

Mr. Covar related that the city is making other attempts at improvement by planning the installation of anaerobic digestors at the Hornsby Bend sludge management facility. Instead of letting sludge settle to the bottom of the pond and slowly discharging the water, the city wants to dry and condition the sludge into usable soil similar to compost and put it back in the land.

Another project uses water hyacinths as a means of water treatment. Wastewater is sent as a by-product of sludge through the root zone of the plants, which will feed on the waste continually. When these water plants die, it is easy to recycle their biomass. The only disadvantage is that the plants are very sensitive to cold weather. The city of Austin is currently contemplating a solution--a three-hundred- by nine-hundred-foot greenhouse. The city also plans a twenty-one-million-dollar improvement of the Govalle facility in Austin.

Finally, improvements will consist of changing permit requirements to a limit of three parts per million of ammonia nitrogen and a minimum requirement of five parts per million of dissolved oxygen, which is needed for fish to breathe. Presently, these requirements are not established by any state or federal statutes.

6.3.3 Environmental Protection Agency Region VI

6.3.3.1 Delegation of Permitting Responsibility to the States

The EPA issues permits under the authority of the CWA. The EPA has contracted with the state of Texas to draft a certain number of the EPA's permits for municipal wastewater discharge applications.[12] The EPA retains final approval. In the cases where the EPA drafts the permit, the application is first reviewed for administrative completeness, and then a copy is sent to the appropriate state agencies. All permits are written by engineers, and the EPA provides public notice and issues the permit.

The EPA requires that cities with pretreated industrial waste passing their sewer systems implement a permitting program designed for this discharge. The city of Austin has an EPA-approved program under which the city is the "controlling authority," which means that the city is responsible for reviewing and writing its own permits. In addition, the city is responsible for its own monitoring, compliance, and enforcement procedures. EPA personnel do not review city permits because of the large amount of permits involved. Rather, city permits are reviewed on a random basis.[13]

6.3.3.2 The Environmental Protection Agency's Comments on Cross-Media Transfers

Movement of pollutants from the on-site landfill at the Walnut Creek facility or the sludge ponds at the Hornsby Bend facility are not monitored by the EPA because they are nonpoint source transfers which the CWA does not address. Mr. Oscar Cabra, chief of the Ground Waste Supply Branch, said he felt these pollutants would not cause more than minimal contamination to groundwater as long as the treatment facility deals only with municipal wastewater. He added that the geology of the area and the distance to the aquifer are factors to be considered. Mr. Cabra said that it doesn't matter when there are unexpected events of nonmunicipal toxic substances passing through the facility because most of the drinking water in Texas, especially in Central Texas, is taken from surface water not groundwater.

Cabra added that, if sludge ponds are unlined, there will certainly be intrusion of pollutants into the ground and some will get into the groundwater; "even with lined ponds, it has been shown that pollutants will move beyond the liner." He said that, depending on the geology, pollutants don't travel more than a few inches per year.

6.4 Critical Issues

Based on interviews with state and city engineers and on review of relevant data, two critical issues emerge: Are agencies adequately enforcing environmental permits? and, Does the permitting process in its current framework maintain and improve environmental quality, especially with regard to cross-media pollutants?

6.4.1 Evaluation of Agency Enforcement Activities

Enforcement is an especially critical issue given the fact that no permit, no matter how comprehensive, can improve the environment if it is not enforced. In general, state and city engineers approve of permitting because it sets definite guidelines, allowing permittees to report their own violations and take self-corrective action. When this fails, of course, enforcement proceedings are initiated. It is our perception that the regulatory agencies are more interested in ensuring that permittees make a "reasonable" effort at compliance and not in the strict enforcement of boilerplate provisions. This "reasonable" standard also applies when permittees seek to amend their permits. Given current budgetary constraints and concern for efficiency, inspections and monitoring reports are often sacrificed in the interest of cutting expenses.

6.4.1.1 Violations

Walnut Creek has never been fined for any violations and is currently ranked first in the state in discharge quality for the amount of water it processes. After a wastewater treatment plant is permitted, it is expected to report its own violations and to correct them. It is clear from the interviews mentioned that the regulatory agency would rather have a permittee correct its own violations than have the state use time and resources in litigation. John Young, district supervisor at the TDWR, discussed his view of permit violations. When a certain Austin wastewater treatment plant exceeded its permit parameters, Young said the TDWR realized the limited capacity and flexibility of the plant and sought to work with it to correct its actions through more plant construction. He states, "They have made a 'good faith' effort. This effort is usually good enough even though it looks like they won't be in compliance when they do discharge again. We'll just have to wait and see, but they are making an effort and this is usually good enough."

George Shoop, plant supervisor at Walnut Creek, emphasized the fact that lab tests of discharges were conducted daily to ensure that permit requirements were being met. If these self-conducted tests show noncompliance, the plant reports violations and takes corrective action. Reporting a violation to the TDWR does not result in an automatic fine.

6.4.1.2 Enforcement Procedure

When cooperation between the regulatory agency and permittees fails, enforcement proceedings must begin. Still, some questions can be raised as to whether enforcement proceedings should begin immediately after a failure to cooperate in correcting violations. The Young interview reveals that, when cooperation fails, a compliance agreement is usually negotiated. A compliance agreement is a contract between the city and the state that emphasizes the attainment of compliance using the threat of a law suit. The compliance agreement is "one step from the courthouse."[14] So even when a series of violations is detected, another step--the compliance agreement--is taken before there is an actual suit. An agency wants to be certain that future violations are probable before it uses up precious resources on legal action.

The state agency's concerns can be understood when one views the Walnut Creek file or those of other wastewater treatment plants. The Walnut Creek permit, for example, contains pages of NPDES requirements. These requirements are part of the system for issuing, conditioning, and denying permits for the discharge of pollutants from point sources into navigable waters, the contiguous zone, and the oceans, by the administrator of the EPA pursuant to section 402 of the Federal Water Pollution Control Act. These mimeographed pages of NPDES requirements are torn from a booklet and attached to permits. This standardized type of addition may explain why engineers are more willing to exercise their enforcement discretion when dealing with the problems of permittees and may account for agency concern for indisputable evidence of unwillingness to comply before taking legal action.

6.4.1.3 Amendments

The city of Austin is currently seeking an amendment to its discharge permit allowing it to treat more sewage at the Walnut Creek wastewater treatment plant. Permit engineers at the TDWR have an attitude toward permit amendments very similar to that taken by the Enforcement Division--that is, using a standard of reasonableness. Louis Herrin, the engineer at the TDWR currently reviewing the Walnut Creek amendment, stated that whenever a wastewater treatment plant in Austin wants to increase its amount of allowable flow, it applies for an amendment that "is almost always granted [if] their justifications are reasonable . . . ." In the case of the Walnut Creek plant it is almost certain that the amendment will pass. Andrew Covar, city engineer, stated that Walnut Creek could probably have been originally permitted for thirty million gallons instead of twenty-five million. Since Walnut Creek is currently ranked first in the state in discharge quality, its current amendment application for increased discharge of thirty-eight million gallons probably will be granted.

6.4.1.4 Concern for Efficiency

The upper and lower levels of the TDWR organization hierarchy view budgetary constraints and concern for efficiency differently. For instance, Dr. Harry D. Pruett, director of permits at the TDWR, and John Young, district supervisor, held differing views toward the consolidation of the Water Development Board, the Water Quality Board, and the Water Rights Commission into the Texas Department of Water Resources. Pruett viewed the consolidation of the three agencies as a method to increase efficiency and oversight. Young, on the other hand, emphasized how the consolidation had caused his staff to be cut by 45 percent, decreasing his district's ability to properly inspect permitted facilities and enforce permits.

This difference in views between upper and lower levels of administration also exists within the city. For example, George Shoop, plant superintendent at the Walnut Creek wastewater treatment facility, expressed the view that the city council and the people of Austin want cleaner water and air, but they are not willing to pay for it by financing better facilities. Staff at upper levels in the permitting process are very concerned with efficiency and oversight. Staff at lower levels, while not totally ignoring efficiency, give the impression that if money is cut they will not be able to do their jobs as effectively as they could, given proper resources.

6.4.2 Does the Permitting Process Maintain Environmental Quality?

Considering the permitting process itself, most engineers agree that it works. They feel that it adequately addresses environmental realities and cross-media pollution. Generally, they feel that any improvements in the permitting process can be made through internal administrative directives and not through a reform of the Texas Water Quality Act.

6.4.2.1 Fit with Environmental Realities

Recent articles and many of the other case studies have pointed to the inadequacy of current laws and regulations in addressing cross-media pollutants. These writings criticize current statutory provisions because they attempt to conceptualize the environment as totally separable media (air, land, and water) and ignore the fact that the environment consists of the complex interaction of these media. When pollutants are regulated in one media, they may be transferred to another where regulations are less stringent. The TDWR argues, however, that this is not the case insofar as water is concerned.

Texas places great emphasis on water quality regulation. Dr. Pruett at the TDWR, for instance, argues that any cross-media effects of water pollution in Texas are negated by the consolidated approach the TDWR takes toward permitting. In other words, the TDWR, in regulating point source, industrial solid wastes, and underground injection, already shows a comprehensive approach to regulation of pollutants. This comprehensive outlook is further enhanced by internal procedures such as technical and administrative review.

When confronted with the fact that metal-based pollutants may not be properly regulated by cities and that this was one area of pollution control the TDWR and the EPA ignored, Pruett replied that the main problem for city wastewater treatment facilities such as Walnut Creek, is not "exotic-type metals" but rather the overload of organic wastes. "There is usually an engineering solution to limits on any plant's physical capacity to handle more sewage." Dr. Pruett's observation is substantiated by the fact that Austin industries such as Motorola and IBM are so image conscious that they are willing to cooperate with industrial waste pretreatment requirements in order to avoid bad publicity. Pruett later qualified this point by saying that the TDWR will look into these "exotic-type metal pollutants" in towns such as Lufkin, Texas,, which are small in population but have a substantial amount of industrial activity. The TDWR intends to administratively expand its scope of environmental review to take into account pollutants not covered by statutes. Apparently no timetable exists as to when the TDWR will administratively expand its jurisdiction to include pollutants not covered in statutes.

When asked whether the TACB was consulted to provide input on cross-media transfers included in water permits, Dr. Pruett asserted that, although it may seem to some that the two agencies should work together, time considerations for permit applications never quite work out. Louis Herrin, another engineer at the TDWR, also stated that each agency strictly adhered to its own jurisdiction and did not interfere with the activities of the other agencies.

The city of Austin shares a similar view. Austin is currently under a great deal of scrutiny by the TDWR, since the city has already been fined for violating permit parameters in its wastewater discharges from other plants. When asked to elaborate on what the city was doing to improve the situation, Andrew Covar, city engineer, stated that Austin was seeking to expand present facilities so it could meet discharge requirements. He readily noted how much money was being spent, but was not concerned with possible intermedia transfers from expanded facilities. New programs pioneered by the city, such as the use of water hyacinths, also failed to address the question of cross-media effects. For example, when water hyacinths were converted into compost would any pollutants in them be transferred to other water sources? These points illustrate the narrowness of the permittee's vision. Although Mr. Covar did say monitoring wells would be placed at the sludge treatment facilities as part of the new expansion program, he did not discuss the effect these expanded facilities would have on air quality.

When asked if the permitting process should be changed to provide for better consideration of cross-media effects of pollutants, Mr. Covar avoided the question by saying that this was really an area of political concern. This observation is especially interesting because perhaps he, as well as other environmental engineers, realizes that under present statutory directives, environmental control can be extended (or restricted) further than might otherwise be feasible if a clearer statute were to be passed by the legislature. Ambiguities certainly give engineers more leverage in enforcing (or avoiding) statutory requirements.

6.4.2.2 Administrative Improvements

When asked to suggest any area of the permitting process that could use improvements, most engineers invariably pointed to the need for administrative improvement, and only rarely mentioned the need for statutory revisions. For example, Dr. Pruett recalled first issuing permits at the TDWR. "When we began issuing permits, they were all scheduled for renewal in five years. Thus, when these five years were up, all the permits were up for renewal and there was a backlog." Having all permits come up for renewal simultaneously would be especially hard since only 0.1 percent of all applicants are denied permit status. Yet when asked if such a backlog resulted in not giving the permits the review time they would have otherwise received if the permits had been staggered, Pruett replied that the agency took it upon itself to stagger permit renewal internally, giving the agency enough time to review the permits thoroughly.

Dr. Pruett also stated that the only time the TDWR will ask for statutory revisions is to increase its regulatory power in order to accommodate the EPA. If the EPA, for instance, decides to regulate something the state has not been involved with, the TDWR will seek enabling legislation allowing it to regulate the previously untouched area to stay in step with the EPA. Thus, engineers see improvements in the permitting process coming through internal directives and not through reform of statutory law.

Notes

[1]Recently the permit was changed. When Onion Creek starts up, Williamson Creek will be taken off line.

[2]See appendix 6.1 for proposed permit amendment.

[3]*Ibid*.

[4]Interoffice memo from Bob Morris, Texas Department of Water Resources, to Bob Silvus and Louis Herrin, August 1984.

[5]Telephone interview with Dr. Harry Pruett, Director of Permits, Texas Department of Water Resources, Austin, Texas, January 31, 1985.

[6]Interview with Louis Herrin, Engineer, Texas Department of Water Resources, Austin, Texas, November 4, 1984.

[7]Telephone interview with Ken Huffman, Chief of Municipal Wastewater Permit Section, U.S. Environmental Protection Agency, region VI, Dallas, Texas, February 8, 1985.

[8]*Ibid*.

[9]Interview with John Young, Enforcement Supervisor, Texas Department of Water Resources, Austin, Texas, November 18, 1984.

[10]Interview with city of Austin employee preferring to remain anonymous, November 10, 1984.

[11]Interview with Andrew Covar, City of Austin, Austin, Texas, November 11, 1984.

[12]Interview with Ken Huffman, February 8, 1985.

[13]*Ibid*.

[14]Interview with John Young, November 18, 1984.

7. Lower Colorado River Authority Permits for Fayette Power Project number 3

7.1 Introduction

This case study evaluates the permitting history of the LCRA's Fayette Power Project number 3. The study covers five air permits and two water permits that are current for this site. The air permits include four state-issued construction permits and an EPA-issued PSD permit, which is required because the area where the plant is being built is designated as a class II clean air area. State permits have been issued for the lignite mine loading system, lignite storage and handling system, lignite powered steam generator, and the limestone and ash handling system. Because the plant is still under construction, no operating permits have been applied for or issued.

The water permits include an EPA-issued NPDES permit and a state-issued wastewater disposal permit. Both permits control emissions from the plant's six outfalls. Wastewater is emitted via these outfalls into the Colorado River. Additional wastewater is contained in a closed water system, the residue of which is eventually buried in an aboveground, on-site landfill.

The air permits and the water permits are analyzed in separate sections to make for easier comprehension of the issues involved.

7.2 Site Characteristics

7.2.1 The Lower Colorado River Authority

The LCRA is a nonprofit, quasi-governmental agency. It was chartered in 1934 by the state of Texas and was given a mandate to provide services that could not or would not be provided by private companies. These services include the provision of electricity, flood control, a safe and reliable water supply, and conservation of the river's natural resources.[1] This last service includes the creation and improvement of parklands throughout the LCRA district.

This district encompasses ten counties in central Texas including San Saba, Burnet, Llano, Blanco, Travis, Bastrop, Fayette, Colorado, Wharton, and Matagorda.[2] An additional thirty-one counties in this region receive electric power from LCRA.

LCRA is governed by a fifteen-member board of directors, each of whom is appointed to a six-year term by the governor with the consent of the Texas senate. The LCRA has no taxing power and must rely on fees and rates it charges for its services as well as borrowing in the open market for its revenues.

7.2.2 Fayette Power Project

Fayette Power Project number 3 is part of the Fayette Power Project system, which includes two existing identical 600-megawatt, coal-fired generating units (FPP #1 and #2) located seven miles east of La Grange, Texas (see figure 7.1). FPP #3 is an integrated facility that includes a lignite mine and a 415 megawatt lignite-fired generating unit. Construction on FPP #3 began early in 1984, and it should be completed in time for the facility to begin operations in May 1988.

There will be one more unit added to the Fayette Power Project system. The generating unit of FPP #4 will be identical to FPP #3 and it will burn lignite from the same mine. Permit applications for FPP #4 are currently under consideration by the TACB. FPP #4 is expected to come on-line in May 1989.

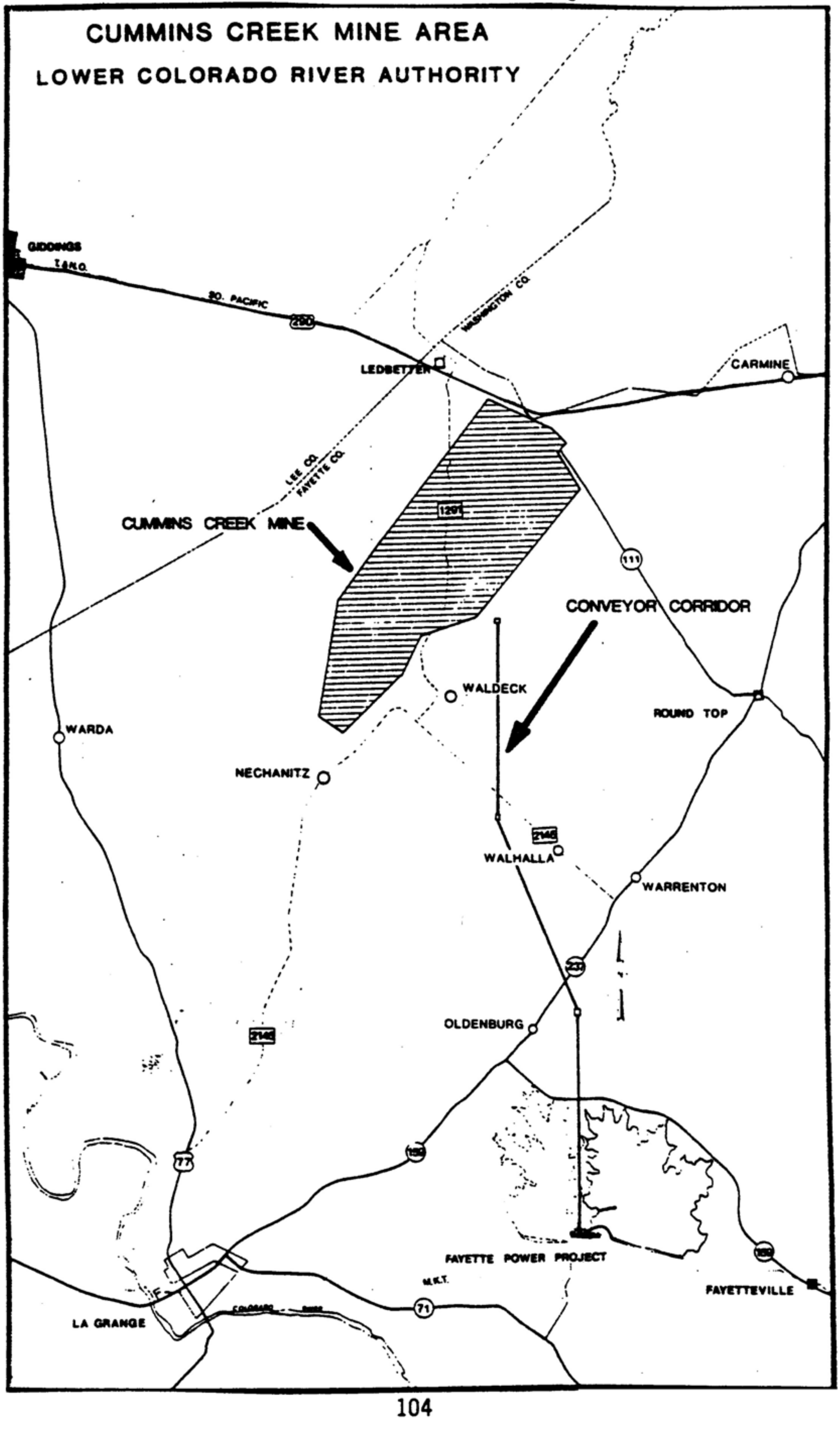
7.3 Air Pollution Profile

7.3.1 Mine and Overland Conveyor Lignite Handling System

Lignite for FPP #3 will be mined eight to fifteen miles northwest of the electric generator, which is located just outside of La Grange, Texas. Under the original plan 120-ton rubber-tire trucks would haul the lignite from the mine to a receiving and processing facility. An LCRA-proposed permit amendment currently under consideration by the TACB would move this facility to the mine mouth in order to reduce emissions associated with hauling. At this facility lignite will be bottom dumped into a 250-ton hopper, which will use a feeder/breaker to reduce the lignite to six-inch chunks. The chunks will then be conveyed to a 300-ton bin. From the bin the lignite will travel approximately twelve miles to the power plant on a three-segment conveyor system. About 1200 tons of lignite per hour will be moved this way.[3]

The only air pollutant to be emitted by this source is particulate matter, which is most likely to occur at the truck unloading area, the lignite feeder/breaker, and each conveyor transfer point. The conveyors will be covered by corrugated, C-shaped metal covers to limit fugitive emissions of particulates. At the conveyor transfer points baghouses will be installed to filter particulate matter out of the air. The particulate matter will then be collected and loaded onto the conveyors so that it may be burned as fuel. Another primary means of controlling particulate emissions in the lignite mine loading and conveyor system will be wet sprays. Whenever the trucks are dumping, water and a detergent mixture will be sprayed into the hoppers. The haul roads traveled by the trucks will be watered as well to reduce fugitive emissions. Because of the above-mentioned controls and the high moisture content of just-mined lignite, particulate emissions from this system are expected to be minor[4]

Figure 7-1: Fayette Power Project and Lignite Mine Location



(i.e., less than 54 tons/year).[5] If the permit amendment is approved, emissions of particulates should be even lower. The wetting solutions and covering devices are proposed as best available control technology for the mine and overland conveyor system.

Permits were not required under the CAA or the TCAA for the mining and loading of lignite onto the trucks. The emissions from these sources are usually insignificant. A further complication in developing regulations is the extreme variation in particulate emissions that occurs in mining operations. This variation is a result of the moisture content of the fuel, mining procedures used, truck speeds, and weather conditions. For example, an extended dry spell tends to cause an increase in the emissions of particulate matter.

7.3.2 Inplant Lignite Handling System

When the fuel reaches the power plant, it is transferred to one of three conveyors. One conveyor stacks lignite in a long-term storage pile. This lignite is used when none is available from active storage piles. A second conveyor moves the lignite to active storage piles, while the third conveyor transfers the lignite directly to pulverizers and from there to the furnace.

LCRA has taken several steps to reduce particulate emissions in this system: all conveyors are covered by corrugated metal covers; all lignite transfer points, including those from conveyor to conveyor, from conveyor to silo, and at feeder locations at the bottom of the silo have hoods and exhaust systems that transfer air to baghouse filters for particulate removal; water and detergent sprays are also used to reduce fugitive emissions. They are sprayed on the lignite at approximately ten transfer points; and finally, dribble chutes built beneath the return belts on the conveyors catch any stray lignite droppings.[6] The LCRA has proposed the above controls to be best available control technology for this facility.

7.3.3 Steam-Fired Electric Generating System

The LCRA is currently building a third lignite-fired electric generating plant (FPP #3) next to two existing coal-fired electric generating units (FPP #1 and FPP #2). Construction began in April 1984. The sole product of FPP #3 will be electric energy. Once in operation the plant will have a normal generating capacity of 415 megawatts with a maximum generating capacity of 451 megawatts.[7] FPP #3 is expected to operate 24 hours/day, 365 days/year.

The steam generator for FPP #3 is a Combustion Engineering-designed, subcritical, pressure-type boiler.[8] Overhead bunkers supply lignite to pulverizers. The crushed lignite is then mixed with heated air and blown into the boiler fire box. The hot combustion gases produced move from the furnace to the superheater and reheater sections of the generator and then to the boiler. Boiler exhaust gases next pass through an electrostatic precipitator (to remove particulates), through a sulfur dioxide (SO2) scrubber, and through a sulfuric acid (H2SO4) mist eliminator before exiting through a 533-foot stack.[9]

Most of the emissions from FPP #3 are produced as by-products of the boiler. These include particulates, sulfur dioxide (SO2), nitrous oxide (N2O), carbon monoxide (CO), sulfuric acid (H2SO4), volatile organic compounds, beryllium (Be), and mercury (Hg).[10]

Emissions are in part regulated by New Source Performance Standards for electric utilities, which are listed in 40 CFR 60 - subpart Da. Under the NSPS, SO2, N2O, particulates, CO, and opacity of emissions from FPP #3 will be regulated in both the state and PSD permits. PSD regulations also set standards for H2SO4, volatile organic compounds, Hg, and Be. These emissions will only be regulated by the PSD permit. Although mercury and beryllium are listed by the EPA as hazardous air pollutants, they are not regulated by NESHAPs because they are generated by an unregulated process.

Both the CAA and the TCAA direct that best available control technology must be applied to the above regulated pollutants. BACT is not explicitly designated, (i.e., specified control technology for given emissions produced by specific processes) by either the CAA or the TCAA, but at a minimum it must allow the facility to meet applicable NSPS (although BACT as specified in a permit may be more stringent than applicable NSPS).

Emissions Control Systems. BACT for sulfur dioxide emissions, as determined by the LCRA and agreed upon by the TACB and the EPA, consists of a limestone scrubber system which is expected to remove 90 percent of the SO2 in the flue gas.[11] Other control devices investigated by the LCRA would not have allowed FPP #3 to meet applicable NSPS for SO2, were more expensive, or had not been commercially proven to meet the applicable standards. The expected 90 percent removal rate should lead to SO2 emissions of 4,735 pounds/hour at maximum output.[12]

The scrubber works by combining pulverized limestone with water to form a slurry. Flue gas is passed through the slurry, and a chemical reaction occurs that results in the formation of calcium sulfate (gypsum). Air is added to this process to promote the formation of calcium sulfate as a solid. Provisions will be made in FPP #3 for the addition of a flocculating agent, which will cause the particles suspended in the slurry to coagulate. This solution will then be pumped into a filter system which will convert the 40 percent solid slurry into an 80 percent solid filter cake. The LCRA hopes to sell the calcium sulfate (gypsum) for use in construction. If this is not possible, it will be disposed of in a landfill that is regulated by the TDWR. Since calcium sulfate is not a harmful substance and since it will be disposed of in a lined landfill, the likelihood of cross-media transfer of air pollutants into the groundwater

Table 7-1: Regulated Boiler Emissions (Tons per year)

Sulfur dioxide	20,739
Nitrous oxides	12,352
Carbon monoxide	2,628
Sulfuric acid mist	955
Particulates	723
Volatile organic compounds	168
Mercury	0.127
Beryllium	0.0055

SOURCE: Texas Air Control Board, Preliminary Determination Summary, 1984.

the state permit. However, they are covered by PSD regulations and are therefore regulated by the federal permit. It was determined during the PSD review that it is not technically practicable or economically feasible to install pollution control devices for the VOCs (i.e., BACT does not exist in this case). VOC emissions are limited to 168 tons/year. The primary pollution threat of VOCs in this case would be from the chemical reaction of the VOCs and sunlight to produce ozone. However, creation of ozone from the hydrocarbons in the VOCs is not expected to be a problem because the level of hydrocarbons in the ambient air around La Grange is low.

Of the hazardous air pollutants, 68 percent of potential mercury emissions are controlled by both the ESP and the scrubber. Because Be emissions are mixed in with the fly ash, its emissions are also reduced by 99.95 percent in the ESP. Because these hazardous air pollutants are only regulated by PSD regulations they are not included in the state permit.[16]

The final pollution control device on the generator is the stack. Stack height on FPP #3 was determined by following the EPA's good engineering practice stack height rules which were issued in February 1982. Based on these rules, the LCRA engineers calculated that a maximum stack height of 533 feet was allowable on FPP #3. Dispersion modeling was performed by the LCRA with the assumption of a 533-foot stack and with a stack exit diameter of 25 feet and 9 inches. The modeling showed that LCRA construction and operating plans do not cause a violation of the PSD increment.

The LCRA will be complying with TACB and EPA regulations by installing stack sampling platforms and stack emission monitors. Monitoring will be performed for N2O, SO2, and particulates. Monitoring of Hg and Be is not required because their emissions fall far below levels at which this testing must occur. No monitoring is required for H2SO4 mist because emissions will be minor and because the particles are so heavy that emissions will be deposited on plant property. (H2SO4 emissions will be small enough that there is no significant health hazard to plant employees.)

A one-time sampling of plant emissions will be required within 180 days after startup of the facility in order to establish the actual patterns and quantities of pollutants being emitted into the air (as opposed to the estimate in the permit application). This sampling will test for N2O, particulates, SO2, CO, H2SO4 mist, Hg, Be, and VOCs.

7.3.4 Fly Ash and Limestone Handling System

The fly ash collection system will be vacuum operated and will remove ash collected from sixty ash hoppers under the electrostatic precipitators and from other hoppers under the preheater on the boiler.[17] This ash will be transferred via vacuum to two 512-ton transfer bins. Cyclone separators in the bins are expected to remove 95 percent of the particulates. A baghouse is expected to remove 99.99 percent of the remaining particulates. Particulate emissions from this system are expected to be less than 0.15 pounds/hour.[18]

The ash transport system will use pressurized air to move a maximum of 240 tons of ash per hour from transfer bins to fly ash storage silos--a distance of approximately 2,600 feet. As the ash/air mixture flows into the silo, gravity will separate out 95 percent of the particulates as the ash falls to the bottom of the silo. The rest of the ash will be separated from the transport air by a baghouse filter. The baghouse filter should remove 99.99 percent of the remaining particulates, so that emissions of this substance should be less than 2.40 pounds/hour.[19] The disposal of the ash in the silos is regulated by a TDWR solid waste disposal permit. The system as described above has been proposed by the LCRA as BACT for this type of equipment.

Crushed limestone for the SO2 scrubber will be delivered to the limestone handling system from bottom dump rail cars or tilt bed dump trucks. It will be dumped into a 300-ton hopper. Feeders attached to this hopper will transfer the limestone to a conveyor which will move the limestone into an active storage pile. This storage pile will be located in an enclosed building in order to reduce limestone dust emissions. From this indoor storage pile the limestone will move via conveyors to surge bins feeding the limestone scrubber system.

To minimize fugitive emissions the limestone receiving hopper will use water sprays. Also, all conveyor systems located above ground will be covered with a corrugated metal cover. To further reduce limestone emissions, dust suppression sprays will be installed in all the feeders in the system. The wet sprays are expected to control 90 percent of the particulates and emissions of 4.8 pounds/hour are expected at the limestone unloading point and 0.8 pounds/hour at the transfer-to-silo point.[20] All parts of the limestone handling system which use enclosure for control are expected to sustain 100 percent control over particulate emissions.

7.3.5 Expected Impact of Air Emissions from Fayette Power Project number 3

PSD regulations required that the LCRA produce a study on a broad range of impacts that would result from the building of FPP #3.

Socioeconomic Impacts. Construction of FPP #3 and the lignite mine will lead to the employment of approximately 570 construction workers over the four year period from 1984-1988. Once completed, the mine will employ 215 people and the power plant another 120.[21]

Socioeconomic impacts are expected to be greatest in Fayette County in the city of La Grange. Because of a previously declining population in La

Grange, it is expected that city services, housing, and school facilities will be adequate to meet the needs of the incoming population. Negative impacts resulting from the construction and operation of FPP #3 are expected to be minimal.

Vegetation and Soil Impacts. Vegetation in the project area falls into the category of post oak savannah. It includes a mixture of woodlands (e.g., post oak, elm, eastern red cedar, etc.) and prairie grasslands. Farming activity in the area is primarily for the purpose of producing feed for livestock. Crops grown include sorghum, corn, and peanuts.

Vegetation in the project area is not highly sensitive to either SO2 or N2O.[22] Furthermore, because SO2 and N2O concentrations are expected to be well below NAAQS, no adverse vegetation effects are expected. Most of the soil in the area is either gravelly or sandy loam. Adverse conditions that could affect the soils would result from the chemical joining of SO2 and N2O to form acid rain. A report prepared for the Texas Energy and Natural Resources Advisory Council found that "... without catastrophic amounts of acid deposition, there is little evidence that deleterious effects will result in most of the soils of Texas."

Negative impacts are unlikely because there is lime in most of the soil in Texas. This lime would react with acid rain as a neutralizing agent. In fact, much of the soil in Texas is so alkaline that it has been suggested that acid rain could even improve state soil conditions.

7.4 Construction Permits

7.4.1 Permit Characteristics

All four of the state-issued permits contain similar general conditions. These conditions cover administrative issues, sampling requirements, record keeping, procedures that must be followed to substitute equivalent emission control methods for methods detailed in the permit application, procedures to be followed in the case of an interruption in construction, and appeals procedures.

7.4.1.1 Lignite Mine Loading and Overland Conveyor System

The permit for this site contains two special provisions. They are that total emissions of air contaminants from this source may not exceed values listed in an attached table[23] covering particulate emissions and that the facility is required to comply with all applicable NSPS.

7.4.1.2 Inplant Lignite Storage and Handling System

This permit contains three special provisions. The first two are the same as above. The third special provision is that the lignite storage piles must be treated with water or chemicals (detergents) in order to control particulate emissions.[24]

7.4.1.3 Steam Generator

This permit is the most extensive of the state-issued permits because it regulates the source responsible for most of the air emissions. This permit contains five special provisions: stack sampling design; stack sampling procedures--including emissions to be tested for, notification of the TACB so an agency representative may be present during sampling, and submission of sampling reports; facility compliance with NSPS; sulfur content of the fuel; and finally, tables regulating emissions of sulfur dioxide, nitrous oxide, carbon monoxide, sulfuric acid mist, particulate matter, volatile organic compounds, beryllium, and mercury. Emissions regulations are defined in pounds per hour and tons per year. The state permit calls for compliance with SO2 and N2O standards to be evaluated based on a thirty-day rolling average.[25]

7.4.1.4 Limestone and Ash Handling System

This permit contains only one special provision. It is that total emissions from this source may not exceed values listed on the table attached to the permit.[26]

7.4.2 Permit History

The LCRA applied to the TACB for construction permits for FPP #3 on November 30, 1983.[27] Four permit applications were submitted for the facility. Under the CAA and the TCAA, a single permit could have been issued for the project, but the TACB believed (and the LCRA concurred) that by breaking the project down into four sites it would be easier to consider the particular environment of each system, its proposed operations, emissions, and pollution control devices. The TACB also felt that this would allow them to write more specific permit conditions.[28]

After the permit applications were received by the TACB, they were sent to the Permit Division director (at the time, James Carraway). Carraway assigned the permit applications to James Crocker, an engineer in the Combustion Section. He was chosen because he had already written permits for several other power plants in the state and was considered to be the "power plant expert."

Crocker worked on all four permits simultaneously. First, he checked the applications for completeness and on February 9, 1983, he requested additional information from the LCRA. This information was received on

March 28, 1983.[29] Under TACB rules there is no time limit that a company must meet in returning supplementary information. The permit application sits in limbo, and the company may not begin construction until the information is received. The amount of time it takes an engineer to request supplementary information after he has been assigned to a permit application varies with the engineer's workload. There are no administrative deadlines that the engineer must meet in completing work on his permits.

As soon as the application was complete, the engineer requested that air quality modeling be done by the Emissions Effects Group of the TACB. At this time, modeling was done for all state construction permits, although it was only required for PSD permits.[30] In the case of a small source or simple construction, the engineer could do the modeling himself using a software package. The purpose of the air quality modeling for the state permit was to ensure that the proposed source met NSPS, BACT, Lowest Achievable Emission Rate (LAER), etc. In the case of FPP #3, air quality modeling showed that the pollution control devices proposed by the LCRA were indeed BACT and would meet the applicable NSPS.[31]

Next, the engineer requested comments from other TACB divisions on the Fayette permit applications. Comments were requested from the Legal Division, the regional office with jurisdiction over Fayette County, the Compliance Division, and the Emissions Effects Group. The Legal Division comments on the existence and nature of any legal actions being taken by the TACB against the applicant. In this case there were none. The Compliance Division comments on the company's history, if any, of compliance with TACB rules and regulations. The regional office acts as the engineer's eyes. They are much more familiar with the proposed construction site, and their comments focus on the location of the site relative to residential areas, the source's potential for generating a nuisance condition, etc. Finally, a toxicologist in the Emissions Effects Group comments on the expected emissions of the source with respect to their toxicity and regulation under NESHAPs. In the case of FPP #3 all groups submitted favorable comments.

After Mr. Crocker received these comments, he prepared the draft permits. Permit conditions are generally based on several criteria. A minimum requirement of the CAA and the TCAA is that all major sources (with emissions greater than 100,000 tons/year) in attainment areas employ BACT. However, BACT is not specifically defined; rather, it is determined on a case-by-case basis by the permit-writing engineer.

In general, NSPS provide guidelines for determining BACT because installed emission control devices must meet the applicable NSPS. (The applicable NSPS in this case are listed in 40 CFR 60, subpart Da.) Previously issued permits for similar facilities are kept on file at the TACB and may be used by engineers checking to determine what was BACT in previous cases.

In some cases BACT may be determined to be more stringent than NSPS. For example, if modeling shows that the source will exceed a PSD increment using pollution control devices proposed in a permit application, more stringent control technology may be required. In this case, however, BACT was determined by NSPS for coal-fired electric utilities.

Guidelines on writing specific permit conditions may also come from the director of the Permit Division--currently Larry Pewitt. Further guidelines may come from the TACB. For example, regulation VI requires that a means of sampling be part of all major sources. Since most power plants emit more than 100,000 tons/year of air pollutants, most of them will be required to have some kind of continuous monitoring device as a condition of receiving a permit.

The draft permit for the LCRA was sent to them for review. The LCRA was satisfied with the permit conditions. In general, however, if a company is dissatisfied with the permit conditions and can make a good case for a change, the TACB engineer may modify the draft permit. For example, in another case a utility wanted to be excused from the constant monitoring requirements. They argued that they had such tight control over their fuel supply and that it was of such a high quality that by monitoring its sulfur content, they could accomplish the same goal as monitoring emissions (because the percentage of sulfur in the fuel is directly related to the amount of sulfur in the emissions). The TACB felt that the argument was valid and modified the permit.

If a company fails to make a good case for a modification to the draft permit, the permit may be issued as originally written. Then it is up to the company to appeal the permit.

In developing the provisions of the state permits, Crocker worked with Virginia Smith, an engineer in the Technical Services Division of the TACB who was responsible for carrying out the PSD review and writing the PSD draft permit, to coordinate the conditions of the PSD and state permits. (At the time the Technical Services Division was the only one at the TACB doing this work. In order to improve efficiency this responsibility has since been given to all the sections in the Permits Division. For FPP #4 James Crocker is writing both the state and PSD permits.)

As soon as the conditions of the two types of permits had been coordinated, the LCRA was given permission to publish public notice of the TACB's intention to grant a permit. This notice was published in the Fayette County Observer on October 7, 1983.[32] It included information about the proposed source, its proposed location, the location where the draft permits could be inspected, and the location where public comment could be made. Surprisingly, in the thirty-day comment period that followed, not a single comment was received.[33] Since no comments were received, the permits were issued to the LCRA on December 22, 1983 (see appendix 7.1).[34]

7.5 Prevention of Significant Deterioration Permits

7.5.1 Permit Characteristics

The PSD permit contains general conditions similar to those incorporated in the state permits. With respect to emissions from FPP #3, the PSD permit contains special provisions regulating the various pollution control technologies utilized at the plant, such as the amount of emissions allowable and monitoring requirements. The tables of allowable emissions (which are attached to the permit) regulate twenty-seven emission points and eight pollutants. Allowable emissions are specified in pounds per hour and in tons per year. Chapter two of the PSD permit is nine pages long and covers stack sampling facilities and procedures.[35]

7.5.2 Prevention of Significant Deterioration Permit History

The TACB has not received full authorization from the EPA to administer the PSD permit program. Under current agreements the TACB carries out the technical review of the permit application and writes the draft permit. The draft permit and the results of the technical review, as written up in the preliminary determination summary, are then sent to the EPA regional office in Dallas. EPA engineers in the Air Branch review these documents and send their comments back to the TACB. (These comments are usually minor.) The TACB then incorporates the changes requested by the EPA into the permit, which is returned to the EPA. If the EPA is satisfied with the permit, it will then go ahead and issue it.

When the LCRA applied for its permit on November 30, 1982, the Technical Services Division at the TACB was doing the PSD review and draft permit writing. The permit was assigned to Virginia Smith. Permit assignments are based on workload. First, the engineer reviewed the permit application to ensure that it was complete, which it was. Next, she contacted the modeling staff at the TACB. Under PSD regulations all clean air areas are limited as to the amount of pollutants that can be emitted within them. This limit is called an increment and varies for different pollutants. The modeling staff checked the available increment of the clean air area where FPP #3 is being built and modeled the expected emissions from FPP #3 to ensure that it would not use too much of the remaining increment. The speed with which the modeling staff responds to such requests is a function of its workload, which at the time was very heavy. It took the modeling staff about three months to complete this work.

At the time, Virginia Smith was working with James Crocker on the permit provisions so the TACB and PSD permits would not be contradictory to each other. She also contacted the Health Effects Group at the TACB to get their evaluation as to the hazard of the Be emissions. They found no major hazard.

In August 1983, she wrote up the preliminary determination summary and draft permit and sent them to the EPA office in Dallas for review. The EPA returned the draft permit and its comments approximately thirty days later. Most of the EPA's comments were minor.[36] At this time the engineer instructed the LCRA to publish a public notice regarding the EPA's intent to issue the permit. A thirty-day comment period followed during which one comment was filed. The complaint received was investigated and dismissed as not significant. Finally, the permit was returned to the EPA in December 1983 for a final review. The EPA was satisfied, and the permit was issued to the LCRA on January 24, 1984 (see appendix 7.2).

There was only one major problem with the PSD permit. The EPA decided to include a condition requiring the LCRA to report SO2 monitoring data based on a three-hour rolling average. The standard in the past has been twenty-four hours, which is less stringent. The LCRA objected to this strict monitoring requirement on the grounds that it was overly discretionary on the EPA's part. The EPA responded that it was now requiring a three-hour rolling average and that the LCRA's plant was not the only one in the region being required to follow it. The LCRA did not formally appeal the condition (probably to avoid a delay in construction), and so it stood.

7.6 Critical Issues: Construction and Prevention of Significant Deterioration Permits

7.6.1 Construction Permitting Process

7.6.1.1 Cross-Media Effects

Some cross-media effects were considered in this case, but only to the extent that they would have an impact on Texas. This procedure is not good in terms of controlling national pollution problems, but it is not unusual considering that the TACB is a state agency and its concerns are limited to the welfare of Texans.

Cross-media effects, in this case the likelihood of acid rain, were considered by the Emissions Effects Group at the TACB. Their evaluation was that there was little chance of a serious problem developing in Texas. The general feeling at the TACB seems to be that Texas lignite-powered electric utilities do not cause acid rain. As mentioned previously, the conditions of Texas soil are such that acid rain, if it were generated, would do little harm to the state's environment.

Acid rain concerns were viewed as minimal by the engineer who wrote the state permits. He was of the opinion that U.S. and Canadian acid rain problems are caused by the emissions of the old, dirty, midwestern power plants that were exempted from NSPS by a grandfather clause in the CAA. The engineer felt that FPP #3 is so clean that it would be unlikely to add to acid rain problems.[37]

EPA engineers feel that there is little reason to consider the acid rain problem when developing a PSD permit. The CAA contains no provisions that allow them to write more stringent permit conditions than are promulgated by other parts of CAA for the purpose of reducing acid rain. Were such conditions to be written into a permit, they would most likely be declared overly discretionary, and the permittee would have an excellent case for appealing the permit.[38]

Other cross-media pollution problems in this case (i.e., the disposal of the calcium sulfate produced by the SO2 scrubber or the disposal of the fly ash collected by the electrostatic precipitator) fall under the jurisdiction of the TDWR. Disposal of these by-products of the air pollution control process is regulated by TDWR permits. The disposal issues involved were not given any consideration by the TACB. Because they have no statutory authority in this area, they give it little or no consideration.

7.6.1.2 Establishment of Permit Conditions

In writing state construction permits, engineers must take into account certain guidelines and constraints. In the case of a source applying for a permit to build in an area in attainment with NAAQS (the LCRA's Fayette Power Projects), the engineer must make sure that the source is using BACT. Neither the CAA nor the TCAA explicitly define BACT, but determinations of BACT are supposed to include cost, history of commercial use, etc. As a minimum standard BACT must at least meet the EPA-determined NSPS for the proposed source. In certain cases and under conditions to be decided by the permitting agency, a determination of BACT may be more stringent than necessary to meet NSPS. For example, a permittee may be seeking to locate in an EPA-defined clean air area. In order to prevent the applicant from using too much of the allowable increment, pollution control technology more stringent than BACT could be required. The provision for enacting more stringent technology is beneficial because a minimum level of air pollution control is established, yet more stringent pollution control may be required in certain situations.

In the case of a source proposing to build in a nonattainment area, the engineer is guided by offset rules. The source's planned emissions must be offset by a decrease in emissions of the same pollutant(s) elsewhere in the Air Quality Control Region (AQCR). This offset can be obtained by reducing emissions at another facility of the same permittee or by convincing the operators of a facility of a different permittee to reduce their emissions to the extent necessary. The offset and its method of attainment are included as special provisions of the permit (when applicable).

For sources seeking to build in nonattainment areas, engineers are also guided by LAER. This standard was established by the CAA and, like BACT, is not explicitly defined. Its emphasis is much more on a technology's ability to minimize emissions and much less on its cost as opposed to BACT where cost is a more important consideration. As a result, LAER is more stringent than BACT.

A further set of guidelines for permit writers comes from NESHAPs. These standards govern the emission of EPA-determined hazardous air pollutants. However, for an air pollutant to be regulated under NESHAPs, it must not only be listed as a hazardous air pollutant, but it also must be emitted as the result of an EPA-specified production process. Thus, while Be and Hg (both listed as hazardous air pollutants) will be emitted from FPP #3, neither will be regulated under NESHAPs because they are both being generated by an unregulated process. Fortunately, in this case both Hg and Be will be controlled because the facility is located in an EPA-designated clean air area and is thus regulated by the PSD program. In a nonattainment area it is conceivable that emissions of hazardous air pollutants could be unregulated. If a company was seeking to build in such an area they would have to obtain an offset to emit these pollutants, but there would be no program regulating the initial emissions of these pollutants.

Another problem that could arise from the operations of the NESHAPs program results from the fact that NESHAPs are the CAA's most stringent standards. Unlike NSPS, they apply equally to old and new facilities (thus, promulgation of a NESHAP can force a company to engage in costly retrofitting to control the offending hazardous air pollutant). Also, unlike NSPS, NESHAPs do not allow for cost considerations in defining required pollution control technology. Because of these factors, the EPA has been hesitant to designate additional hazardous air pollutants. Instead the EPA has attempted to regulate some hazardous air pollutants under other CAA programs. The danger exists, however, that the EPA's handling of this matter may lead to unregulated emissions or hazardous air pollutants.

Permit engineers may also be limited by the narrow scope of the CAA and the TCAA. Only six pollutants are regulated by NSPS (sulfur dioxide, nitrogen oxide, carbon monoxide, particulates, ozone, and lead). As previously mentioned, NESHAPs are also limited in the scope of their coverage. Engineers in Texas may write permit conditions to control air pollutants that they have no mandate to control (through the CAA or TCAA). In many other states, because the administrative and legislative processes are slow to react to developing pollution problems, it is possible for harmful conditions to develop, yet permit engineers have no tools with which to attack those problems.

On the other hand, TACB and EPA engineers are prevented from writing overly discretionary permit conditions that could result in costly changes in plant design with little added benefits in the form of emissions reductions. As the system now stands, companies applying for permits know exactly which pollutants they must control and the levels of control they must obtain. Thus, they can plan to integrate the necessary pollution control devices into their facilities during the planning stages.

Under the CAA state emissions standards may be more stringent than those promulgated by the EPA. Theoretically, if a state became aware of a harmful pollution problem, it could react by introducing its own standards without waiting for the EPA to react. In reality letting each state introduce its own standards would not work to control air pollution problems that are interstate in nature (i.e., acid rain). Also, there may be economic disadvantages if a state follows such a procedure. For example, if the TACB discovered a new pollution problem and passed regulations to control the emissions that caused the problem, firms looking for sites to build new facilities might ignore Texas because the new regulations might increase the relative cost of locating in the state. Firms would probably choose to build in states where environmental standards were not as strict.

The permit-writing engineer is constrained to some extent by TACB administrative processes. Before draft permits are finalized, they are reviewed by the engineer's section chief, and by the director of the Permit Division. The conditions of the permit may be altered by either of these two people. Supposedly, any omissions or other types of errors made by an engineer should be caught by someone with more experience.

Engineers may obtain further guidance in establishing permit conditions from TACB files. The TACB keeps copies of all permits they have issued so an engineer may check previously issued permits to determine the conditions that were established for similar sources under similar conditions.

Generally, the process of writing specific air permit conditions seems to be broadly defined by NSPS, BACT, LAER, offsets, and NESHAPs. However, the permit-writing engineer is granted a significant amount of flexibility within these guidelines.

The general nature of the definitions of BACT and LAER is beneficial to the extent that as air pollution control technology improves, definitions of BACT and LAER can become more stringent. NSPS, on the other hand, are quite explicit and serve as a minimum standard for pollution control. However, NSPS may be revised as the EPA decides it is necessary, and so NSPS may also keep pace with pollution control technology.

7.6.1.3 The State Permitting Process and Permit Conditions

In this case the permitting process functioned quite smoothly. Because Dennis Haverlah, the individual responsible for preparing the LCRA's permit applications, had worked for the TACB, he was well aware of what materials were required and of the regulations that had to be met. The permit applications were accompanied by an overwhelming amount of technical documents, which made the job of the permit-writing engineer much easier.

Generally, the TACB's permitting procedures appear to be very efficient. The engineers in the Permit Division appear to be well trained and are kept up-to-date by their group leaders on any changes in environmental regulations that could affect their work. The engineers also seem to be backed up by a competent support staff, namely the Emission Effects Group, Enforcement Division, legal staff, and regional offices.

The fact that TACB engineers face no administrative deadlines for completing their work may appear to pose a problem, but in reality this is not the case. Generally, the TACB takes six months to issue a permit (from the time the application is completed). While applicants naturally prefer the process to be as short as possible, the LCRA was satisfied that the amount of time it took for them to receive their construction permits was not excessive. This lack of administrative deadlines may be particularly useful now as the state of Texas is facing a budget deficit. In its efforts to reduce that deficit, the TACB has been placed under a hiring freeze. Therefore, already overloaded permit engineers will see their workloads increase further.

Within the limits of the law (the CAA and the TCAA), state permit conditions appear to be thorough. All four permits include two pages of general conditions that cover such matters as validity of the permit, record keeping, sampling requirements, definition of construction, and the procedures to be followed when the applicant desires to substitute equivalent control measures or appeal the permit.

All four permits also contain extensive special provisions that apply specifically to emissions and control of emissions from FPP #3. These special provisions include tables of maximum allowable emission rates which list in tons per year and pounds per hour the maximum levels of all pollutants that may be emitted from <u>each</u> emission point on the site. Special provisions also list the applicable NSPS regulating the source and require that the company comply with those standards. Furthermore, these provisions list each pollution control facility to be used by the source and how it shall be applied to reduce emissions as well as state monitoring requirements (which apply solely to the generator because it is the only site that qualifies as a major source under state law).

7.6.1.4 Texas Air Control Board and Lower Colorado River Authority Interaction

Generally, agency/permittee interaction is limited to submission of a completed application to the TACB, the permittee's review of the draft permit, the TACB's notification to the permittee to make public the agency's intent to issue a permit, and finally, issuance of the actual permit(s).

In the LCRA case, interaction between the engineer writing the state permits and the LCRA was extensive. As previously mentioned, this was probably due in part to the fact that the LCRA's representative responsible for handling the permits, Dennis Haverlah, had previously worked as an engineer for the TACB. Besides submitting the application form, the LCRA prepared a two-volume technical summary describing FPP #3 and its proposed systems of operation and pollution control.

The permitting process in the LCRA case was not a negotiating process. Permit conditions were for the most part spelled out beforehand because of the stringency of applicable NSPS. Thus, the LCRA knew before it submitted its permit application what would be required of it and was able to plan accordingly.

The LCRA was essentially satisfied with the construction permits they received from the TACB. They felt that the pollution control technology they were required to install was the most economically efficient technology available. But there was a small disagreement over a TACB requirement for a one-time trace element sampling. Apparently, the TACB was not satisfied with the accuracy of the LCRA's data on the trace elements. This sampling will be performed as soon as FPP #3 begins operation. The LCRA's consternation results in part from the fact that this kind of sampling has not been required of other power plants being permitted in Texas and also because it will cost the LCRA $10,000.[39]

7.6.1.5 Compliance

Because FPP #3 is still under construction it has no compliance history. If a facility fails to comply with its construction permits, including emission of pollutants not mentioned in the permit or emissions in amounts greater than those specified by the permit, it will not be issued an operating permit and will have to cease operations until the situation is remedied. Compliance with operating permits [for sources emitting greater than 100,000 tons/year of air pollutants] is checked by TACB inspectors once a year during on-site inspections. The company is notified beforehand of the inspector's visit. Surprise inspections are carried out by the regional offices of the TACB in response to citizen complaints. Quarterly emission reports containing the results of the LCRA's monitoring are also to be submitted to the TACB. The board's compliance requirements for major sources are much more stringent than for minor sources, as demonstrated by the Motorola and IBM case studies.

The LCRA will be subjected to the above-mentioned controls plus the previously mentioned trace element sampling. Furthermore, the LCRA will also be subject to NSPS monitoring regulations, including very stringent in-stack monitoring requirements. State regulations also require monitoring for any facility emitting more than 100,000 tons/year of a regulated air pollutant.

Should the LCRA fail to comply with any of its permits (e.g., for maintenance-related shutdowns, accidental failure of plant equipment, etc.), they must file an upset report with the TACB regional office having jurisdiction over Fayette County. If this violation is a result of a planned action, such as maintenance, the LCRA must notify the TACB ten days in advance. Notification need not be formal; it may be given over the telephone.

However, should a violation occur as a result of an unplanned event, the LCRA must notify the TACB as soon as possible. As soon as the violation is resolved, the LCRA files the upset report listing exactly what happened and what they did to remedy the situation.

TACB enforcement procedures call for consideration of the nature of a permit violation before a penalty is assessed. Considerations include the severity of the violation and its effects on the environment as well as the company's attitude in redressing the situation.

7.6.2 Prevention of Significant Deterioration Permitting Process

At the time the LCRA applied for its PSD permit, one TACB division did the PSD review and wrote the PSD draft permit while another worked on the state permits. Extensive coordination between the two engineers working on each permit was required. In earlier cases this division of labor sometimes produced contradictory PSD and state permit conditions. Recently, however, the TACB changed its procedures so that the engineer who writes the state permits carries out the PSD review and writes the PSD permits. This system of writing permits should be more efficient.

Another problem with the PSD review is budgetary in nature. PSD permit procedures require that extensive modeling be carried out. When the LCRA applied for its permit, the modeling staff was overloaded with work and the LCRA modeling was delayed several months. Since then the modeling staff's workload has increased, but its resources have not increased at a comparable rate, creating even longer delays in the PSD review process.[40]

A third problem with the PSD permitting process relates to the EPA. In the LCRA case many of the EPA's suggested changes to the draft permit were minor. Apparently, in most cases the EPA comments call for only minor changes in the permits.[41] TACB engineers tend to think that the necessity of submitting draft permits for EPA review, making the subsequent changes to the draft permit, and then returning the permit for a second review is overly time consuming.[42] Although the EPA does attempt to carry out its review quickly, it cannot be denied that it increases the amount of time required to obtain a PSD permit.

Texas plans to obtain full authority over the PSD program. When this occurs, TACB engineers will carry out the technical review, write, and issue the PSD permit. At that time this problem will be eliminated. The PSD permit conditions and permit review are thorough and appear to meet the goals of the PSD program.

7.6.2.1 EPA/TACB and EPA/LCRA Interaction

Generally, relations between EPA staff responsible for issuing the PSD permit and the TACB engineer doing the PSD review were amicable. Although disagreements sometimes arose (as they did in this case) between EPA staff and TACB staff, both sides seem to believe that differences can best be solved by friendly negotiations, rather than by heated arguments.[43]

The LCRA's relations with the EPA were not as congenial. The LCRA felt that the EPA's three-hour SO2 rolling average monitoring requirement was overly discretionary (and overly stringent). They also felt that the EPA was unwilling to listen to their arguments in favor of a less stringent monitoring requirement. The EPA's position was that other power plants in region VI had been required to perform the same type of monitoring; there was no reason why the LCRA should not be required to carry out the same monitoring.

7.7 Water Permits

7.7.1 Overview

The LCRA has been issued two water permits for the Fayette Power Plant: NPDES permit number TX00]73121 issued by the EPA and Texas industrial wastewater permit number 02105 issued by the TDWR. The federal permit is issued under authority of the CWA of 1972 whereas the state permit is issued under the authority of title 2, chapter 26 of the TWC.

An NPDES permit application for FPP #1 and #2 was first filed with the EPA in October 1978. The permit was issued on July 16, 1979. The state wastewater permit application for units 1 and 2 was filed with the TDWR in October 1976, and the permit was issued on October 19, 1978. In July of 1983, the LCRA applied for amendments to unit 1 and 2 permits to include the addition of unit 3. Applications for amendment were filed with both the state and federal agencies. The amendment application was filed with the TDWR in July 1983, and the permit was issued four months later. The application for amendment to the existing NPDES permit was submitted to the EPA in June 1983, and a permit still has not been issued. The addition of unit 4 will require amendments to the state and federal permits issued for unit 3. Those applications have already been filed with the TDWR and the EPA. The TDWR issued a permit for unit 4 in December of 1984, while the NPDES permit still had not been issued when this report was completed.

FPP #3 has two separate systems for disposing of wastewater. The first is an open-cycle system that discharges the plant's effluents into open waters, which then flow into or stand adjacent to the Colorado River. The wastewaters are discharged from the plant into the open water through a number of outfalls. Each outfall is monitored and controlled by federal and state permits. The second type of wastewater disposal system is the closed-cycle system. This system is designed to prevent the flow of certain effluents into open waters. Wastewater in the closed cycle is channeled into either an ash disposal pond or a reclaim pond where it is stored or recycled for use in various plant processes. The solid wastes that eventually accumulate in the ash disposal pond are periodically removed and buried in a solid-waste disposal area. This landfill is controlled by TDWR solid-waste disposal regulations. The closed water system does not require a water permit.

7.7.2 Water Pollution Profile and Permit Characteristics

7.7.2.1 The Open-Cycle System

The Fayette power plant has six point sources (outfalls) that discharge wastewater into Texas waters. All six outfalls are regulated by state and federal permits.

Outfall 001 intermittently emits discharges from Cedar Creek reservoir, the company-owned cooling pond, into Cedar Creek. The permitting of the discharge is twofold. First, the Fayette Power Project has been required by the Texas Water Rights Commission to maintain a release rate of 0.5 cubic feet per second (cfs) continuous discharge to maintain a certain water level in order to meet water rights of property owners downstream of the Cedar Creek Dam. The second purpose of permitting outfall 001 discharges is to limit the concentration of dissolved solids that will increase in response to forced evaporation. The concentration of dissolved solids is monitored regularly and is not to exceed nine hundred over a thirty-day period with a maximum concentration of eleven hundred in order to preserve the water quality standard. When the level of concentration reaches this limit, a flow of water is released to break up these dissolved solids. This process is called a blowdown discharge. Since 1978, the net gain of dissolved solids on FPP #1 and #2 has been less than fifty. With the addition of unit 3, the dissolved solids concentration is expected to increase at a slightly faster rate. The permit regulates temperature, pH limits, the daily maximum flow and the daily average flow.

Wastewater is discharged through the plant's storm drainage system and is emitted via outfall 002. Also, drainages from areas that may be contaminated with oil are collected and processed through an oil waste treatment system. This system is designed to remove oil and grease from the water to a concentration less than 15 mg/l. The oil recovered from this system is recycled in accordance with the federal Resource Conservation and Recovery Act. The effluent water is discharged via the storm drainage system into Cedar Creek. Limitations on flow frequency, temperature, total suspended solids, oil and grease, and pH from this outfall are written into the permits.

The discharge of storm water runoff from the coal storage pile, plant area drains and the discharge from the retention pond are all emitted by outfall 003. After the water is treated by the company's water treatment plant it is released into Cedar Creek at a point approximately four thousand feet downstream from the reservoir. Flow frequency, temperature, and total suspended solids are limited by the permits.

The major water discharge from the power station is the once-through condenser cooling water. Emitted from outfall 101, the cooling water flows into the Cedar Creek Reservoir. Water is taken in from the reservoir and pumped through condenser rods to cool the generating unit. It is then discharged back into the reservoir. The condenser cooling water will be identical in quality to the water in the reservoir except for the addition of heat and small amounts of chlorine which is added to control the growth of algae and bacteria. In addition to the chlorine and temperature, the flow frequency and pH are also regulated by the permits.

7.7.2.2 The Closed-Cycle System

Units 1, 2, and 3 will discharge low volume wastewaters, which include boiler blowdown, sewage treatment plant effluent, and demineralizer regeneration wastes.[44] These discharges, which have a variable flow due to rainfall, are routed into the closed-cycle reclaim pond recirculating system. The water from the reclaim pond can be utilized as makeup waters for plant operations such as FGD (scrubber) processes, fly ash wetting and solid waste disposal dust suppression. Under normal operating conditions this low-volume wastewater is completely recirculated via the reclaim pond.

During periods when the processes requiring the use of the reclaim water are not operating or during periods when there is heavy rainfall, there should be a reduced demand for wastewaters held in the reclaim pond. When such conditions occur, it is proposed that the low-volume wastewater be discharged into the Cedar Creek reservoir in order to maintain a proper water balance between the water level in the reclaim pond and the amount of water needed for plant operations. This rerouting pathway is designated as outfall 201 and pollutant limits are defined by NPDES guidelines.

Units 1 and 2 have no scrubbers for the flue gas cleaning system, consequently there is no scrubber sludge waste.[45] With the addition of Units 3 and 4 however, scrubber sludge waste will be produced.

Approximately 90 percent of the fly ash produced by FPP #1 and #2 is currently sold for use as a building material. For FPP #3 fly ash and scrubber sludge will be buried separately in the waste disposal area so that the material can be easily retrieved in case a market develops for either product.[46]

The waste disposal area has a natural forty-foot clay liner that protects against possible seepage into the groundwater. Federal and state regulations require that a number of test holes be dug through the clay liner to determine the flow, or dip, of the aquifer. Once the flow of the aquifer is calculated, a minimum of two wells are placed up-dip and a minimum of three wells are placed down-dip to gauge the effects of the plant and solid waste disposal on the aquifer. Once the thirty-acre disposal cells are filled, TDWR guidelines require that the landfill be covered by three feet of compacted clay and one foot of top soil. The area must then be reclaimed.[47] Since the solid wastes are disposed on-site, a RCRA permit is not required. Federal and state laws, however, do require that the waste disposal area be registered.

The proposed landfill disposal area will be developed in approximately thirty-acre blocks with all undisturbed area runoff diverted away from the runoff collection pond to an unnamed tributary of Cedar Creek. Runoff from the thirty-acre active disposal area will be collected in a pond designed to contain a fifty-year storm event (9.8 inches in twenty-four hours). Runoff in excess of the fifty-year storm event may overflow into the same unnamed tributary of Cedar Creek as the undisturbed area runoff. Waters collected in the runoff pond will be pumped to the reclaim pond and utilized as makeup water to various plant systems.

7.7.3 The Water Permitting Processes

7.7.3.1 The Federal Permitting Process

The EPA was granted authority to issue NPDES permits under the CWA of 1972. Federal permits are required for anyone discharging any waste into Texas waters. The NPDES application is filed directly with the EPA region VI office in Dallas. The federal permit application is generally filed before the state permit application because section C of the NPDES permit application, which lists all possible pollutants, is used as part of the technical report for the state application. Since the federal process usually lags behind the state permitting process, the LCRA planned to file the NPDES permit eighteen months to two years prior to the time they expected to begin construction. They planned to file the state permit approximately six months later.

Generally, as soon as the NPDES application is received by the EPA, copies are distributed to state and federal agencies under the coordination requirement of the CWA. At the same time, a copy of the application is sent to the EPA's New Source Review Section to determine if an environmental impact statement (EIS) is required. Unit 3 was not considered a new or major source as it would not have any significant impact on the existing wastewater system for units 1 and 2. All internal and external comments based on this circulation are sent back to the Water Section at the Dallas region VI office.

The permit application is then forwarded to an engineer who writes the draft permit. Although no partial authority has been given to the TDWR for writing NPDES permits, staff at the EPA, the TDWR and the LCRA reported that the state actually writes the draft NPDES permit for those sources that are considered to have a minor impact on the environment. State-drafted permits are then sent to the EPA for review and final approval. The pollution source is classified as being major or minor by a numerical system that is based on such things as the type of industry, the type of effluents, and the location. Permits for major sources are drafted by EPA engineers.

NPDES permit limitations are based on two criteria established by the CWA: BACT standards and water quality standards. Permit limitations are usually a mixture of both standards with the more stringent standard taking precedence. The EPA administers the CWA by establishing various categories of pollution sources. Given BAT for a specific industry--in this case electric power plants--and the quality of the water segment that the wastewater will be discharged into, each effluent limitation is determined. A specific list of toxics from the 129 "priority pollutants" established by the EPA is specified in the federal register for each type of industry. If the industry specific toxics are known to be present, the applicant must provide a complete chemical analysis to establish the exact amounts of discharge. All known pollutants to be emitted must be listed in the application. The engineer from the EPA reviews the proposed discharges set by the applicant to see if they fall within the federal guidelines. A report explaining how the limitations were calculated must accompany the draft permit.[48]

Cross-media effects of pollutants are handled by engineers on a case-by-case basis. There is no formal process for analyzing and controlling cross-media pollution. Cross-media transfers are a function of the nature of the industry and its effluents and processes. These factors are taken into consideration by the engineer writing the permit.

After the permit is drafted, it is open to public comment for thirty days. The EPA is responsible for responding to every comment received. The unit 3 permit initially went through the system uncontested, and a permit was issued in the spring of 1984. Construction of unit 3 began in midyear of 1984. However, shortly after construction began the EPA recalled the unit 3 NPDES permit. After considering a third-party request, the EPA decided that the impact of the entire lignite operation should be considered rather than considering the impact of each component of the operation separately (i.e., the mining operation, the power plant operation, and the transportation operation). The initial status of unit 3 was changed from a minor pollution source to a major source, thus requiring that an EIS be filed. Since the NPDES permit was already issued and construction had already begun, the LCRA was allowed to continue construction. Under this agreement the LCRA is held liable for making any needed changes if they are found to be necessary by the results of the EIS. The EIS was prepared by a private consulting firm under contract with the EPA. The preliminary EIS report has not yet been released. The LCRA reported that there are a few matters to be discussed with the EPA and the consulting firm before the EIS is made public. The LCRA indicated that some inaccurate data appeared in the draft EIS statement. The results of the EIS are expected to be released in the spring of 1985.

7.7.3.2 The State Agency's Point of View

The TDWR has full permitting authority under the TWQA. Originally passed in 1967, the act was amended and recodified by the 65th legislature as title 2, chapter 26, State Water Code. After the permit application is received, it is checked for administrative completeness--that the application statements are notarized as being true and correct; that there is a listing of downstream landowners, usually within two miles; that the $25 filing fee is paid; and that the technical report is completed by the permit control group. If the application is administratively complete, it is forwarded to the director of the Industrial Permits Group, which includes four engineers besides the director. The director assigns the application to an engineer based on his knowledge and expertise in various industries (power plants, wastewater treatment plants, high-technology, refineries).

Based on the information contained within the application submitted by the LCRA, the engineer (who has worked primarily with power plant permits since he joined the agency in 1974) develops a fact sheet and a proposed (or draft) permit. The fact sheet contains the name of the applicant, the reason for permit action, description of the plant type, description of the wastewater system, the outfalls and the discharges they regulate, the water segments affected, a quantitative description of the discharge, the proposed effluent limitations for those pollutants proposed to be limited according to state and federal guidelines, and an explanation of how the effluent limitations and conditions were calculated. The proposed permit limitations are determined by the following statutory provisions: (1) TDWR application no. 40777 dated June 18, 1984, which includes NPDES standard form C application; (2) existing permits--TDWR 02105, effective November 28, 1983, and expiring November 28, 1988; NPDES TX0073121, effective July 19, 1979, and expiring July 15, 1984; (3) EPA guidelines for S>E>S>; November 19, 1982, 40 CFR 423.12 BPT; 423.13 BAT, 423.14 BCT, 423.14 NSPS; (4) TDWR Rules; (5) Texas Surface Water Quality Standards, April 1981.

The proposed permit must, at a minimum, take into account the applicable EPA regulations. In addition, the permit must also take into account Texas Surface Water Quality Standards and TDWR rules. TDWR rules specifically regulate twelve hazardous metals. Some of these metals are included in the industry-specific toxics that must be analyzed according to EPA regulations. For each of these twelve metals there are specific concentrations that cannot be exceeded.

After the fact sheet and proposed permit are prepared, they must pass through a review committee, which sends a copy to the applicant, who is allowed to respond or comment on the proposed limitations. In addition to the applicant, these documents are sent to four divisions within the TDWR for comment: Enforcement and Field Operation, Water Quality and Stream Standards Division, Underground Injection Control, and general counsel (so that the language is determined to be legally enforceable). From each of these divisions, the permit writer receives comments and suggestions that can be adopted and written into the permit. For example, the Field and Enforcement Division evaluates the compliance history of sources whose permits are coming up for renewal or amendment. The Industrial Permit Division has a seventy-day time limit in which to write the draft permit.

Next, the draft permit is submitted to the TWC--the judicial arm of the TDWR. From the fact sheet, the TWC prepares a public notice that sets forth pertinent facts. This public notice is sent to the downstream landowners, significant parties, and must also be published in a local paper by the applicant. It is at this point in the permitting process that the public has an opportunity to comment. There is a thirty-day period for this purpose. If there is legitimate opposition to the permit, a public hearing is scheduled. If the permit is uncontested, the commission sets it on their agenda for action. Usually, if there are no objections, the draft permits are judged technically and legally correct and approved. In the case of contested proposed permits, a public hearing is held, usually in the locality of the permit site. State permit applications for unit 3 have gone through uncontested.

7.7.3.3 Compliance

Compliance procedures consist of a self-reporting system under which the LCRA is responsible for monitoring and reporting with a certain frequency set forth in the permit. Tests are conducted according to specified methods that are explained in guidance books published by the EPA. These test results are submitted to the TDWR and the EPA. Once received by the federal and state agencies, the monitoring data is put into each agency's computer system. On occasion the data for a particular site is checked to make sure the facility is in compliance as defined by EPA statutes. Texas does not have a definition for noncompliance. By federal definition, noncompliance means for any consecutive six-month period, the monthly average for any three months (within that six-month period) cannot exceed 40 percent of the limit on the permit.[49] Field inspections by the TDWR are supposed take place at least once a year. Beginning in 1984, the number of inspectors was doubled from twenty-five to almost fifty which allows at least one on-site inspection per year. In most cases the company is contacted beforehand so that the inspector can have full access to the facility. Results from the field tests are compared with the reports submitted by the permittee. The LCRA has no history of noncompliance.

7.7.3.4 Interagency Communication

The permit-writing engineer reported that during the process of permit writing contact with other environmental agencies is minimal. Contacts are primarily with the Texas Parks and Wildlife Department and the Texas Department of Health. The Texas Parks and Wildlife Department is usually consulted in matters affecting fish, and the Texas Department of Health is consulted on matters involving human health. These agencies receive a copy of the draft permit before it goes to the review committee. The engineer can make modifications to the draft permit based on their comments if necessary. In this case the engineer stated that no contacts were made with either the Solid Wastes Division of the TDWR or with the TACB.

7.7.3.5 LCRA/TDWR and LCRA/EPA Interaction

The LCRA is in the process of applying for an amendment/modification to their current NPDES permits for units 3 and 4. The state permits for both units have already been issued by the TDWR. Construction has begun on unit 3 although the NPDES permit has not been issued by the EPA.

Like any applicant, the LCRA is responsible for knowing water pollution regulations. For water permits, outside consultants are sometimes used by the LCRA. The Black and Veatch Engineering Consultants were used for preparing the unit 3 and 4 permit applications. The Water Quality Division of the LCRA Permits Section is responsible for compiling data for the permit applications and submitting it to the agencies. A common practice at the LCRA is to engage in preapplication negotiations with the permitting agencies. Early negotiation serves the purpose of overcoming misunderstanding and barriers that may develop and cause delays after the actual permitting process is underway.

With regard to water permits, the LCRA has had no real problems with the process or with compliance. They do not feel that the regulations are overly restrictive. Time and experience over the past several years has allowed everyone involved in the process to know exactly what is expected. Permit conditions are very straightforward. Methods of operation, equipment, etc. have been static and have reached a point where not much negotiation is necessary. The LCRA feels it is better to know what to expect so it can plan ahead.

The working relationship with state and federal agencies was described as cooperative. There are few disagreements and in fact, they try to avoid them because good working relations are to everyone's advantage. The LCRA said they are willing to comply with the requirements of the government agencies.

7.8 Critical Issues: Water Permits

7.8.1 The Establishment of Permit Conditions

A chemical analysis of the wastewater discharged from the Fayette plant indicates that over forty chemicals are present. There are over ten thousand different chemicals produced each year by various industrial processes, and the EPA has established effluent standards for only 129 toxic chemicals. The permits for LCRA wastewater only control ten toxic substances and hazardous metals. Furthermore, none of the effluents that are channeled into the ash disposal pond are controlled.

Originally, permit applicants were required to perform a chemical analysis of all wastewater discharged from their site into Texas surface waters to determine if any of the 129 priority pollutants designated by the EPA were present. This process was very complex and cost the applicant about $10,000 for each chemical analysis. The results of these early tests showed that most industries had only trace amounts of the chemical pollutants present. These small amounts were not significant enough to require pollution control devices. Thus, only the effluents that appeared in significant amounts throughout a particular industry were targeted for special examination in the permitting process. The CWA was amended, and currently each industry category covered by the act has its own list of priority pollutants that require a chemical and quantitative analysis.

According to the industry-specific category for electric power plants, there are only sixteen pollutants that require analysis and specific limitations. Any effluents that do not fall within this category but are known to be present, also must be reported. Engineers use their personal discretion in establishing permit conditions for those chemicals that do not have federal limitations within a specific category. The lack of effluent standards and federal guidelines may pose problems in that such limitations can be contested by the permittee on the grounds of being overly discretionary.

7.8.2 Delays due to Administrative Inefficiencies at the Environmental Protection Agency

A second issue regarding the permitting process is administrative efficiency. The Fayette project is financed by revenue bonds. Since revenue cannot be generated until the plant has been completed and is producing electric power, time is of the essence. Any delays or setbacks could cost the LCRA substantial amounts. These costs are in turn passed on to the consumers of LCRA-generated electric power.

There seems to be no problem with administrative effectiveness in the state permitting process. The TDWR usually processes the permits within the prescribed time limits. However, this is not the case for federal permits that have no set time limits on processing. Due to the large number of permit applications and the complexity of the pollution sources, the federal permit processing can be expected to be slower than the state process. The state process was noted as being more efficient. Development of problems at the state level is rarely accompanied by serious delays, even when permits are contested. The LCRA reported a case in which a permit was contested at the federal level, and it took approximately four months before a hearing was held. Eventually the hearing was dropped.

In addressing the issue of possibly giving full NPDES authority to the TDWR, an LCRA representative said that, even if delegation of federal authority to the state resulted in a greater chance for contested permits, the LCRA would rather take that chance and deal directly with the state than to deal with the regional office of the EPA.

7.8.3 The Problem of Solid Wastes

In evaluating the issue of cross-media effects, there are several major topics of concern. The first topic is the disposal of fly ash and sludge waste. These wastes are channeled into a closed-cycle system that leads to the ash disposal pond. The solid wastes are eventually removed from the pond and disposed of in an aboveground landfill. Neither the fly ash nor the sludge waste are controlled at any point in the disposal process since the closed-cycle wastewater system and the on-site solid waste disposal area do not require permits. The critical issue is whether or not these solid wastes are potentially dangerous. The engineer who wrote the draft NPDES permit at the EPA was unsure if the fly ash or sludge waste posed a danger. He did comment, however, that the sludge waste may pose a greater problem because of the presence of selenium. Studies to determine possible hazardous effects of fly ash and bottom ash were to have been completed by the EPA in 1981, but as of 1985 this information is still not known. Information on fly ash is especially important since 90 percent of this waste is sold for building material. Low-volume wastes are also discharged into the closed-cycle system. Little information is available on these wastes.

7.8.4 Public Participation

Most problems in the area of public participation result from an inability to quickly distinguish illegitimate complaints from legitimate ones, an unclear delegation of the responsibility for educating the public, and no clear sense of what role the public should play in the permitting process. On one hand, public pressure has had the effect of making applicants and government agencies more serious in their efforts to follow through with their responsibilities. On the other hand, public intervention has caused needless delays in the permitting process. For instance, the EPA must respond to every comment received from the public. Sometimes the comments and complaints require only an investigation, other times a hearing must be held. The LCRA stated that often the complaints stem from a dispute with a neighbor or result from misinformation or a misunderstanding. With a threat of federal funds being cut, the LCRA is afraid that more of the responsibility for investigation and responding to comments will be shifted to the permit applicant.

7.8.5 Interagency Communication

An examination of the water-permitting process reveals that communication between and within state agencies is rather weak. At the TDWR there is a formal system established for circulating the draft permit to the Enforcement and Field Operations Division, Water Quality and Stream Standards Division, the Underground Injection Control Division and the general counsel for comments. However, few comments are actually received and there is very little contact with other permitting sections such as the Solid Waste Disposal Section. Knowledge of the regulations covering other media is minimal. There is also very little contact with other state or federal agencies. Such contact usually does not occur until a crisis situation develops. For example, there seems to be very little contact with the Texas Parks and Wildlife Department until a fish kill is reported.

7.9 Common Issues: Air and Water Permits

7.9.1 The Limiting Effects of Environmental Legislation

The primary issue to be considered is whether or not the permitting program is performing its primary function--to control pollution sources. The initial response to that question was that the permits do in fact control the emissions that are regulated by statute. However, when taking a closer look at the permit application, it is obvious that there are numerous chemical substances being emitted by the Fayette plant that are not controlled by the permits.

The narrow scope of the federal legislation limits the permit writer's ability to control pollutants. Although permit writers have the authority to write limitations more stringent than federal standards and to limit emissions that may not be in the specific industry category, they are faced with the burden of proving the necessity of such limitations. This necessity must, in turn, be based on established programs, regulations, or scientific data. Setting conditions on the disposal of fly ash or setting more stringent limitations for sulfur or nitric oxides is difficult if the federal agency has not yet accumulated enough information to establish guidelines for a particular pollutant.

7.9.2 Administrative Effectiveness: State versus Federal Level

The technical capabilities of the regulating agencies appears adequate. The engineers in the Permit Division at the TACB appear to be well trained and are kept up to date by their group leaders on any changes in environmental regulations. They also receive technical assistance from the TACB support staff if needed. However, under recent state budget cutbacks this support is becoming a seriously limited resource. Permit writers at the TDWR also are well informed and base their decisions on several documents. The exchange of information between engineers in different divisions and the process of information updating is not formalized or integrated into the TDWR administrative system. The technical abilities of the EPA region VI office seem sufficient.

The administrative processing of air and water permits at the state level appears to be efficient. The LCRA reported that permits were issued within reasonable periods of time. If problems or administrative delays develop, they are usually resolved through negotiations and cooperation between the agency and industry. Although the TACB does not incorporate time limits for processing air permits, this has not been a problem. The LCRA expressed a more favorable relationship with both state agencies because they operate more efficiently and are easier to communicate with than the EPA.

The EPA region VI office is less efficient than the state agencies, but this difference has been attributed to the large number of permit applications and the complexity of the pollution sources. Texas plans to obtain full authority over the PSD and NPDES programs. When this occurs, some administrative bottlenecks will probably be overcome.

7.9.3 Interaction Between the Lower Colorado River Authority and the Regulating Agencies

Generally, the interaction between the LCRA and the permitting agencies is favorable and conducive to open communication. When preparing both the air and water permit applications, there was frequent contact with the regulating agencies at the state and federal levels. Preapplication negotiations are encouraged to avoid the development of problems after the administrative process begins. The LCRA's policy also favors open communication and negotiations with agency personnel if disputes should develop.

7.9.4 Cross-Media Transfers

The major cross-media transfers anticipated for unit 3 of the Fayette power plant are acid rain and the transfer of wastewater to solid waste disposal. The dangers associated with these cross-media transfers are speculative in nature. More information is needed to determine if adequate attention is given to the issue of acid rain and the disposal of fly ash, bottom ash, and scrubber sludge. The LCRA has taken precautions to protect the air, water, and land by using state-of-the-art pollution control devices, requiring an onsite treatment facility for the wastewater, using liners in the solid waste disposal site, and incorporating sophisticated and comprehensive monitoring system.

7.10 Conclusion

In most respects the LCRA case seems to be a model case of how the permitting process should work. The LCRA puts extensive resources into their pollution control efforts, and attempts to meet all federal and state air and water pollution regulations. Moreover, they seem to make this effort willingly--going so far as to put their environmental staff and their production and design engineers to work together on designing power generation projects.

It seems that the LCRA's joint responsibility over energy production and environmental protection combined with their nonprofit quasi-governmental status works to further the goal of efficient energy production with a minimum negative environmental impact.

In other parts of the country, environmentalists and utility companies are at odds. This is partly because the utility's goals of generating a profit clash with the environmentalist's goals. As seen by many utility executives and shareholders, every dollar spent on pollution control is a dollar less of profit. It appears that the LCRA's nonprofit status and awareness of environmental responsibilities motivate the agency to seek acceptable solutions to the cheap energy/clean environment trade-off.

Notes

[1]Lower Colorado River Authority, Annual Report, (Austin, 1984), p. 6.

[2]Ibid., p. 3.

[3]Fayette Power Project Number Three, Application for Prevention of Significant Deterioration Permit, sec. 6, p. 1.

[4]Ibid., sec. 9, p. 1.

[5]Texas Air Control Board Construction Permit #C-9231.

[6]Fayette Power Project Number Three, Application for Prevention of Significant Deterioration Permit, sec. 5, p. 1.

[7]Ibid., sec. 1, p. 1.

[8]Ibid.

[9]Ibid.

[10]Ibid., sec. 2, p. 2.

[11]Ibid., sec. 4, p. 1.

[12]Ibid.

[13]Ibid., sec. 4, p. 3.

[14]Ibid.

[15]Interview with James Crocker, Engineer, Texas Air Control Board, Combustion Section, Permits Division, Austin, Texas, November 20, 1984.

[16]Texas Air Control Board, Preliminary Determination Summary, 1983; and Prevention of Significant Deterioration permit #PSD-TX-486, 1984.

[17]Fayette Power Project Number Three - Application for Prevention of Significant Deterioration Permit, sec. 9, p. 1.

[18]Ibid., p. 3.

[19]Ibid.

[20]Ibid. sec. 8, p. 1.

[21]Ibid., attachment 10.

[22]Ibid.

[23]Texas Air Control Board, "Air Permit," Permit #C9231, issued to the Lower Colorado River Authority.

[24]Texas Air Control Board, "Air Permit," Permit #C9232, issued to the Lower Colorado River Authority.

[25]Texas Air Control Board, "Air Permit," Permit #C9233, issued to the Lower Colorado River Authority.

[26]Texas Air Control Board, "Air Permit," Permit #C9234, issued to the Lower Colorado River Authority.

[27]Lower Colorado River Authority Permit Applications for Fayette Power Plant Number Three.

[28]Interview with James Crocker, November 20, 1984.

[29]Lower Colorado River Authority Permit Application for Fayette Power Plant Number Three.

[30]Due to recent budget cuts, the TACB was forced to discontinue modeling for construction permits. Now applicants for state permits must provide their own modeling.

[31]Interview with James Crocker, November 20, 1984.

[32]Ibid.

[33]Ibid.

[34]Lower Colorado River Authority Construction Permits for Fayette Power Plant Number Three.

[35]Prevention of Significant Deterioration Permit #PSD-TX-486.

[36]Environmental Protection Agency, Region VI Office, Comments on PSD-TX-486.

[37]Interview with James Crocker, November 20, 1984.

[38]Interview with Tom Diggs, Environmental Engineer, Environmental Protection Agency, Air Branch, Region VI Office, Dallas, Texas, February 8, 1985.

[39]Interview with Dennis Haverlah, Engineer, Lower Colorado River Authority, Environmental Resources Division, Austin, Texas, November 21, 1984.

[40]Interview with Virginia Smith, Environmental Quality Specialist, Texas Air Control Board, Effects Evaluation Section, Technical Division, Austin, Texas, March 18, 1985.

[41]Interview with Tom Diggs, February 8, 1985.

[42]Interview with Virginia Smith, March 18, 1985.

[43]Interview with Tom Diggs, February 8, 1985.

[44]See appendix X3 for chemical breakdown of these wastes.

[45]Texas Department of Water Resources, Fact Sheet, comp. Roy Newton, 1984 (internal document).

[46]Interview with H.M. Locker, Chief of Water Permits, Lower Colorado River Authority, Austin, Texas, January 31, 1985.

[47]Ibid., February 28, 1985.

[48]Interview with Bob Hammeschlager, Chief of Water Permit Section, Environmental Protection Agency, Region VI Office, Dallas, Texas, February 8, 1985.

[49]Interview with Roy Moeller, Enforcement Division, Texas Department of Water Resources, Austin, Texas, November 28, 1984.

8. Monsanto Fibers and Intermediates Company, Texas City: Underground Injection Control by the Texas Department of Water Resources

8.1 Underground Injection and Monsanto Fibers

8.1.1 The Underground Injection Process

Underground injection is a waste management technology in which a fluid is forced beneath the surface of the ground by injection down a well. The technology was first used in Texas over seventy years ago in conjunction with sulfur mining. About fifty years ago, the petroleum industry employed the method to increase oil production. In the 1930s, underground injection was widely used to dispose of saltwater that normally accompanies oil and gas production. From this initial use, deep well disposal technology has been adopted by different industries for a variety of purposes. Beginning in the 1950s, deep well disposal of industrial wastes came into use and later was more widely adopted with "the enactment of environmental laws designed to protect surface waters from pollution."[1] Municipalities sometimes use subsurface injection to dispose of effluents from municipal sewage treatment plants; the mining industry utilizes underground injection to assist in recovering substances such as sulfur, uranium, phosphate, sodium sulfate, and brine.[2]

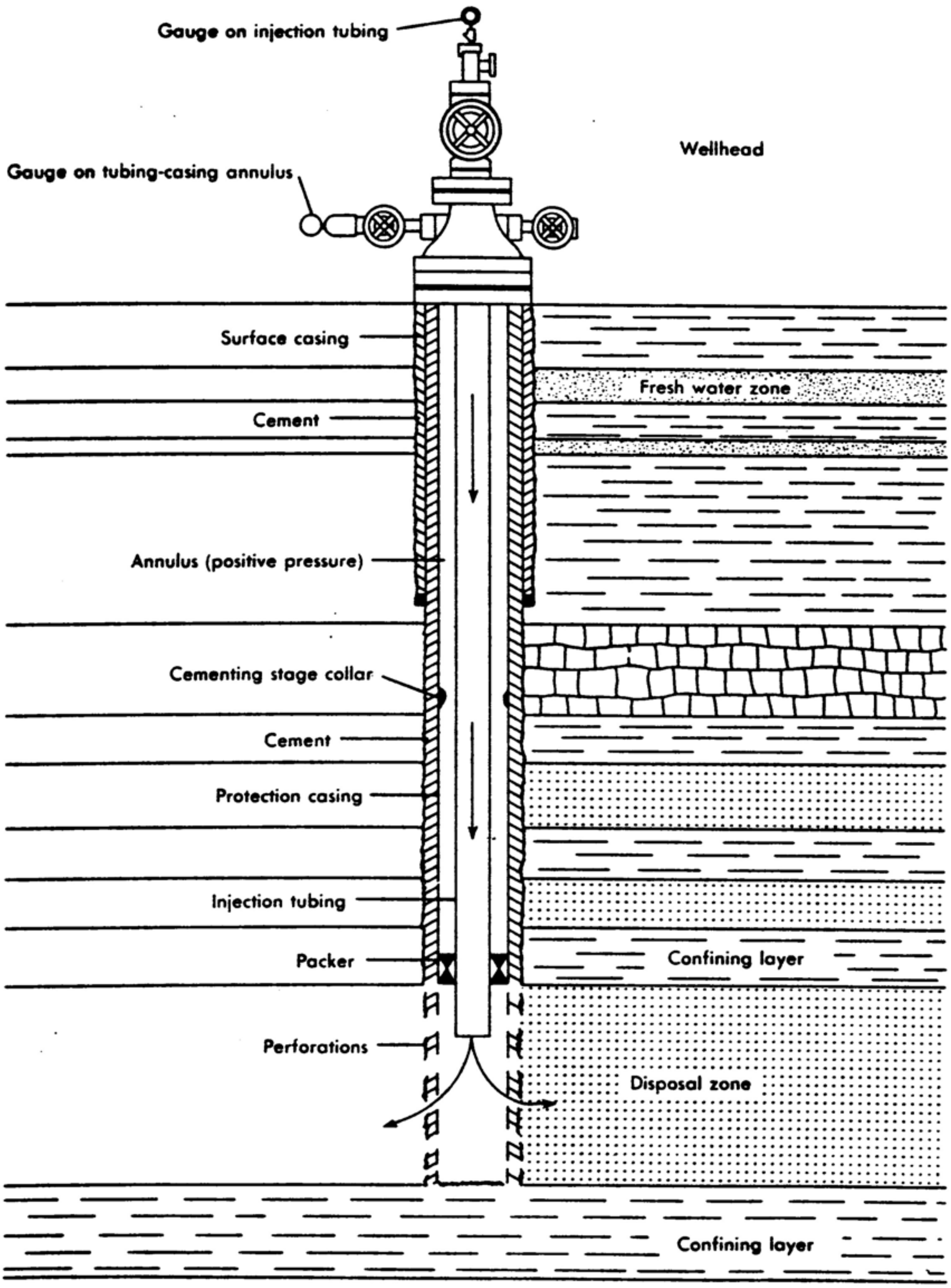
8.1.2 Components of an Injection Well

An injection well has frequently been described as "a well within a well."[3] This description reflects the major components and the stages in construction of an injection well, which provide several layers of protection for groundwater. First, a steel surface casing is installed to the level necessary for the protection of underground sources of drinking water. Cement poured outside the surface casing provides a primary defense of steel and cement for protecting drinking water zones against potential leaks in the injection well (for a cross-section diagram of an injection well, see figure 8-1).

Drilling is continued below the surface casing into the permeable receiving zone where the liquid will be injected. The long-string casing, another protective barrier, is installed from the surface to the receiving zone and again cemented for the entire depth of the casing. The two steel and cement partitions are designed to protect any aquifer in the vicinity of the injection well from groundwater contamination.

An injection tube, through which waste will be injected, is then inserted inside the long-string casing. The well is sealed at the top with a wellhead and also sealed at the bottom. The wellhead is equipped with instrumentation for monitoring the injection operation. In particular, the instruments record the annulus pressure to prevent potential leaks of wastes into groundwater. The annulus, the space between the injection tubing and the well casing, is filled with an inert, noncorrosive fluid and

Figure 8-1: Typical Industrial Waste Disposal Well



maintained at a pressure different from the injection pressure in the tubing. The pressure difference serves as a warning system in the event of waste leakage. With an annulus pressure greater than injection pressure, a decrease in annulus pressure results from any leak in the tubing, packer, or casing. With an annulus pressure less than injection pressure, any leak produces an increase in annulus pressure. In either case, well operators would be alerted to the possibility that a leak had occurred and corrective action should be taken.

8.2 Site Characteristics

8.2.1 Monsanto

Monsanto is the fourth largest chemical company in the United States and develops, manufactures, and markets more than one thousand products including chemicals, plastics, agricultural products, manmade fibers, and electronic materials. Monsanto is headquartered in St. Louis, Missouri, and has annual sales of approximately seven billion dollars. In Texas, there are three sales offices, one laboratory technical center, and four industrial plants. The plant located in Texas City, Texas, is one of 160 Monsanto plants worldwide and is located close to the Gulf of Mexico to take advantage of the supply of petroleum, raw materials, fuel shipping facilities, and climate. The Texas City plant was originally a thirty-acre tract of land built under the auspices of the Defense Plant Corporation and purchased from the federal government by Monsanto in 1946. Today, Monsanto's industrial complex is on 231 acres of land located directly on Galveston Bay on the southeast corner of Texas City.

Adjacent to the Texas City facility are other industrial plants including American Oil Company (AMOCO), Texas City Refining, and Union Carbide. Residential housing surrounds the northeast corner of the Monsanto plant and is close to the complex. The majority of this housing is old and in poor condition and the occupants of these houses are generally of lower socioeconomic status.

8.2.1.1 Monsanto's Texas City Plant

The Texas City plant employs thirteen hundred people, 40 percent in the technical center and 60 percent in operations and support. The products generated are chemical intermediates, which are produced from raw materials such as natural gas, petroleum by-products, air, chlorine, and ammonia. The product line has diversified from styrene in 1942[4] to a variety of other intermediates: methanol, used as an intermediate for making formalin; synthetic lactic acid, used in food preparation and the manufacture of acetate resins; phthalic anhydride, used in the production of alkyde and polyester resins, dye-stuffs, perfumes, and pharmaceuticals; esters used in plastics and fibers for textiles; acetone cyanohydrin, used in the production of plexiglass; and acrylonitrile, used for making manmade fibers such as nylon and acrylic fiber. Styrene is used in plastics, synthetic rubber, and surface coating industries. These chemical intermediates are used for production of Monsanto products such as "Astroturf" and herbicides as well as being sold to other manufacturers as intermediate products. Monsanto's major markets include the agricultural, automotive, plastics, construction, rubber, and textile industries.

8.2.2 Characteristics of Waste Disposal Well Number 91

Waste disposal well number 91 (WDW-91), the focus of this study, is located on the southwest corner of the Monsanto plant adjacent to WDW-196. The Monsanto Company obtained their permit for subsurface disposal of industrial waste composed of "organic and inorganic constituents resulting from the operation of Monsanto's Texas City plant."[5] WDW-91 and WDW-196 are used as back-ups for one another in the case of failure of either well. Consequently, the permit addresses combined and cumulative injection rates and volumes for both wells.[6]

8.2.3 Wastes Generated at the Texas City Plant and the Use of Underground Injection

With any industrial process, wastes are an unfortunate by-product. The Monsanto Texas City plant produces 1.248 billion gallons of waste per year.[7] Seventy-five percent of these wastes are treated by surface treatment methods and disposed of either by pipeline transport to the Gulf Coast Waste Disposal Authority (GCWDA)[8] or direct discharge into the Gulf of Mexico. The remaining 25 percent are disposed of by subsurface injection. All wastewaters deposited in the Gulf of Mexico are nonhazardous wastes generated from activities such as cooling. Those wastes transported by pipeline to the GCWDA are nonhazardous liquid wastes, while wastes injected underground are process hazardous wastes. Solid hazardous wastes are transported by vehicle to GCWDA.

8.2.3.1 Reasons For the Late Use of Underground Injection by the Texas City Plant

One other Monsanto industrial plant in Texas has been using underground injection as a means of waste disposal since 1961. The Texas City plant, however, did not use underground injection until 1977.[9] Several factors explain the late use of this disposal method by Monsanto. First, initial capital expenditures for well construction are substantial. According to Seth Molofsky, TDWR geologist, "today, it would cost approximately one million dollars[10] to drill an underground injection well."[11] In addition, the applicant must demonstrate financial responsibility through bond purchase or its equivalent[12] for well closure.[13]

Second, geologic and hydrologic conditions must meet several criteria. Geologically, the underground formations must possess the natural ability to contain and isolate the injected waste. If this is not possible, groundwater contamination is likely to occur. Injection zones should not contain recoverable mineral resources such as oil or gas, although the best formations are those that previously contained these materials. Formation materials and subsurface water must be chemically analyzed to eliminate the possibility of dangerous reactions with the wastestream. The ideal injection reservoir possesses these characteristics.[14]

Third, underground injection may be neither feasible nor reliable due to the chemical composition of the organic and inorganic compounds being injected. Prior to 1977,[15] Monsanto's Texas City plant used conventional surface treatment facilities exclusively.

Finally, employing underground injection as a substitute for surface disposal would not have been cost-effective. Conventional surface treatment facilities were still reliable, proven, and their availability provided a distinct economic advantage. In 1970, it was determined that because of product-line expansion, the volume and types of chemical wastes would require additional treatment resulting in much higher costs. Consequently, Monsanto submitted an application for a waste disposal well.

8.3 Permit History

8.3.1 The Texas Department of Water Resources and Waste Disposal Well 91

8.3.1.1 Monsanto's Original Permit

On October 21, 1970, the TDWR (at that time, the Texas Water Quality Board), received an application from the Monsanto Company for a waste disposal well permit for its industrial plant in Texas City, Texas. Monsanto anticipated the need for an injection well based on potential wastes generated from the production of a detergent substitute. The existing market for this product, nitrilotriacetic acid (NTA), was profitable enough for Monsanto to begin construction of an NTA production facility. However, three months prior to receiving the permit, Monsanto discontinued construction of the NTA facility for environmental reasons. Because the technical and administrative work was already completed by the Texas Water Quality Board, the original permit was issued on April 2, 1971, for disposal of NTA wastewaters. By this time, Monsanto was in the initial evaluation stages for construction of a new production plant for generation of acrylonitrile (AN).

8.3.1.2 Amendments to the Original Permit

The permit document has since been amended, to allow for the injection of AN wastewaters, and reauthorized to conform with departmental policy. The requirements and information contained in the permit are now more specific in order to meet increasingly stringent state regulations. In essence, the regulations represent a response to the increased use of injection as a disposal alternative.

The permit granted to Monsanto in 1971 contained only three major sections. The first section authorized construction of the injection well and described the exact location where the well was to be drilled. (The well is located in Galveston County and lies within the confines of the Texas City plant.) The second section authorized Monsanto to use the well for the disposal of waste described in the original application and specified the depth of the well. The final section prescribed construction and operational requirements of the injection well.[16]

Even though the permit for well construction and operation was granted in 1971, Monsanto decided against drilling the injection well until 1975.[17] That year, Monsanto applied for an amendment to the permit to allow injection of wastewaters generated from the production of the new product--acrylonitrile (AN). The amendment was approved; it specified that "no significant change in the total wastestream" was to occur.[18] The amendment also changed Monsanto's operational requirements to aid in the detection of well malfunctions. The new requirement recognized that better monitoring of injection wells was needed.

8.3.1.3 Waste Disposal Well 91: State Jurisdiction and Repermitting

On January 6, 1982, the TDWR attained primary governmental responsibility (primacy), which allowed the department to administer the underground injection control program with the EPA providing oversight. This gives the TDWR control over permitting, operating, monitoring, and construction of various class I, III, IV, and V underground injection wells throughout Texas and requires considerable contact with the EPA. Thus, UIC program requirements included a review of WDW-91 and all other injection wells under TDWR jurisdiction. WDW-91 is likely to be repermitted by May 1985, with few major alterations. All injection wells must be reviewed and, if acceptable, repermitted by July 1987.

In 1981, to satisfy the condition that class I injection wells be repermitted every ten years, the TDWR set out to renew WDW-91.[19] This same year, the Texas City plant was granted permission to construct an additional injection well, WDW-196, to act as a substitute when WDW-91 was out of service. The amended version of the WDW-91 permit stipulated more detailed operating parameters and injection rates, as well as reporting, maintenance, and record-keeping requirements. Also, WDW-196 is referenced because the maximum volume of waste injected was cumulative between the two wells[20] (see tables 8-1, 8-2, and 8-3).

Table 8-1: Construction Requirements in Three Permits, 1971-81

	1971 Permit	1977 Amendment	1981 RePermit
Well Location	Texas City, Tx.	Same as 1971	Same as 1971
Depth	5000 to 7500 ft.	Same as 1971	Same as 1971
Borehole Positioning	Eastman Survey	Same as 1971	Same as 1971
Cementing Method: Surface Casing	-NS-	-NS-	Pump and plug
Long String Casing	From setting depths-to ground level	Same as 1971	To 1578 feet Same as 1971
Logs Required: Surface Casing	Well logs	Same as 1971	Spontaneous-Potential and Resistivity Caliper
Long String Casing	Well logs	Same as 1971	Spontaneous-Potential Gamma Ray Caliper Cement Bond
Supervision	-NS-	-NS-	By knowledge-able engineer
Well Testing	-NS-	-NS-	Surface casing to 1000 psi for 30 minutes; Long string casing to 1500 psi for 30 minutes
Injectivity Tests	-NS-	-NS-	To determine well capacity and reservoir characteristics
Record Keeping	Submit drilling, completion, casing, and cementing re-cords and logs be-fore certification	Same as 1971	All logs and descriptive reports sub-mitted

NS=Not Specified

Table 8-2: Operation Requirements in Three Permits, 1971-81

	1971 Permit	1977 Amendment	1981 Re-Permit
Wastes Injected	Refer to report accompanying application	Same as 1971	Acrylonitrile; Hydrogen cyanide; Iminodiacetic; Phenolic process wastewaters
Injection Rates	34,000 bls/day(1)	Same as 1971	53,568,000 gals /month(2) 525,600,000 gals/year(2)
		1200 gpm(3)	Maximum instantaneous-1200 gpm; Maximum annual average-1000gpm(2)
Injection Pressure	Less than 2000 psig	Same as 1971	Less than 1500 psig
Pressure Gauges	-NS-	Injection tubing Tubing long string	Same as 1977
Recording Devices	-NS-	Injection tubing-pressures; Injec-flow rates; Tubing long string pressures	Same as 1977 plus weather-proof facilities for the instruments

Table 8-3: Maintenance, Plugging, and Record Keeping in Three Permits, 1971-81

	1971 Permit	1977 Amendment	1981 Re-permit
Workovers	-NS-	Notify executive director for approval.	Same as 1977 plus: a report of workover filed 30 days after completion; bottom hole pressure taken; supervised by well engineer.
Plugging	Submit plans for plugging and capping.	Same as 1971	Bond needed; cement weight specified; notify executive director 30 days before operations begin and 30 days after completion.
Record Keeping	Injection tubing pressures, injection flow rates, tubing long string casing.	Same as 1971	Same as 1971 plus: monthly total volume of injected fluids & flow rates; surface injection pressure;waste analysis; bottomhole pressure readings; when emergency measures used; retain five years.
Site Requirements	-NS-	-NS-	Sign posted; all-weather road; facilities painted & maintained.

NS=Not Specified

Pre-injection Facilities	-NS-	-NS-	Surface facilities diked; Areas lined; Linings waste compatible; Pond liner leak detection inspected daily when used; Solid & Hazardous wastes referenced for disposal
Reports	Biannual	Same as 1971	Monthly; bottom hole pressure every 3 years

NS=Not Specified
(1)=barrels
(2)=References WDW-91 and WDW-196 combined
(3)=Gallons per minute

SOURCE: Texas Department of Water Resources, Waste Disposal Well 91

8.4 Administrative Processes

8.4.1 The Underground Injection Control Section of the Texas Department of Water Resources: Its Relationship with the Environmental Protection Agency and Monsanto

8.4.1.1 Underground Injection Control Personnel

When the EPA granted the TDWR the authority to issue underground injection well permits approximately 156 class I underground injection permits had been issued in accordance with the state injection well program.[21] Presently, 65 percent of those permits have been reviewed and, where appropriate, repermitted by the Disposal Well Unit of the UIC Section. Originally, the TDWR expected that "during the first five years of the state program, the department could issue up to approximately 450 UIC permits" including all classes of injection wells under its jurisdiction.[22] Currently, 135 industrial waste disposal wells are operating throughout Texas[23] (for a map of general well locations, see table 8-5).

The Disposal Well Unit of the UIC section employs seven geologists and two engineers who are assigned oversight responsibilities for industrial waste disposal wells. Each person in the unit is responsible for permitting, inspecting, and corresponding with every permittee in his jurisdiction. They are also responsible for helping permittees solve any problems they may have with the well. Since 1982, the TDWR has received an average of five new class I applications for permits each year, although this number is declining.[24] Sam B. Pole IV, a geologist, foresees a decrease to as few as "three or four class I well permit applications per year."[25] The reason for this decline can be at least partly attributed to increased regulatory demands such as the submission of additional information, the fulfillment of more technical requirements, and public review.[26]

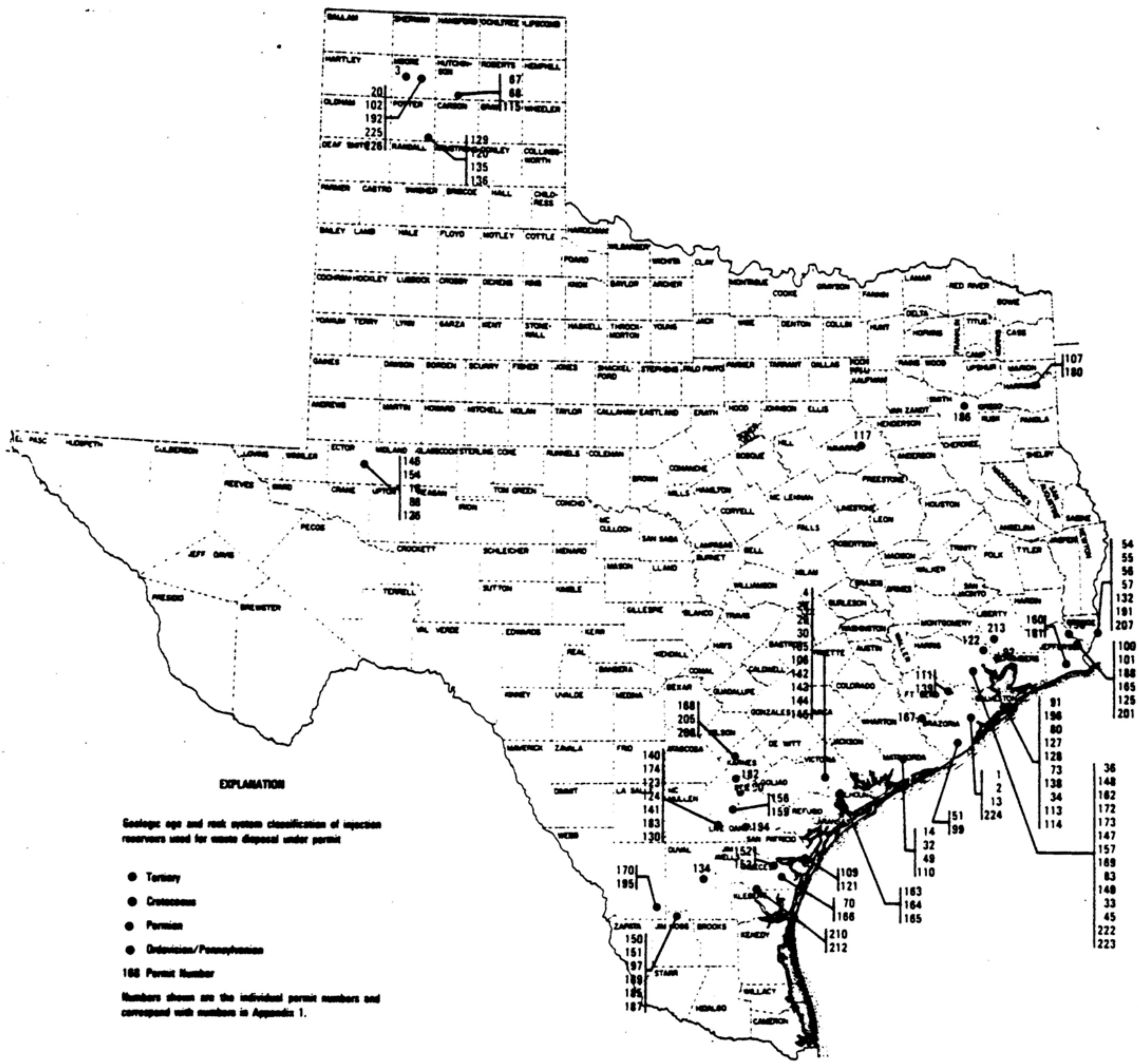
8.4.1.2 Regulatory Authority of the Texas Department of Water Resources

The TDWR has received primary enforcement responsibility in accordance with underground injection control rules promulgated under the SDWA of 1974. In fact, Texas' long tradition and experience with subsurface injection has resulted in more stringent regulation than is found at the federal level. The TDWR, therefore, adheres also to the authority granted under chapter 27 of the Texas Water Code (Injection Well Act of 1981), which provides regulation for all underground injection wells in Texas.[27] The EPA based many of its regulations on the Texas model.

8.4.1.3 Redundancy of Federal Requirements

Many staff members in the UIC Section at the TDWR feel that EPA-promulgated requirements are often redundant. Permitting,

Figure 8-2: Industrial Waste Disposal Wells in Texas, 1983



Industrial Waste Disposal Wells in Texas, 1983

repermitting, monitoring, and enforcement are all conducted independently of the EPA since Texas received primacy. The EPA does, however, conduct biannual file inspections and requires a total of seven reports each year.[28] EPA personnel may also conduct independent site inspections and file reviews on randomly selected wells at any time.

Many of the staffers at TDWR believe that the redundancy hinders departmental efficiency. Mr. Sam Pole IV, UIC geologist, best summed up the general feelings for the EPA's report requirements: "There is a lot of 'bean counting' to justify fund requests at the federal level. The EPA tends to justify funds by the number of enforcement actions reported. But having a lot of actions can indicate that you do not have a very good program."[29] In this sense, the reports are unproductive; a program with more enforcement actions may be a likely candidate for more funds even though such a program may imply inefficiency. In TDWR's case this situation is especially disadvantageous because the agency has permitted more Class I wells than any other state, but has a lower rate of major violations and well failures.

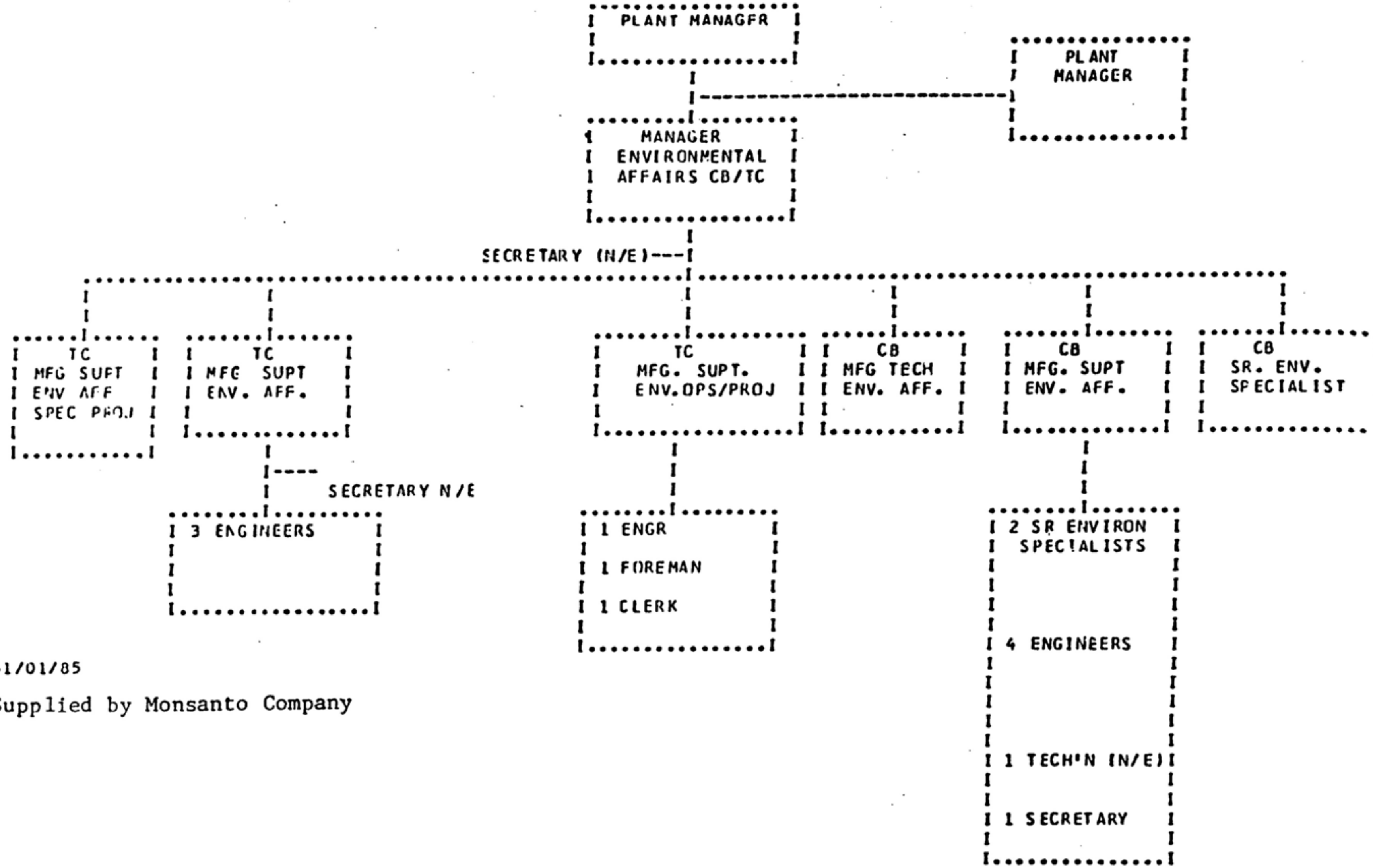
8.4.1.4 The Underground Injection Control Section's Relationship With Monsanto

UIC personnel at the TDWR have a relationship with Monsanto that is representative of their relationships with other similar companies permitted by the agency. Large corporations permitted by the UIC Section of the TDWR tend to have substantial resources and personnel, which enables them to go beyond the scope of established minimum regulatory standards. Small companies, on the other hand, may lack adequate in-house staff and technical expertise to satisfy regulatory requirements and timetables.[30] Monsanto's Environmental Affairs Office is organized to include both the Texas City and Chocolate Bayou plants. Although the main office is at the Texas City plant, this organizational network aids both plants by avoiding duplication of effort and taking advantage of individual strengths at each location (for organizational chart, see figure 8-3).[31]

8.4.1.5 Monsanto Texas City Personnel: Adherence To Regulations

The Texas City plant has been issued twelve operating permits covering the entire environmental spectrum[32] (for listing of permits held by the Texas City Monsanto plant, see tables 8-4 and 8-5). Monsanto realizes that with this many permits, constant contact with state agencies is inevitable. Thus, adherence to regulations is necessary to maintain a sound, working relationship. Monsanto could inject any type of substance into WDW-91 with very little chance that the violation would be discovered. It is to Monsanto's advantage, however, to avoid such an incident for two reasons. First, the penalties for breach of permit are considerable. The permittee can be fined as well as forced to withdraw the waste that was injected. Such actions are too costly to justify the risk. Second, the company seeks public acceptance. Any loss of public faith through bad publicity could severely damage the company's reputation and hurt the company financially.

Figure 8-3: Organizational Chart: Monsanto's Texas City Plant



Supplied by Monsanto Company

Table 8-4: Permits Issued To Monsanto By The Texas Air Control Board

NO.	UNIT	PROJECT	CONSTRUCTION APPLICATION	CONSTRUCTION PERMIT	OPERATION APPLICATION	OPERATION PERMIT
C-757	Ethylbenzene	New Process	3/23/73	Ex 6/6/73	-	-
C-961	Acetic Acid	Tank	5/1/73	6/20/73	3/26/74	7/18/74
C-1047	Acetic Acid	Tank	5/1/73	6/20/73	-	-
C-1272	AN-5	New Unit	7/12/73	1/2/74	5/20/77	3/9/79
C-2910	ACY	New Unit	11/15/74	3/6/75	7/30/76	10/26/76
C-3260	AN-5	NH_3 Tank	3/24/75	6/2/75	5/23/77	6/20/77
C-5260	Utilities/AN-5	Boiler Fuel Conversion	4/15/77	9/9/77	4/9/81	4/2/82
C-5260A	Utilities/AN-5	No. 6 Fuel Oil Tanks	4/15/77	Ex 8/5/77	-	-
C-5364	Distribution	Phenol Tank	5/23/77	7/5/77	7/30/80	10/17/80
C-6795	Methanol	Syn Gas/H_2SO_4 Manufacturing	7/27/78	12/27/78	-	-
C-7703	Oxo Alcohol	Fractionation	6/14/79	Ex 8/15/79	-	-
C-8270	IDA-II	New Unit	3/10/80	8/18/80	10/15/82	3/15/83
C-8571	Oxo Alcohol II	New Unit	10/1/80	2/23/81	-	-
C-8600	Phthalate Esters II	New Unit	10/20/80	Ex 2/23/81	-	-
X-1901	Oxo Alcohol	LEOB/LEOH Tanks	7/30/80	Ex 8/15/80	-	-
X-4413	TBA	TBA Tanks	4/13/83	Ex 7/1/83	-	-

Ex = exemption.

1/85
Supplied by Monsanto Company

Table 8-5: Permits Issued To Monsanto By The Texas Department of Water Resources

WASTEWATER PERMITS

1. NPDES Permit No. TX 0005762
   TDWR Permit No. TX 00575

   Non-process wastewater effluent permits covering four outfalls.

2. TDWR Permits WDW 91 and WDW 196

   These permits authorize the deep well injection disposal of process wastewaters.

3. Process wastewaters are also transported to Gulf Coast Waste Disposal Authority (GCWDA) 40 Acres Facility where they are treated and subsequently discharged with other treated wastewaters through a permitted outfall also regulated by NPDES and State permits issued to GCWDA.

SOLID AND HAZARDOUS WASTE PERMITS

1. Texas Industrial Solid Waste Registration No. 30285

   This registration covers the plant's on-site hazardous and non-hazardous waste treatment, storage, and disposal facilities.

Dynamic corporations like Monsanto undergo periodic changes in plant conditions, production levels, and processes. Subsequently, the TDWR must be notified of changes ranging from those requiring requests for amendments to the operating permit to more minor changes such as well workovers and simple maintenance to the wellhead. Amendments require submission of technical reports outlining the impact of the requested change. Simple maintenance report requirements are not as extensive. For workovers, requests, plans, details of the work performed, and status reports are required. In any event, after minimum requirements have been met, provision of further detail and research are up to the corporation's discretion. Seth Molofsky, TDWR geologist, describes a good relationship between the UIC section of the TDWR and Monsanto: "They have always complied with every request we have had of them. When any modeling or well workover had to be completed, Monsanto always goes to the extreme and does the best job they possibly can."[33]

8.4.2 Monsanto's Relationship with the Underground Injection Control Section of the Texas Department of Water Resources and the Environmental Protection Agency

8.4.2.1 Permittee/State Agency Interaction

Monsanto has consistently maintained close contact with those state agencies charged with environmental protection. Monsanto makes frequent contact with almost every division within the TDWR. Because the Texas City plant has two injection wells permitted at that site, contact between the UIC Section of the TDWR and the Environmental Affairs Section at Monsanto is frequent. Contact may be either formal and recorded or informal and normally undocumented. The formal contact consists of state-required documentation and reports including periodic operating reports from the self-reporting system;[34] technical reports; and correspondence concerning noncompliance, proposed maintenance, and workovers. The informal contact is almost wholly restricted to telephone conversations, which may include requests for responses to simple and easily answered problems. When combined, these two forms of communication provide a foundation on which a cooperative working relationship has developed.

8.4.2.2 Monsanto's Evaluation of the Underground Injection Control Program

Ralph Marquez, superintendent of environmental affairs at Monsanto's Chocolate Bayou plant, describes the relationship as oriented toward problem solving. About the UIC personnel at the TDWR, he says, "they have always taken the approach of getting the problem solved rather than taking an adversarial position. They are not legalistic. They want to get to the bottom of the problem and get it solved quickly."[35]

Monsanto personnel believe in the three-tiered approach taken by the TDWR in resolving compliance problems. First, the TDWR attempts to find the proper solution to the problem. When minor violations occur, a geologist may simply telephone the company to inquire about the breach of compliance. If the problem is not resolved, the geologist consults his supervisor concerning appropriate action. UIC responses may range from written directives for compliance to formalizing a compliance agreement including work to be accomplished and a time schedule. Finally, and only as a last resort, legal action may be taken by the attorney general's office.

This three-tiered approach is employed in any instance where noncompliance occurs. The company avoids paying penalties for noncompliance if the problem is solved, and the public avoids the costs of litigation and pollution. Monsanto believes this technique is comprehensive, applicable to both large and small situations, and useful with any size company, including those permittees comprising the "five or ten percent" who consistently require the TDWR's attention.[36]

8.4.2.3 Monsanto's Evaluation of the Environmental Protection Agency

Monsanto personnel believe the EPA and the TDWR use different techniques to resolve enforcement, noncompliance, and other problems with permittees. The EPA tends to be one-dimensional and inflexible by emphasizing only an administrative approach and by adhering strictly to established guidelines. In comparison, the TDWR uses a more personal and flexible approach, taking into account circumstances peculiar to the situation. The EPA's actions when reviewing underground injection well permit applications provide a good example.

In certain instances, after receiving an application, the EPA may take an inordinate amount of time before reviewing a permit application and then on short notice require the applicant to submit more information. This requirement of information on short notice takes place regardless of any deadlines, although the information must be submitted before further processing can take place. Further discussion and resolution of the problem may not occur until an administrative hearing is scheduled and held. William G. Cooper, technology consultant for Monsanto, compared the TDWR's application review procedures with the EPA's: "The TDWR is more one-on-one and tries to find answers to questions and solutions to problems by meeting face-to-face."[37] The TDWR's emphasis on personal contact rather than on paperwork and administrative procedures provides a basis for better relations and a preferable working atmosphere.

8.5 Critical Issues

8.5.1 Underground Injection Poses Unique Problems

The issues that surround underground injection are unique in scope and content. Critical issues important to other methods of treatment and disposal may simply not apply to underground injection. Unlike surface pollution technologies, underground injection attempts to isolate organic and hazardous wastes from the dynamic interactions of the environment. The other pollution technologies strive to reduce pollution from a particular medium as well as to consider the potential detrimental effects resulting from interaction with other media. Documentation concerning cross-media problems with underground injection is limited and such problems may not appear for many years.

8.5.1.1 The Cross-Media Issue

Present and future cross-media concerns associated with underground injection will be the central theme in this analysis. This theme will be developed by the incorporation of three issues that are critical components of underground injection as a pollution control technique. The issues are the amount of waste injected into WDW-91 and WDW-196 at the Monsanto Texas City plant, problems of compliance relating to Monsanto and other permittees, and the use of permits as an administrative technique to control pollution. The use of permits will be viewed through several perspectives, including the views of Monsanto and the TDWR and the role of public involvement in the permitting process.

8.5.2 Safe Waste Disposal

8.5.2.1 Use of Underground Injection vs. Other Methods of Control

As mentioned previously, Monsanto's Texas City plant produces approximately 1.25 billion gallons of liquid waste per year.[38] Seventy-five percent of this waste is disposed of by surface water treatment. Incineration and landfill disposal methods are used less than 0.5 percent of the time. The remaining 25 percent is disposed of by underground injection.[39] Thus approximately 312.5 million gallons of processed wastewaters are injected into WDW-91 and WDW-196 annually. The injected wastestream consists of iminodiacetic process wastewaters, acrylonitrile process wastewaters, hydrogen cyanide complex wastewaters, and phenolic wastewaters. The average annual amount of these wastewaters injected is well under the permitted annual injection limit of 525.6 million gallons.[40] Comparatively, there are 111 other injection wells in Texas that are permitted to inject anywhere from 5.184 to 788.4 million gallons of waste per year.[41]

8.5.2.2 Advantages of Using Underground Injection: Costs and Location

Certain factors indicate why underground injection may be more desirable than surface disposal for current and future use. First, in a highly industrialized area such as Texas City, land is required to treat, store, and dispose of wastes generated by each facility. Certain types of treatment and disposal methods require more land than is available, such as settlement ponds for wastewater treatment and landfills for solid waste. Conversely, injection wells and their associated pretreatment facilities can be constructed and confined to a small surface area. The wastes that are produced and disposed of are never seen after they are treated.

Second, geologic formations near the Gulf Coast, where a major portion of the injection wells in Texas are located, are particularly receptive to injected wastes. The region produces a "significant share of the world's oil and gas from deep sedimentary basins."[42] Bill Klemt, geologist, states that "these Texas basins . . . exhibit low structural deformation and are therefore favorable not only for the production of hydrocarbons, but also for subsurface disposal."[43] The use of such geologic reservoirs contributes to environmental safety.

Third, and perhaps most important in today's economy, are the direct costs associated with waste treatment and disposal. As landfills and other types of surface treatment and disposal become more expensive, injection may be seen as a means to dispose of more wastes than those that are just "untreatable" on the surface. Startup costs for underground injection may be higher than other treatment and disposal methods,[44] but long-run costs may be lower. Well workovers and maintenance can be minimized by the installation of pretreatment facilities. Lower long-run costs may entice companies that produce large quantities of waste to consider injection before other methods.

8.5.2.3 Lack of Data and Its Importance in Underground Injection Control

Several factors make underground injection an attractive alternative for disposal of liquid wastes. Approval of injection well technology for disposal of wastes that may or may not be reasonably treatable by surface means is dependent ultimately upon well location and need as determined by the UIC Section of the TDWR. Current literature suggests that injected wastes may have unknown effects on formations and groundwater. These sources indicate that indiscriminate and random permitting may be ill-advised: "(E)xperience shows . . . that injected wastes may react adversely with the well materials, the injection zone, and the continuing formations to cause corrosion, plugging, unwanted waste migration, and violent reactions."[45]

The same sources, however, fail to account for the "subsurface mechanisms that decay, retard, and prevent movement of injected wastes."[46] The geologists and engineers at the TDWR point to the lack of a technical basis for such statements; they are often made by researchers incapable of making objective scientific judgments due to lack of proper training.[47] The apparent contradiction on the availability of information reaffirms that the decision to permit should not depend solely on cost-effectiveness but on whether present and future geologic and hydrologic integrity can be maintained.

8.5.3 Compliance

8.5.3.1 Definition of Compliance

Possible dangers from underground injection correlate directly with the standards used to interpret noncompliance used by the UIC Section of the TDWR. The UIC Section of the TDWR uses a literal definition by regarding any discharge in excess of the permitted amount as a violation. This definition insures that the permitted companies maintain well and waste disposal integrity as outlined by the criteria contained in the permit and rules and regulations of the department. This definition also insures that, even with the self-reporting method used by the UIC Section of the TDWR, minor incidents are observed and acted upon.

8.5.3.2 Problems with Other Definitions of Compliance

Other definitions of noncompliance may not be as compatible with this reporting system. If the definition of noncompliance were more lenient, contamination of the area adjacent to the waste disposal well area could certainly be commonplace. The current definition allows for action to be taken by the UIC Section any time there is a minor or major compliance violation. Violations can range from the company discharging over the permitted limit to injecting wastes at an unsuitable pressure. The yardstick used for the degree of action taken in response to instances of compliance violations is the threat to the public and the environment. The severity of the violation may jeopardize the company's standing with the TDWR, especially when the incident is not reported. To our knowledge, this is not the case with Monsanto's Texas City plant.

8.5.3.3 Monsanto's Compliance History

Since being permitted, Monsanto has had very few instances of noncompliance. A review of correspondence between Monsanto and the TDWR suggests that the instances that were reported and acted upon have been minor in nature and have been resolved without major difficulties.[48] This is an indication that Monsanto takes subsurface injection very seriously and does not want to jeopardize the availability of injection as a means of disposal. Other companies may not be as conscientious as Monsanto, thus not only threatening the use of the self-reporting system, but also underground injection as a disposal method.

8.5.4 Permits as a Technique for Monitoring and Pollution Control

Monsanto's overall view concerning permits is that they are necessary for the standardization of requirements for underground injection well owners. Each applicant must be given equal consideration before and after a permit is granted. (Monsanto also believes that permits promote familiarity with the details of underground injection and increase organizational stability of the UIC Section and the TDWR as a whole.) Ralph Marquez commented on the demands placed on company personnel and resources by permits conditions: "Permit requirements are very demanding; we do not complain about them. We also make it a point to see that other companies do things right because we will all pay if something is done wrong."[49] Monsanto personnel, therefore, agree with the usefulness of permits, as a method of pollution control.

Regarding alternatives to permits as an administrative tool for pollution control, Monsanto believes that there are few substitutes available at the present time. Two possible alternatives suggested by C.M. Hancock, environmental affairs superintendent of Monsanto, would be to employ a system of external or internal audits or a self-policing system of pollution control in addition to permits.

> Self-policing used with permits could work for a majority of the companies required to have permits. It's the minority that need to be permitted and monitored. If an internal type of auditing is used, the company should probably be audited externally as well.[50]

Such administrative tools may inadvertently disregard cross-media concerns just as permits currently do. Inexperience with alternatives to permits and no precedence leaves little room for their acceptability.

8.5.4.1 Maximizing Permit Effectiveness

Substantial criticism has been directed at permits as being licenses to pollute.[51] This criticism is derived from the contents of the permit, which in most cases simply places limits on how much pollution a company can emit. The TDWR believes that if specific limits and enforceable provisions are placed in permits they become effective tools for pollution control. This is due to the removal of technical ambiguity, which facilitates monitoring and enforcement. Geologist Seth Molofsky says, "it is very important to have a specific permit with enforceable provisions. For example, a phrase such as 'significant leaks' is open to controversy; whereas stating that a pH level of 4.9 is required leaves no room for discussion."[52]

Concerning other administrative techniques to control pollution, there seems to be an absence of tested and reliable alternatives. Molofsky commented on the use of possible alternatives such as self-policing or auditing as suggested by Monsanto: "Those two or three methods are more in favor of industry and I do not believe they would be as effective if actually substituted for permits."[53]

8.5.4.2 Cross-Media References in Waste Disposal Well 91

Permits have also been criticized recently for not addressing cross-media concerns.[54] However, recent UIC permits have referenced other methods of disposal and closely associated waste production processes.[55] This implies a greater awareness of other environmental permits held by the same company and waste that cannot be dealt with by underground injection. WDW-91 addresses several cross-media concerns throughout the permit. For instance, in the pre-injection facilities section the following references are made.

1. Dikes will be constructed around surface facilities to totally contain spillage and in such a manner that a minimum amount of rainfall is retained for disposal by injection;

2. All pre-injection facilities including all surface impoundments and tanks that store and treat hazardous wastes are considered to be hazardous waste facilities, and the permittee must conform to all applicable requirements related to hazardous industrial solid waste storage, processing, and disposal;

3. Emergency storage facilities that are ponds shall be lined with a material compatible with the wastewater and of adequate design strength. Also leak detection systems must be installed; and

4. All solid waste arising from the pretreatment facilities shall be disposed of in accordance with the department rules for solid waste management.

8.5.4.3 Sufficiency of Cross-Media References for Environmental Protection

Our analysis suggests that the usefulness of permits cannot be measured simply by the inclusion or exclusion of cross-media references. The viability of underground injection as a disposal method may be diminished if too many permits are granted. Subsurface injection should be used sparingly for those wastes that are otherwise untreatable on the surface. Realistic goals must be developed to address difficult problems such as these. A viable short-range goal is to reduce the number of permits issued and total volume of wastes injected. A long-range goal should be to reduce waste volumes and continue developing new and effective means of disposal.

8.5.5 Public Participation in the Permitting Process

Public participation is an integral part of processing underground injection well applications and of their subsequent approval or denial. The degree of involvement is affected by knowledge about underground injection technology as well as the availability of information about well proposals. The UIC rules issued by the TDWR guarantee that the latter information will be provided. In this respect, ample opportunity for public participation in the permitting process is provided.

When an application for a UIC permit, permit amendment, or permit renewal is filed, the TDWR requires that the applicant publish a notice in a newspaper in the county of the proposed injection well. The TWC will mail notice of the application to affected persons as well as to certain government agencies. Thus, these measures provide affected parties the opportunity to respond to the permit application simply by requesting a public hearing. The hearing, however, must be requested "within thirty (30) days following publication of the Commission's notice."[56] In theory, the opportunity for vital public debate is provided. However, in practice there may be a breakdown in public involvement in the permitting process.

8.5.5.1 Explanations For The Breakdown in Public Involvement

When Monsanto's WDW-91 was renewed in 1981, the company was required to go through the public notice process. No hearing, however, was requested. The lack of citizen interest may be due to the heavy industrialization in the Texas City area. Even before Monsanto had originally applied for an underground injection well permit, three other companies already had operational injection wells.[57] Most citizens in the area are not too concerned when an industrial facility applies for a permit because they have "grown to live with it."[58] The following are possible explanations for the breakdown of public involvement in this case. First, underground injection employs technology beyond the understanding of the average citizen. Only a relatively small number of engineers and geologists are well acquainted with the mechanical, geological, and hydrological concepts associated with this waste management technology. Although people may be aware of potential dangers associated with underground injection, most do not have the technical expertise or, at the very least, knowledge of technical issues to have an effective voice in the permitting process. Clearly there is a difference between realizing that an application for an underground injection well has been filed and understanding any potential effects such actions may have. Without technical expertise and knowledge of opportunities for public involvement, the average citizen may encounter difficulty in challenging the permitting of an underground injection well. When this happens, vital interaction between the permitting agency and the public may be virtually nonexistent.

Second, lack of interest may be attributed to the public's "faith in underground injection technology."[59] This may be particularly true for heavily industrialized areas where underground technology has been employed safely for several decades. For example, people along the Texas Gulf Coast have long been associated with the oil and gas industry. According to Bill Klemt, TDWR geologist, these people are convinced of the safety of underground injection due to favorable experience in well technology and because the Texas Gulf Coast exhibits sound geologic conditions. Thus, the lack of any serious mishaps preserves public faith in the integrity of both injection well technology and the regulatory mechanisms responsible for their supervision.

8.5.5.2 People Directly and Indirectly Affected by Underground Injection Permitting

The problem of limited public involvement should be emphasized when considering the number of people affected by UIC permitting decisions. Because groundwater supplies about 60 percent of the water used by Texans for domestic, industrial, and agricultural purposes, and 45 percent of their drinking water, potential contamination from an injection well could

Table 8-6: Public Participation in UIW Permitting

Name of Well	Public Participation and Results
**CECOS WDW-146	Active but no opposition. Increased site safety measures; rule change to require blowout preventors during workovers.
**Chemical Waste Management, Inc., WDW-70	Active with mild local interest and opposition. Enforcement action to clean up surface areas; withdrawal of application for second well.
*Chemical Waste Management, Inc., WDW-160	Active; required public hearing held in Beaumont January 2, 1985. Density and pH restrictions specified and to be reported; stringent surface facilities review and regulation.
**Disposal Systems, Inc. WDW-169	No public interest expressed.
**Empak, Inc. WDW-157	No public interest expressed.
**Gibraltar Wastewaters, Inc. WDW-186	Public participation was intense and thorough. Exposed construction and operational violations (mostly with surface facilities). Increased reporting and monitoring. Delayed issuance of permits for existing and new well.
**Malone Service Company WDW-73,138	No public interest expressed.
**Merichem Company WDW-147	No public interest expressed.
*Wastewater, Inc. WDW-167 and 193 (proposed)	Public participation and opposition was intense, thorough, and continues to date. WDW-167 was

* - Rural Setting
** - Industrial Setting
*** - Residential Setting

Name	Public Participation and Results
	drilled but never placed in service. Proposed WDW-193 required resubmittal to comply with new UIC regulations and update data. No resolution date in sight.
**BFI WDW-171	Public participation and opposition was intense, thorough, and continues to date. Well was eventually authorized by the Texas Water Commission, but has not been drilled. There is no indication as of April 1985 that WDW-171 will drilled.
*Rereate, Inc. WDW-202 (proposed)	Public and elected officials showed strong interest. Never got out of Permits Division. Application returned for lack of action.
**Lone Star Waste Disposal WDW-203, 204 (proposed)	Public participation and opposition was intense and thorough. Has delayed decision on these applications for over two years.
*Hydro Injection, Inc. WDW-209 (proposed)	Public and elected official interest was intense. Resulted in no action by applicant to proceed with public hearing. Application returned.
*MSH, Inc. WDW-216, 217, and 218 (proposed)	Public opposition mild. Together with internal problems resulted in failure of the project. Applications returned.

* - Rural Setting
** - Industrial Setting
*** - Residential Setting

Name	Public Participation and Results
*Envirosafe Services of Texas, WDW-228 (proposed)	Public participation and opposition is strong. Has delayed permit processing for two years. Anticipate extended public hearings.
*Uranium Resources, Inc. WDW-236 (proposed)	Public opposition very strong. Points raised resulted in TWC denying Class III permit. This likewise put WDW-236 on hold.
***Crystal Chemical Company WDW-179 not commercial	Longest public hearing for any injection well. Permit draft denied by TWC.

* - Rural Setting
** - Industrial Setting
*** - Residential Setting

SOURCE: UIC Section of TDWR

Thus, all of the design, operational, and reservoir problems related to the wastewater should be anticipated during the permitting process in order to develop wastewater controls.

8.5.6.3 Involuntary Cross-Media Transfers at Monsanto

Cross-media transfer may also occur during the stages when the wastes are transferred to the injection well. This may happen at the area of pretreatment, at the wellhead, or in the pipe transporting the waste. Leaks taking place at locations such as these "do occur, but are quickly repaired."[67] Other areas of concern include the transferring of solids after pretreatment to storage bins and ultimately to the GCWDA. Also, other wastes not associated with the pretreatment process prior to injection are transported via pipeline to GCWDA. These concerns, however, do not directly apply to Monsanto. The company pretreats their wastes at a surface facility prior to injection. Because the pretreatment facility is a closed system, the possibility of involuntary cross-media transfers is minimized. The hazardous wastes are then directly injected into the well.

8.6 Conclusions

8.6.1 The Texas Department of Water Resources, Underground Injection Control Section

8.6.1.1 Workload

Underground injection as a disposal technique has raised ideas and issues not pertinent to other disposal methods. Specifically, disposing of wastes into a medium where little is known about immediate or future contamination raises questions concerning the use of permits to allow underground injection as well as underground injection as a pollution disposal technique. Currently, the TDWR has issued 135 permits for underground injection. The UIC Section employs seven geologists and two engineers to monitor compliance by the permittees and to review new permit applications. The rate of approval for new permits is approximately three per year. Each geologist, therefore, is responsible for working with anywhere from 11 to 27 permittees.[68]

Although the individual workload appears reasonable, the underlying issue concerns total wastes injected underground. With this many injection wells operating throughout Texas, billions of gallons of wastes are annually pumped beneath the earth's surface.[69] If more wells are permitted in the near future, the potential for construction and monitoring problems becomes greater. Also, an increase in number of wells may have an effect on the self-reporting system by not allowing geologists to scrutinize reports as thoroughly as before.

8.6.2 Monsanto Company

8.6.2.1 Monsanto's Ability to Comply with Regulatory Requirements

Large companies such as Monsanto are able to efficiently and effectively employ underground injection as a disposal technique because of the availability of company resources. Another factor in Monsanto's involvement with waste disposal wells is that this site produces large volumes of liquid wastes. Many smaller companies simply do not produce the volume of wastes that justify consideration of injection well use. Monsanto also has the financial and technical capability and willingness to meet mandated requirements outlined by the UIC section of the TDWR. As a result, there have been few instances of noncompliance and those have been minor.

It is important to remind the reader that the Monsanto case is not necessarily representative of the entire permitted community. The analysis here applies specifically to Monsanto and may not reflect all industries under UIC jurisdiction in Texas. Consequently, case study conclusions may not necessarily apply to other permitted companies. However, some inferences can be applied to the use of permits and the inclusion of cross-media references.

8.6.3 Pollution Control and Cross-Media Implications

8.6.3.1 Alternatives to Permitting

Suggestions for alternatives to permitting have included internal and external auditing, and self-policing. Such alternatives, however, have obvious limitations, such as no legal standing. They are untested and potentially may produce further complications and problems than currently exist with permits. If used alone, these alternatives would naturally favor industry, primarily because there would be little if any accountability. There would be no loss of accountability if these methods were used in conjunction with permits. In fact, present methods of enforcement actually resemble external auditing. However, their use and outcomes are questionable due to the lack of precedents. Permits, as they are presently used, provide for accountability by aiding the permitter to keep track of critical events such as incidents of noncompliance and limitations on permittees such as injection rates. Permit provisions must be specific and enforceable, however, so that the issue of compliance or noncompliance is easily determined and not subject to controversy.

8.6.3.2 Avoiding Involuntary Cross-Media Transfers

Underground injection permits often reference other methods of disposal and waste production processes. This is not an anomaly, but an attempt to increase the scope of the permit. The lack of current documentation regarding contamination emphasizes the need for inclusion of processes suspect at this point. If more references concerning waste processes and treatment are included in the permit, increased understanding of the interactions of underground injection, surface treatment and disposal, and cross-media transfers should result. This will not only aid permitters in their efforts to monitor the activities of permittees, but also allow for more public scrutiny and foresight into potential cross-media problems.

Notes

[1]Texas Environmental Coalition, More Than a Hole in the Ground: A Primer on Injection Wells, n.d.

[2]Interview with Bill Klemt, Chief, Underground Injection Control Section, Texas Department of Water Resources, Austin, Texas, April 26, 1985. See also Texas Environmental Coalition, More Than a Hole in the Ground.

[3]Chemical Manufacturers Association, Deep Well Disposal: An Option for Responsible Management of Chemical Wastes 1984, p. 8. (Pamphlet).

[4]Telephone interview with C.M. Hancock, Environmental Affairs Superintendent, Monsanto Fibers and Intermediates, Austin, Texas, February 26, 1985.

[5]Letter from Jerry W. Mullican, Subsurface Disposal Section, Texas Water Quality Board, to James S. Showen, Acting Director for Hearings and Enforcement, November 16, 1970.

[6]Texas Water Commission, Permit to Conduct Underground Injection Under Provisions of Chapter 27, Texas Water Code (Austin, Texas, May 18, 1981).

[7]Texas Department of Water Resources, "Injection Well Report of Operation," Semiannual Operating Report (Austin, Texas, January 26, 1982).

[8]The Gulf Coast Waste Disposal Authority treats and disposes of hazardous materials produced by the industrial facilities in the Texas City area.

[9]Telephone interview with C.M. Hancock, February 26, 1985.

[10]This amount will vary depending upon factors such as well depth and materials used in construction.

[11]Telephone interview with Seth Molofsky, Geologist, Texas Department of Water Resources, Underground Injection Section, Austin, Texas, January 10, 1985.

[12]A financial test or corporate guarantee approved by the Texas Department of Water Resources can be used.

[13]WDW-91 and WDW-196 would cost $93,000.00 each to plug as of January 17, 1983. For examples of well closure costs see W. R. McCurley, "Demonstration of financial assurance for closure of UIC facilities, Monsanto, Co., Chocolate Bayou and Texas City plants" (Austin, Texas: Texas Railroad Commission, Oil and Gas Division, January 17, 1983); or Rhonda MacKinnon, "Plugging Bond Rationale, Velsicol Chemical Corporation," Permit No. WDW-155 (Austin, Texas: Texas Department of Water Resources, December 6, 1982.

[14]A list of ideal characteristics includes (1) sufficient thickness with adequate porosity and permeability; (2) large areal extent; (3) adequate confining intervals; (4) simple structural geologic conditions (free of complex faulting and folding); (5) adequately separated from usable groundwater; (6) formation fluids and minerals in the injection intervals of no apparent value; and (7) formation fluids compatible with the waste to be injected. See William B. Klemt, Deep Well Injection of Industrial Hazardous Waste in Texas (Austin, Texas: Texas Department of Water Resources, October 22, 1984), p. 3.

[15]Telephone interview with C.M. Hancock, February 26, 1985.

[16]Texas Water Quality Board, "Waste Control Order for Subsurface Disposal of Industrial Waste No. WDW-91" (Austin, Texas, April 2, 1971).

[17]Telephone interview with C.M. Hancock, February 26, 1985.

[18]Texas Water Quality Board, "An Order Amending Subsurface Waste Disposal Permit WDW-91 Monsanto Company" (Austin, Texas, June 3, 1977).

[19]Consolidated Permits, Texas Administrative Code, Title 31, Section 341.315 (Shepard's Oct. 9, 1982) (Conditions To Be Determined for Individual Permits).

[20]Texas Water Commission, "Permit to Conduct Underground Injection Under Provisions of Chapter 27, Texas Water Code" (Austin, Texas, May 18, 1981).

[21]Texas Department of Water Resources, "Waste Disposal Well Assignment List" (Austin, Texas, October 12, 1983). (Internal document).

[22]Texas Department of Water Resources, Underground Injection Control Technical Assistance Manual: Subsurface Disposal and Solution Mining, comp. Charles J. Greene (Austin, April 1983), Report 274, p. 53.

[23]Interview with Sam B. Pole IV, Geologist, Texas Department of Water Resources, Underground Injection Control Section, Austin, Texas, May 3, 1985.

[24]This number excludes applications for permit amendments. In 1984, close to ten permit applications for industrial waste disposal wells were received by the Underground Injection Control Section of the Texas Department of Water Resources.

[25]Interview with Sam B. Pole IV and Seth Molofsky, November 28, 1984.

[26]Telephone interview with Seth Molofsky, February 22, 1985.

[27]The Injection Well Act Amendments of 1981 supplanted groundwater legislation derived from the 1961 Injection Well Act on which parts of the Underground Injection Control section of the Safe Drinking Water Act were based. The 1981 Injection Well Act is now Chapter 27 of the Texas Water Code.

[28]This figure represents one annual, two semi-annual, and four quarterly reports. See interview with Sam B. Pole IV and Seth Molofsky, November 14, 1984.

[29]Ibid.

[30]Interview with William G. Cooper, Technology Consultant; Edward G. Fiesinger, Senior Manufacturing Specialist; and C. M. Hancock and R. B. Marquez, Environmental Affairs Superintendents, Monsanto Intermediates and Fibers Company, Austin, Texas, December 3, 1984.

[31]Certain personnel and some positions were eliminated for various reasons. A newer version of the Monsanto organizational chart will be available in July 1985.

[32]The number includes two Underground Injection Control permits, two wastewater permits, one solid waste permit and seven air permits. See written response to interview questions from C.M. Hancock, Environmental Affairs Superintendent, Monsanto Fibers and Intermediates Company, Texas City, Texas, January 22, 1985.

[33]Interview with Sam B. Pole IV and Seth Molofsky, November 28, 1984.

[34]The self-reporting system requires that a number of operating

reports be submitted periodically to the Underground Injection Control Section by permitted companies. These reports not only include information relating to quantities of waste injected, but also contain information relating to wells located in the surrounding area. For further details see Consolidated Permits, Texas Administrative Code, Title 31, Section 353.65 (Shepard's, May, 1984).

[35]Interview with William G. Cooper, Edward G. Fiesinger, C.M. Hancock, and R.B. Marquez, Austin, Texas, December 3, 1984.

[36]Ibid.

[37]Ibid.

[38]Average taken from last six months of 1981. See Texas Department of Water Resources, "Injection Well Report of Operation" (Austin, Texas, January 26, 1982).

[39]Telephone interview with C.M. Hancock, January 10, 1985.

[40]Texas Water Commission, "Permit to Conduct Underground Injection Under Provisions of chapter 27, Texas Water Code" (Austin, Texas, May 18, 1981), p. 3.

[41]Texas Department of Water Resources, "Waste Disposal Well Assignment List" (Austin, Texas, April 17, 1985). (Internal document).

[42]Interview with Bill Klemt, April 26, 1985.

[43]Ibid.

[44]Costs are approximately $1,000,000.00 for well construction, $100,000.00 for well closure, and $200,000.00 to $300,000.00 for well workovers.

[45]David Moldenhauer, Injection Wells in Texas, Draft Report (Austin: Texas Department of Agriculture, 1984), p. 22. For further information on underground injection see U.S. General Accounting Office, Federal and State Efforts to Protect Groundwater, Report to the Chairman, Subcommittee on Commerce, Transportation and Tourism Committee on Energy and Commerce, House of Representatives, RCED-84-80, February 21, 1984; and Underground Injection of Wastes, (Washington, D.C.: Congressional Research Service, October 20, 1983), Report No. 83-195 ENR.

[46]Interview with Bill Klemt, April 26, 1985.

[47]For instance, David Moldenhauer, author of Injection Wells in Texas wrote the report while serving as an intern for the Texas Department of Agriculture while attending law school.

[48]For an example, see letters from Bill Klemt to C.M. Hancock, March 23, 1982, and September 20, 1983.

[49]Ibid.

[50]Interview with C.M. Hancock, January 8, 1985.

[51]U.S. Congress, Senate Committee on Environment and Public Works, Pollution Taxes, Effluent Charges, and Other Alternatives for Pollution Control, 95th Cong., 1st sess., 1977, p. 2.

[52]Telephone interview with Seth Molofsky, February 22, 1985.

[53]Ibid.

[54]A few states have attempted a multimedia approach by permit process integration, including Illinois and New York. These are primarily states that have assumed permitting responsibility from the Environmental Protection Agency. See Rochelle L. Stanfield, "Pollutants That Just Won't Go Away Pose Challenge for EPA and States," National Journal 49 (December 8, 1984), pp. 2345-46.

[55]Texas Water Commission, "Permit to Conduct Underground Injection Under Provisions of Chapter 27, Texas Water Code" (Austin, Texas, May 18, 1981), p. 5.

[56]Texas Department of Water Resources, Instructions and Procedural Information for Filing an Application for a Permit to Dispose of Wastes by Well Injection., TDWR-0023 (Revised 12-29-81).

[57]AMOCO had three wells; GAF Corporation and Malone Commercial had one each.

[58]Telephone interview with Seth Molofsky, February 22, 1985.

[59]Interview with Bill Klemt, April 26, 1985.

[60]U.S. General Accounting Office, Report to the Chairman, Subcommittee on Commerce, House of Representatives: Federal and State Efforts to Protect Groundwater, GAO/RCED-84-80, February 21, 1984, p. 76.

[61]David Moldenhauer, Injection Wells in Texas, Draft Report (Austin, Texas: Texas Department of Agriculture, 1984), p. 5.

[62]Telephone interview with Seth Molofsky, February 22, 1985.

[63]Donald V. Feliciano, Underground Injection of Wastes, (Washington, D.C.: Congressional Research Service, October 20, 1983), Report No. 83-195 ENR, p. 15. See also Chemical Manufacturers Association, Deep Well Disposal: An Option for Responsible Management of Chemical Wastes, 1984. (Pamphlet).

[64]Chemical Manufacturers Association, Deep Well Disposal, p. 2.

[65]Donald V. Feliciano, Underground Injection of Wastes, p. 15.

[66]The Texas Department of Water Resources has the authority to disallow the injection of wastewaters that are not compatible with the well construction, injection reservoir, and confining intervals.

[67]Interview with Bill Klemt, April 26, 1985.

[68]Texas Department of Water Resources, "Waste Disposal Well Assignment List" (Austin, Texas, October 12, 1983). (Internal document).

[69]Industrial waste disposal wells currently inject approximately 5.5 billion gallons of wastewater each year. See William B. Klemt, Deep Well Injection of Industrial Hazardous Waste in Texas, (Austin, Texas: Texas Department of Water Resources, October 22, 1984), p. 1.

9. Motorola, Inc.: Permitting the Production of Semiconductors

9.1 Introduction

9.1.1 High-Technology Industries Classified as Clean

High-technology industries such as the semiconductor industry have often been called clean industries. This case study interpreted clean in two ways. To begin with, the industry might be called clean because it does not release the quantity of conventional pollutants that traditional manufacturing industries emit. The industry is also clean in the sense that air entering the plant must be purified and the rooms must be sterilized because chips have to be produced in a clean environment. At first view, therefore, it appears that Motorola is a type of company that regulatory agencies do not have to concern themselves with; however, this is not the case.

In its daily production processes, Motorola carefully manages and controls the use of many chemicals, acids and gases to keep the rooms clean in which chips are being produced. The same concern is not apparent in Motorola's practice of directly venting most emissions into the air without processing them through a scrubber, incinerator, or some other BACT device. According to a Motorola spokesman, this is not a contradiction because the quantity of air pollution Motorola emits is not significant.[1] It appears that the TACB agrees with this assessment. Instead of having one air permit for the entire plant and amending it each time a new building is added, the TACB simply issues a new permit or exemption for a building when it is constructed. Because many individual buildings at Motorola do not produce a quantity of air pollution great enough to merit a permit, exemptions are granted. A Motorola spokesman explained that many semiconductor firms operate with permit exemptions.[2]

It is interesting that the TACB chose to permit Motorola on a building-by-building basis rather than issuing one permit for the entire site, as it did for IBM's circuit board manufacturing plant. The TACB's approach may be related to the fact that the legitimacy of the <u>bubble concept</u> (i.e., the treatment of all buildings on a given site as being under a bubble, with the bubble regulated by one permit) was being questioned at the time Motorola's permits were being considered.

9.1.1.1 Collective Emissions Not Considered

Motorola operates in a very competitive but lucrative field and can afford the costs associated with effective emissions control. Motorola is not trying to get around the legal requirements. Yet, the regulatory system is not set up to deal properly with companies like Motorola--companies that produce a small amount of potentially dangerous emissions. The system recognizes that government resources are limited and thus focuses on larger polluters.

The TACB considers many things when issuing a permit or an exemption, but it appears that one of the most important considerations is the level of emissions the applicant intends to generate. If this level is above a certain range, a permit is required. If it falls below that range, an exemption may be issued. This describes the TACB's approach in simplistic terms in order to make a point: a considerable proportion of the air emissions at Motorola are vented directly into the air without passing through a scrubber or an incinerator because the quantity of emissions does not warrant treatment, according to TACB regulations. As mentioned earlier, Motorola uses chemicals and gases that are hazardous to human health. The quantity of emissions is small relative to the amount of air outside the plant. Nevertheless, it seems that the daily release of these pollutants from this and other similar plants could eventually have a detrimental effect on the environment. More technical analysis is required to gauge the extent of this problem.

9.2 Site Characteristics

The Austin-based division of Motorola, Inc., produces integrated circuits (ICs). In 1973, the Motorola division located in Phoenix, Arizona, initiated a drive to open a plant in Austin, Texas. Within a year's time, Motorola officials decided to make the Austin plant a full-scale metal oxide semiconductor (MOS) fabrication site. Since 1974, Motorola has continued to construct more buildings at the site on Ed Bluestein Boulevard in east Austin to operate at full production. Operations at the Motorola facility now consist of manufacturing, packaging, marking, and labeling integrated circuit devices. Motorola is a major employer in Austin, with approximately 5,000 people working at the site (out of 6,000 Motorola employees in Austin).

9.3 Pollution Profile

9.3.0.1 Air Emissions from Building A

Much of the production process occurs in building A, which has the highest rate of emissions on the site. The building's air emissions are regulated by TACB permit R-1290. This was one of the first buildings constructed at the site. The building contains two production lines, both of which produce ICs. Although methods of production and chemicals used differ somewhat between these two production lines, the air emissions are basically the same.[3]

Because an IC is sensitive to dirt or dust, the air in building A must be cleaned before it enters the clean rooms in which the ICs are produced. Circulation in these rooms is designed to filter and recirculate air in order to avoid contamination of the ICs. According to a Motorola spokesman, a small amount of pollutants can escape from the clean rooms when employees enter and exit. These vapors are closely monitored. According to the company, they do not pose a threat to plant workers because they are emitted in insignificant amounts.[4]

Production processes in building A create two kinds of air emissions: acid vapor emissions and organic solvent emissions. In the first category, the fumes released include hydrofluoric, hydrochloric, sulfuric, nitric, acetic, and phosphoric acids. The second category of emissions from the building include organic solvent emissions, which contain hexamethyldisilizane (hmds), trichloroethane, freons, n-butyl acetate, isopropyl alcohol, xylene, decane, and acetone.[5]

Motorola also uses what one source called "hazardous gases" (e.g., arsine, phosphine, hydrogen chloride, and diborane) in its production process in building A. In one step in the process of manufacturing ICs, impurities are introduced onto the wafer of silicon, which will eventually be cut up into individual dies. These dies are then transformed into an integrated circuit. The substance that is deposited on the wafer is called a dopant. According to an article by Joseph LaDou in Technology Review, "highly toxic arsine, phosphine, and diborane gases are being used extensively (in high-technology industries) to make the dopants."[6]

A spokesman for Motorola explained that all but a very small portion of the gases used are deposited directly onto the wafer. He added that the quantity that is not deposited is so small that the amount is immeasurable through current technology. A miniscule amount of gas remains in the air and is drawn from the rooms through hoods. LaDou's article also pointed out that the employees who work with and near these gases may suffer exposure that will prove harmful to their health. This danger was disputed by several Motorola representatives who argued that many precautions are taken to ensure safety at the Austin plant.

9.3.0.2 Other Permitted Buildings at the Motorola Site

In the other buildings, production activities occur in which some air emissions are produced. The following list of buildings includes information on production (a general description of the activities going on in each building) and a statement about the air emissions released from each building. The emissions figures are taken from an estimate prepared by a Motorola spokesman. These figures were used for this summary because they were the only available estimates of actual emission rates. TACB documents list only maximum allowable rates of emissions for each building. The emission amounts released from each building (as prepared by Motorola) are as follows:

Building B - Still under construction (under TACB permit C-7606), building B will house operations similar to those in building A. The projected emissions of the building are one ton per year (t/y) of acids and 13.64 t/y of solvents.

Building CP - Building CP is the central plant and contains three boilers for site climate control purposes, an air-conditioning system, and facilities for making high-purity water. Each boiler is permitted

Table 9-1: Air Emission Amounts from Individual Buildings

Building	Acids (t/y)*	Solvents (t/y)
A	24	45
CP	-	-
F	2	6
H	0.1	0.3
J	-	2.4
K	-	1.8
L	-	.1
M	0.02	2.2
V	0.04	1

* tons per year

separately by the TACB. Two of the boilers, each 500 horsepower, are regulated by TACB permits R-2122 and R-5485. Total emissions for these amount to 19.27 t/y of particulates and 35.92 t/y of sulfur dioxide.[7] The third boiler, 750 horsepower, has an exemption, X-12684, for its emissions. The central plant also houses the monitoring station for the building automation system (BAS), which will be discussed in a later section.

Building F - This building houses an assembly process in which individual chips are taken from the silicon wafer, placed into a package, and finally made into an integrated circuit device. Emissions in this building are regulated by TACB exemption X-12656. Total emissions amount to 2 t/y acids and 6 t/y solvents.

Building H - This building contains probe-test-mark-pack-label facilities. When this building was first built, it was connected to building F and the two were considered one building. At that time one exemption was granted to the building. Today, the exemption still holds for the entire structure even though the division has occurred. Therefore building H is also regulated under TACB exemption X-12656. Total emissions from the building are .1 t/y acids and .3 t/y solvents.

Building J - In this building masks are produced. Emissions are regulated by standard exemption X-43. The total emissions from this building are 2.4 t/y solvents and 1 t/y acids.

Building K - This building houses the probe-and-test facilities that are used for testing the individual dies on the silicon wafers. Emissions from this building are regulated by TACB exemption X-10384 and amount to 1.83 t/y solvents.

Building L - In this building, the integrated circuits are tested. Also, some marking, packing and labeling activities occur here. Emissions are regulated by TACB exemption X-10383 and amount to .1 t/y solvents.

Building M - This building contains operations similar to those of building H. Regulated by TACB exemption X-10385, emissions amount to .02 t/y acids and 2.2 t/y solvents.

Building V - This building contains a small assembly area that is used for assembly and soldering of microchips. Regulated by TACB exemption X-12247, emissions from this building amount to .04 t/y acids and 1 t/y solvents.

9.3.0.3 Other Permits Issued for the Site

Motorola has also received several permits not issued by the TACB. Nonhazardous organic waste at the site is regulated by the TDWR. Organic wastes are stored in two 5,000-gallon tanks and one 1,000-gallon tank on the site. The tanks, which are composed of carbon steel and stainless steel and sit in secondary containers, are emptied once every three weeks, and the contents are sent to Midland-Odessa, Texas, or to Louisiana for disposal.[8] Until 1981, several of the tanks were kept underground. Motorola voluntarily placed them aboveground after a leak was discovered in the piping at the junction with the tank. According to Motorola officials, no citations were issued.[9]

Under a city of Austin permit, Motorola is required to operate a pretreatment plant through which all liquid-process water wastes are routed before being sent into city wastewater systems. Mandated by city ordinances, these pretreatment requirements apply to many firms in the city so that hazardous chemicals or other wastes can be filtered out before they reach the city system, which was not designed to handle them.[10]

9.3.1 Abatement Devices Used for Emission Control

9.3.1.1 Incinerator Used to Control Building A Emissions

A catalytic incinerator is used to reduce the hydrocarbon emissions from building A. The TACB's general rules define an incinerator as "an enclosed combustion apparatus and appurtenances thereto, which is used in the process of burning wastes for the primary purpose of reducing its volume and weight by removing the combustibles of the waste and which is equipped with a flue for conducting products of combustion to the atmosphere."[11] (As mentioned, these emissions include, in this case, fumes from n-butyl acetate, isopropyl alcohol, xylene, decane, and acetone.) All other emissions released from building A are untreated. (Not all the hydrocarbons pass through the incinerator because some of these compounds contain silicon, which has a deactivating effect on the catalyst's surface.)[12]

The incinerator usually operates at about 70 percent efficiency (i.e., it removes 70 percent of the hydrocarbons that enter it), according to Motorola representatives. In order to comply with permit emission requirements, the incinerator must operate at a minimum of 65 percent efficiency when building A is at full production. This will keep the emission rate below the 250 lbs/day limit that is spelled out in the operating permits issued by the TACB. A Motorola spokesman estimated that the average incinerator influent is 160 lbs/day, which constitutes the bulk of hydrocarbon emissions produced in building A. At an efficiency of 65 percent, this influent would result in the expulsion of 104 lbs/day from the incinerator stack.

Once every three weeks a total hydrocarbon analyzer is used to check the removal efficiency of the catalyst. An analysis is done on both the inlet and the outlet of the incinerator. The catalytic incinerator is also tied into the plant's building automation system (BAS), which among other things monitors the temperature and the operation of the fan of the incinerator. If the incinerator's temperature moves outside a certain range or the fan quits operating, the BAS registers the change, thereby notifying Motorola personnel of a malfunction. A Motorola spokesman said that a change in temperature is practically the only way to determine if the catalytic incinerator develops a sudden malfunction.[13] The incinerator is located on the east side of building A, facing the central plant. Consequently, obvious mechanical failures could be easily spotted.

9.3.1.2 Abatement Devices Currently in Operation

The incinerator in building A is the only major air abatement device currently in operation at the site, and only hydrocarbons from that same building pass through it. Thus, air contaminants released from other buildings (CP, F, H, J, K, L, M, and V) do not travel through a scrubber or an incinerator before being released. This is allowed by the TACB, which has considered each building separately and has subsequently issued permits and exemptions that do not require the installation of additional abatement units because the emissions levels fall far below the maximum allowable rate. It should be noted that building B will house an incinerator and a scrubber to treat and reduce emissions from that building. (The building is projected to be at full production by the end of 1987.)[14]

The total air emissions from these buildings are 16.99 t/y according to the estimate offered by a Motorola spokesman. In addition, 24 t/y of acids are directly vented from building A. Therefore, approximately 41 t/y of untreated contaminants enter the atmosphere. This translates into 225 collective lbs/day.

9.4 Permit Characteristics

9.4.1 Construction Permit

In 1973, representatives of the Motorola plant located in Phoenix, Arizona, sought approval for an Austin-based MOS fabrication plant. The construction permit application was received by the TACB on July 18, 1973.[15] The TACB issued a construction permit to Motorola on October 11, 1973. In 1974, Motorola applied for an extension on the permit because construction had not yet begun at the site. This extension was necessary because of a permit provision that states that a permit is automatically void if construction has not begun within one year of date of issuance.[16] The request for an extension was approved by the TACB, and in 1974 Motorola began construction of building A.

9.4.1.1 General Provisions

The construction permit issued to Motorola is a standardized form consisting of two major sections: a certificate and a list of special provisions. The certificate affirms TACB approval of construction of the semiconductor production module. The certificate states that the proposed semiconductor facility must be constructed in accordance with all the rules and regulations established by the TACB to enforce the TCAA. Construction is also subject to any additional or amended rules and regulations of the TACB. A final section of the one page certificate lists eight general conditions Motorola must meet.

The general provisions in the certificate for C-1290 are not specific to Motorola. They apply to all recipients of construction permits. This section of C-1290 formally reiterates what a permit holder may and may not do in the construction of the facility. The listed regulations apply to administrative aspects of the permitting process and do not mention any specific abatement, enforcement, or compliance requirements.

9.4.1.2 Special Provisions

There are six special provisions contained in C-1290. The first special provision states that emissions from the facility must not contribute to air pollution, as defined in the TCAA: "The presence in the atmosphere of one or more air contaminants or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation or property."[17] The next two provisions deal with sampling. The first establishes a rule for the use of sampling ports on the site, and the second states that stack sampling must be conducted to determine the quantity of pollutants emitted into the atmosphere. The fourth provision lists emission types for which Motorola is required to test. The fifth provision lists rules for sampling procedures, which include a time frame within which sampling must occur, instructions for notifying the TACB when sampling will occur, and guidelines regarding information that should be submitted to the TACB. The final special provision of this construction permit establishes a ceiling of 250 lbs/day hydrocarbon emission rate.

According to a spokesman in the Permits Division at the TACB, the 250 lbs/day limit was proposed by Motorola. He said that this figure is relatively low and because Motorola proposed to stay below that level, the state agency chose to accept it and to incorporate it into the permit.[18]

In the special provisions section of the permit, the TACB generally lists any specific limitations or requirements it is placing on a facility. In C-1290 the first five special provisions are very broad in scope and could very well apply to any facility for which an air permit is sought. The special provisions regarding sampling and testing are also nonspecific. Nowhere in the special provisions section did the TACB suggest particular sampling techniques that may be better suited for a certain type of facility. The choice of which sampling techniques to use is completely left up to the people in charge of the facility, although the techniques must be approved by the TACB. The only provision or clause in this section that is specific to the Motorola plant is the one establishing a limit on hydrocarbon emissions. Because Motorola is a minor source of pollution, it may be unnecessary to list a number of specific provisions. Without more technical knowledge we are unable to determine if the lack of these provisions could cause increased environmental pollution or if they are adequate for the relatively low level of emissions at this site.

The Motorola construction permit contains few specific conditions. In contrast, the LCRA construction permits incorporate an extensive list of special provisions. The differences are a result of the classifications of each site; LCRA is defined as a major source, while Motorola is a minor source. (Classification is based on quantity of emissions.)

9.4.2 Operating Permit

On October 20, 1981, the TACB granted operating permit R-1290 to Motorola. During the five-year lapse between the filing of the permit application and its issuance, the TACB informed Motorola that because the projected hydrocarbon emission rate for building A at full production would be above 250 lbs/day (the permitted amount), Motorola would be required to install an pollution abatement device.[19]

9.4.2.1 Similarity to Construction Permit

The operating permit for building A, R-1290, has three main sections. The first section, as in the construction permit, contains a certificate declaring that Motorola's operation has been approved by the TACB. Clauses included in the certificate state to whom the permit is issued and the exact location of the site. The certificate is composed of brief clauses stating that the facility must operate in accordance with the federal CAA, the TCAA, and the rules and regulations of the TACB. The certificate enumerates five conditions that apply to all facilities receiving an air permit. Four of these conditions are general: the permit is nontransferable; the permit holder should make sufficient stack sampling or other tests to prove satisfactory performance; the permit holder must maintain good working order of abatement devices; and emissions from the facility may not contribute to air pollution as defined by the TCAA. The final condition listed on the certificate establishes a section to identify any special provisions or rules that may pertain to the particular site.

The second major section of the permit, titled General Provisions, is divided into five provisions, which are broad and apply to any facility awarded a permit. The first provision establishes the responsibility of the permit holder to demonstrate equivalency of planned emission control, sampling, and monitoring methods as alternatives to methods referred to in the permit. The second provision establishes a general procedure to be followed during sampling. The third provision establishes the right of the permit holder to appeal a permit or any of the provisions contained in it. The fourth provision requires facilities to report changes in construction plans to the TACB within ten working days. The final general provision establishes a rule requiring that accurate records be maintained and made available to the TACB immediately upon request.

The third major and final section of the operating permit lists any special provisions for the permitted facility. As in the construction permit, the operating permit sets a limit on the amount of hydrocarbon emissions, which must not exceed 250 lbs/day from building A. This final provision reiterates the ceiling that Motorola proposed and that the TACB agreed upon as a reasonable maximum level of emission.

The operating permit is similar to the construction permit in that almost all of the provisions contained in both permits are general and apply to facilities other than Motorola. The operating permit resembles the construction permit because it is essentially an enforcement device for the TACB. If a company fails to construct its facility to meet conditions stipulated in the construction permit, then an operating permit will not be issued. If the TACB officially denies the operating permit, the facility must shut down.

9.5 Critical Issues

9.5.1 The Permitting Process

A major finding of this case study has been that many aspects of the permitting process have changed since the construction permit was first awarded to Motorola in 1973. These changes include different permit procedures and different administrative requirements. For example, in January 1985 the TACB altered one of its major regulations (regulation VI) by increasing the stringency of requirements for facilities trying to locate in nonattainment areas.[20]

9.5.1.1 Impetus for Change in the Permitting Process

There are three major sources for change in the permitting process at the TACB. The first source is internal and results from the TACB's need to promote compliance with the NAAQS. A TACB spokesman said that this is an ongoing source of change because every time a permit is issued, the state implementation plan must be revised so that overall pollution limits are not exceeded.[21]

A second source of change in the permitting process consists of external factors, which include public interest groups and private firms that are concerned about how the TACB is achieving its overall objectives and how TACB regulations affect their operations.[22]

The final impetus for change in the TACB's permitting procedure is the Texas legislature. As established in the TCAA, the TACB is subject to the Texas Sunset Act. In 1985, the TACB was to undergo review by the Texas legislature's Sunset Advisory Commission.[23] In combination with the review, the TACB is presently considering several changes. According to a TACB spokesman, one of the proposed changes would establish an expiration date for all permits.[24] Unlike state-issued water permits, the life of an air permit is infinite. However, a permit may be revoked if its conditions are continuously violated and if all enforcement procedures fail. While the requirement of an expiration date for permits would allow for periodic review of all permits, the change would also add to the administrative duties of the TACB, which is already short on resources.[25] Another suggestion for change, as noted by the TACB, relates to the fee system. The proposal is that the TACB increase the amount of its fees for processing applications. This increase would not be expected to substantially help the TACB meet increasing operating expenses because the fee system was not set up to recoup the expenses of the agency. Lawrence Pewitt, current director of the Permits Division at the TACB, mentioned that the existing system of fees is in no way intended to make up the costs incurred by the TACB in processing permits.[26]

9.5.1.2 Effect of Budget Reductions at the Texas Air Control Board

The TACB, along with many other state agencies, currently faces budget cuts that will hinder its ability to process permit applications. This change is evident in the Permits Division at the TACB. Because of budget cuts the combustion section in the Permits Division is operating with only four engineers, each of whom is working on an average of forty-five to fifty-five projects at one time. James C. Caraway, director, Permits Division, TACB, noted that thirty pending projects for an engineer is a good load.[27] These projects include permit applications, exemptions, amendments, changes in location, changes in ownership, changes in name, public notice periods, public hearings, and correspondence. As noted by Caraway, "Any of these various projects may require as much of the engineer's time as a permit application." Caraway also stressed the importance of a thorough review of all of these documents. However, the price of this review is a three- to six-month backlog.[28] Consequently, changes have been made to take some of the pressure off the engineers. For example, the Compliance Division at the TACB has been given the responsibility of handling changes in location and ownership.

Decreases in budget allotments also reduce the types of services the TACB provides applicants. For example, in January 1985 the TACB disbanded its atmospheric modeling section, which was used to model air quality based on proposed emissions from newly constructed sources. This section was originally developed to assist engineers in their review of permits by determining the ground-level impact of emissions. Modeling came to be more important in the permitting process as a result of the TACB's increased emphasis on the role of the health effects section. This section, which consists of four people, is responsible for determining a site's potential threat to human health. In order to perform this function, the section must have an accurate model of the atmosphere. Texas had been one of three states that conducted atmospheric modeling for applicants and permit holders. New applicants are now responsible for providing their own modeling. These models have to conform to TACB standards, and they are reviewed by engineers at the agency. Now, modeling will probably be performed by environmental consulting firms (particularly in the case of smaller applicants) or by environmental quality section located within the firm applying for the permit.

From an agency perspective Caraway felt that in spite of the changes that have occurred in the permitting system, the principal goal of the TACB, "to reduce emissions to the maximum extent possible,"[29] has not changed since the agency was founded in 1971. Caraway described the permitting process as viable and as helping the TACB accomplish its objectives.

9.5.2 Motorola's Approach to Permitting

9.5.2.1 Motorola's Environmental Section

When Motorola first applied for permit C-1290 in 1973, the entire application was handled by a group of engineers at a Motorola plant in Phoenix, Arizona. In 1979 an environmental section was created within the company. The primary purpose for creating the section was to assure compliance with local, state, and federal environmental regulations. The section also concerns itself with other environmental matters at company sites, such as energy and utility conservation and landscaping.[30] Environmental sections are now a common occurrence in the IC industry. There are six employees in the Austin Motorola environmental section. Their backgrounds and areas of specialization include civil engineering, chemistry, environmental engineering, biology, and chemical engineering.[31]

9.5.2.2 Changes in Permitting Process

Changes in the permitting process at the TACB require applicants to submit considerably more information than was previously necessary, a fact that a Motorola representative affirmed. He compared information submitted to the TACB when Motorola applied for R-1290 to that which Motorola is now submitting to obtain an air permit for building B. (Building B will be the second full-scale production module at the Ed Bluestein plant.) This change is not viewed by the Motorola spokesman as an extra load of work but as a positive change. He explained that by submitting more data to the TACB, the TACB can better understand the semiconductor industry, its operations, and the emissions it produces.

9.5.3 Compliance Requirements for Permitted Facilities

Emission inventories are an important instrument that can help assure that a permitted facility remains within emissions limits. An emissions inventory consists of sampling results that identify the "opacity, rate, composition, and concentration of emissions."[32] These are the only compliance-related reports that the TACB requires every permitted facility to submit on a regular basis. However, major sources, such as the LCRA, are required to submit additional compliance reports as well. Caraway commented that not all facilities are required to submit an emissions inventory (e.g., facilities receiving exemptions) and described the TACB's review of the emissions inventory as haphazard.[33]

Compliance requirements for Motorola's Austin plant are minimal. The only information that is periodically requested by the TACB is a five-year emissions inventory. A Motorola spokesman described the information included in a five-year report as similar to that in a permit application. The spokesman also noted that not all of this information is required by the TACB but that Motorola submits more information than is required in order to aid the TACB in its evaluation.

9.5.4 Agency/Permittee Interaction

After an operating permit has been awarded, the TACB's regional offices retain jurisdiction over permitted sites. Therefore, most of Motorola's regular contact regarding permit R-1290 is with the regional office in Waco, Texas. Site inspections are performed annually by the office; otherwise, no regular contact occurs. Pewitt noted that permit-related interaction between the TACB and any permit applicant is usually for clarification purposes only. Most of the time, the applicant has submitted insufficient information or has not properly explained the information included.[34] Therefore, the TACB must contact the applicant for clarification. A Motorola spokesman agreed, remarking that relations with the TACB are excellent and not extensive.[35]

9.5.5 Cross-Media Issues

9.5.5.1 Industry Attitude toward Cross-Media Regulation

The issue of cross-media pollution is given little priority at Motorola. A company spokesman stated that they expect the TACB to take the lead in this area of regulation. Furthermore, he said that if something of this nature is to be required of Motorola, the firm would expect explicit guidelines laid out well in advance so that the company could incorporate the requirements into its plans.

The Motorola official also said that the company does not have the expertise to study cross-media effects on its own.[36] A study of cross-media effects is not required of Motorola nor is it necessary for

Motorola's daily operations. Therefore, Motorola has declined to study the issue.

9.5.5.2 Limited Scope of Texas Air Control Board Activities

The TACB does not emphasize control of cross-media pollution. It is organized to regulate air pollution in the state of Texas. Regulating pollution in any medium other than air is beyond its legislated duties; however, regulating air emissions to control the effects of pollution in other media is also beyond its duties established by statute. (Caraway noted that the TACB does have a program set up to monitor acid rain but that the issue of problems related to acid rain is not integrated into the permitting process.)[37] Interaction between state regulatory agencies, in which considerable cross-media discussion could occur, in fact appears to be rare, and when it does occur it is usually routine in nature. For example, Caraway said that when a facility applies for a RCRA permit at the TDWR, the TACB is notified if there is incineration involved.[38] Interaction of this type is necessary but does not make any substantial contributions to solving the problems of cross-media pollution.

9.5.6 Recommendation for Changes in the Permitting Process

9.5.6.1 Texas Air Control Board Representative's Recommendations

Caraway said he thought the current permitting process in Texas is "a very good one," stressing that the regulations are "tight but fair" and that "enforcement in Texas is consistent."[39] When asked if he thought the current permitting process should be changed or improved in any way, Caraway replied that he would require that each permit application be completed by a certified engineer before it reaches the TACB. Caraway felt this would help reduce the amount of review time each application requires. Caraway would also change the current system by using the regional TACB offices to issue the operating permits. This shift in permit responsibility would lessen the workload at the state office.[40]

9.5.6.2 Motorola Representative's Recommendations

The Motorola representative said that the TACB needs to make greater use of the bubble concept when evaluating sites to be permitted[41] (i.e., not granting separate permits for each building that may be added to a site). The possibility exists that permit applicants may section off existing buildings so that they can qualify for exemptions rather than being subject to regulations associated with permitting programs. Thus, the companies may be able to avoid incorporating emissions control devices into their facilities. The spokesman also felt that the TACB should require more atmospheric modeling.[42] This is an interesting observation in light of the recent dissolution of the atmospheric modeling division at the TACB.

Notes

[1]Interview with member of Environmental Section, Motorola, Austin, Texas, February 12, 1985.

[2]<u>Ibid</u>.

[3]Letter from Gary Johnson, general manager of MOS Integrated Circuits Group at Motorola, to Bill Stewart, Executive Director at TACB, November 18, 1983, p. 8.

[4]Interview with member of the Environmental Section at Motorola, Austin, Texas, February 12, 1985.

[5]<u>Ibid</u>., November 29, 1984.

[6]Joseph LaDou, "The Not-So-Clean Business of Making Chips," <u>Technology Review</u>, May/June 1984, p. 30.

[7]Operating permits R-2122 and R-5485, Motorola permit file, Texas Air Control Board.

[8]Interview with member of Environmental Section, Motorola, Austin, Texas, November 20, 1984.

[9]Interview with members of Environmental Section, Motorola, Austin, Texas, May 22, 1985.

[10]<u>Ibid</u>.

[11]<u>Texas Air Control Board General Rules: 31 TAC Chapter 101</u>, March 13, 1984; p. 4.

[12]Interview with member of Environmental Section, Motorola, Austin, Texas, November 29, 1984.

[13]<u>Ibid</u>.

[14]Interview with Motorola spokesman, Austin, Texas, February 12, 1985.

[15]TACB Permit Application Summary: Motorola,Inc. permit-1290 file, TACB, October 8, 1981, p. 1.

[16]Construction Permit-1290, Motorola, Inc.: Motorola Permit file, October 11, 1973, p. 1.

[17]<u>Texas Clean Air Act</u>, Section 3.28, no date, p. 1.

[18]Interview with James Caraway, Section Chief, Texas Air Control Board, Austin, Texas, May 1985.

[19]The actual amount that Motorola was emitting at the time is uncertain. Several reports, one performed by an independent agency and one performed by Motorola, noted that over 500 pounds of hydrocarbons per day were being released from building A. Motorola officials today claim that the over-500 pound figure was in error, but the error was not really discovered until 1980--after a catalytic incinerator was installed. Taken from interview with Motorola representative, Austin, Texas, February 12, 1985.

[20]Interview with James C. Caraway, February 13, 1985.

[21]<u>Ibid</u>.

[22]<u>Ibid</u>.

[23]Texas Air Control Board, <u>Texas Clean Air Act</u>, Section 2.01a, no date, p. 2.

[24]Interview with James Caraway, TACB, February 13, 1985.

[25]<u>Ibid</u>.

[26]Interview with Lawrence Pewitt, Director of Permits, Texas Air Control Board, Austin, Texas, November 2, 1984.

[27]Interview with James Caraway, February 13, 1985.

[28]<u>Ibid</u>.

[29]Ibid.

[30]Interview with Motorola spokesman, Austin, Texas, May 22, 1985.

[31]Interview with member of Environmental Section, Motorola, Austin, Texas, February 12, 1985.

[32]TACB General Rules, p. 25.

[33]Interview with James Caraway, February 13, 1985.

[34]Interview with Lawrence Pewitt, November 2, 1985.

[35]Interview with spokesman at Motorola, Austin, Texas, November 20, 1984.

[36]Ibid.

[37]Interview with James Caraway, February 13, 1985.

[38]Ibid.

[39]Ibid.

[40]Ibid.

[41]Interview with member of Environmental Section, Motorola, Austin, Texas, February 12, 1985.

[42]Ibid.

10. IBM Austin: Permitting a Circuit Board Manufacturing Plant

10.1 Introduction

This case study examines the environmental permitting process for IBM's circuit board manufacturing plant in Austin, Texas. This plant was selected for study because it is a major employer in the area and is part of the expanding high-technology sector of the Austin economy. Permit #7382 was chosen since it is the major permit issued for the plant.

This study illustrates how a large company with a sophisticated and chemically intensive manufacturing process can effectively interact with a state agency to meet regulatory requirements. Several examples from this permit history show to what degree permitting may be a negotiating process and to what degree it is not. These examples also demonstrate IBM's commitment to environmental quality through its functional organizational structure and its internal management controls.

Critical issues in this case study focus on the nature of the company and its policies. The case study also illustrates how permitting comprehensiveness may be achieved through permittee initiative rather than through legal or regulatory action.

10.2 Site Characteristics

10.2.1 Economic Significance of Site

The IBM site employs over seven thousand workers. It is the third largest employer in Austin and the largest private employer in the area.

The plant manufactures printed circuit boards for use in computers, office machines, and other high-technology equipment. The processes involved to manufacture the circuit boards use many chemicals, some of them hazardous. The company understands the environmental implications of such a chemical-intensive production process, and has devised specific internal management controls to deal with this issue.

10.2.2 Construction

IBM started construction on its Austin plant in the summer of 1979. According to official permit records, construction began on April 16th; however, actual groundbreaking was delayed until the final approval of the construction permit for air emissions, which took place on May 24th. Some sections of the plant have been in operation since February 1, 1981, although full production did not occur until 1982.[1]

10.2.3 Production Process

10.2.3.1 Overview

The basic production process involves an alternate layering of copper and fiberglass sheets. The thin sheets are treated so that they adhere to one another. An acrylic photosensitive film is used to apply circuit designs to these layers. Each copper layer undergoes a chemical etching process and then a solvent stripping process that removes the copper from the surface of the fiberglass except along the tiny protected lines of the circuit design. More layers of copper sheeting--so thin that it resembles foil--and fiberglass are applied to each side. More and more layers are built up on the circuit boards as they become more complex. These layers are connected to each other at the end of the process, when minute holes are drilled through all the layers. The insides of these holes are plated with copper so that continuity exists through all layers of the boards. Electrical signals are conducted along any of the tiny lines of copper to various components and/or to other circuit layers.

The various stages of this process involve many chemical interactions, which are responsible for most of the plant's emissions. There are three basic steps: developing, which utilizes a weak solvent; etching, which uses a strong cupric chloride acid; and stripping, which utilizes various caustic bases.

10.2.3.2 Preparatory Steps

There are several preliminary steps in the production process. The process begins with the impregnation of the fiberglass sheets to prepare a basic element known as <u>PrePreg</u>. Preparation of PrePreg occurs in the treater tower area of the plant and produces hydrocarbon solvent vapors, which are controlled by a catalytic incinerator. The next stage of the production process is the slit-and-shear operation, in which the rolls of treated copper foil and PrePreg are cut into rectangular shapes. Very few emissions result from this process--none from cutting the copper and a minimum of dust (which is controlled by a dust collector) from cutting the fiberglass. The third stage of the production process is the lamination stage, in which two pieces of copper foil are sandwiched around one piece of PrePreg. Heat and pressure bond these layers. No pollution abatement equipment is necessary at this stage nor at the next one, in which the photoresist is applied and exposed, using a glass master in a process similar to silk-screening.

10.2.3.3 Circuit Production through the Develop/Etch/Strip Sequence

Following these preparatory steps, the circuits are created on the boards in the develop-etch-strip sequence. An aqueous basic solution develops the circuit patterns, which are protected from the subsequent etching and stripping. This series of production steps results in low air emissions--aerosols, which are removed by high-efficiency demisters and by scrubbers as a secondary protection.

The resulting three-layer product goes back through the lamination step to have more fiberglass and copper applied. The number of layers applied depends on the sophistication of the final product in which the circuit board will be used.

10.2.3.4 External Production of Circuits

Creating circuits for the outside layers is the final production step. Different chemicals are used--weak and strong solvents instead of bases--and the photoresist film is different. This area of the plant is the highest source of emissions. It is a source of hydrocarbons, which are controlled by carbon adsorbers. The quantities trapped by these adsorbers are sufficient to warrant recycling, which helps significantly reduce the plant's solvent consumption.

10.2.3.5 Drilling

The circuit boards then undergo a drilling operation. IBM has installed dust collection vacuums at every drilling machine. These are not required by the air permit because this dust would not be vented outside, but the vacuums clean the air inside the plant. Copper plating of these holes also results in some emissions, which pass through scrubbers. These scrubbers also were not required by permit but were installed when the exhaust system was redesigned.

10.2.3.6 Protective Coating

To complete the manufacturing process, the boards are given a protective coating, a type of epoxy, on the circuitry that will not be soldered. The coating is a gelatinous resin, thicker than syrup, which is baked on. This process emits small amounts of many different kinds of solvents, which are captured by a carbon adsorber. As these solvents are mixed and are emitted in small quantities, it is not feasible to recycle them internally.[2]

10.2.4 IBM's Precautionary System

IBM in Austin has designed systems to minimize the risk of spills or upsets as well as to reduce emissions. There are no deeply buried chemical storage tanks at the Austin plant. The tank area is fenced and has been covered with gravel, in compliance with city of Austin Fire Department requirements. This arrangement is being changed to make visual inspection of the vaults possible. The tanks are not actually underground, but twenty feet below grade and placed in concrete vaults. Depending on the hazardous nature of their contents, these vaults have resistant coatings. Vaults for more aggressive solvents are lined with stainless steel. A continuous monitoring and automatic alarm system has been installed to detect leaks.

Caustics such as hydrochloric acid and cupric chloride are stored in above-grade tanks and vaults, which are protected by concrete dikes.

IBM also stores over a million gallons of fuel oil on-site with a similar system of liners and dikes. Chemicals kept on hand in smaller quantities are stored on racks that have resistant coatings in a building (the chemical distribution center) whose rooms are separated by drains to prevent accidental spills and reactions.[3]

10.3 IBM Permit #7382: Permit History

10.3.1 Application and Review

Permit #7382 for the IBM circuit packaging facility in Austin, Texas, was applied for on February 22, 1979. IBM's permit application followed standard TACB procedure. The application was assigned to an engineer in the Permits Division for review and subsequently a draft permit was written.

During the permitting process, the draft permit was cleared through the Austin/Travis County Health Department and the city of Austin Environmental Resources Management Department (ERMD). The health department toured the facility at IBM, which is standard procedure. The Austin ERMD usually checks only the paperwork, which they did in this case.

10.3.2 Development of the Permit: Negotiation

The permitting process in this case study was characterized by negotiation. During the application process, IBM decided to put up shorter stacks than had originally been designed and submitted for approval. They wanted more and shorter stacks for aesthetic reasons. Another consideration was the expense of the ductwork leading to the stacks; with more stacks there was less need for costly ductwork. The permit engineer had no complaints about the shorter stacks because the amount of emissions would not change. IBM subsequently found that under certain atmospheric conditions these shorter stacks caused emissions to linger in the vicinity of the plant, so the stacks were later heightened.

Another example of permitting adjustments concerned the plant's need for mobile emergency generators that could be turned on in case of power outages or for training purposes. IBM proposed to burn diesel fuel in six mobile generators with the understanding that this would be a temporary and occasional occurrence. However, the company had requested earlier that allowable emissions for the whole plant be figured on the basis of continuous operation: twenty-four hours a day, seven days a week, fifty-two weeks a year. They wanted the allowable emissions to be figured this way for flexibility in their production schedules in case of extra demand but did not actually expect to operate at more than 85 percent capacity.

Based on calculations of continuous operation and round-the-clock use of the generators, plant emissions would have exceeded established thresholds and would have been subject to PSD regulations. This would have entailed EPA control, since the TACB does not have authority to issue PSD permits. The EPA considered use of the mobile generators to be a modification of the plant that required PSD permitting, even though the generators were intended for temporary emergency usage. (A TACB engineer said that there was almost no possibility that the plant could be run on a full-time continuous basis with the emergency generators because it would not be economical. The company would be more likely to close the plant.) Because the plant could conceivably be operated in this fashion (i.e., it is physically possible), the EPA wanted to impose PSD regulations that would cover such a situation.

However, IBM preferred to apply only for the state permit in order to minimize paperwork, administrative costs, and delays. After communicating with the EPA about the problem, a recommendation was accepted that resulted in a compromise but that did not lower emission standards. A special provision that limited the amount of fuel that could be burned in a year was written into the permit. Therefore, SO2 and N2O emissions were brought under control by regulating the amount of fuel burned. This adjustment resulted in a more effective and realistic control and allowed IBM to avoid the PSD permitting process that was being activated to regulate a situation that never would have occurred.[4]

10.3.3 IBM's Approach to Permitting: Corporate Facilities Practices

IBM has developed corporate facilities practices to reduce risk in its plants. Many company standards may be more stringent than the laws of the states or countries where plants are sited. These company standards are based on the strictest legal standards that IBM has encountered at its various plant locations. Plant managers may request exemptions for their sites only under special circumstances. Therefore, depending on the substance to be controlled, IBM may exceed Texas or EPA requirements for controlling emissions.[5]

10.3.4 Public Participation in the Process

Few complaints were filed against the issuance of the IBM permit. Only two letters were received in response to the public notice. Neither commented about the presence of an elementary school near the plant. The complaints were not specific; they were just against industrial development of the area. Both letters were from residents of the neighborhood.

A site inspection during the construction permit process found the elementary school to be within thirteen hundred feet, directly east of the incinerator stack. The permitting engineer involved speculated that no complaints were raised about this because the wind usually blows away from the school. However, he mentioned that there have been cases in which permits have not been issued and plants have not been built (in the Austin area) due to public outcry over the close proximity of a school.[6]

10.4 Permit Conditions

10.4.1 Emissions and Abatement Equipment

10.4.1.1 Air Pollution Profile

Allowable emissions for the IBM facility are particulates, 10.44 tons per year; volatile organic compounds, 69.27 tons per year; inorganic gases, 22.25 tons per year; nitrous oxides, 137.60 tons per year; sulfur dioxides, 35.14 tons per year; carbon monoxide, 6.69 tons per year.[7]

10.4.1.2 Abatement Equipment

IBM uses two scrubbers and three filters as abatement equipment under permit #7382. Emissions are calculated on the basis of continuous operation of the plant. The sources of the various emissions are from different areas of the plant. Volatile organic compounds come mostly from the panel building processes, with smaller amounts coming from the chemical distribution center and the storage tank farm. Inorganic gases also come from the panel building processes and the panel building support equipment. Nitrous and sulfur oxides are produced primarily by the boilers and generators.[8]

The original estimates on the application for the construction permit were continually revised upward by IBM as it was learned that more emissions would be produced. This is relatively common according to the permit engineer because projections are based on estimates rather than hard data. The opposite trend may also occur and actual emissions turn out to be less than anticipated. Lower emissions are usually accounted for by improvements in technology, both in the industrial process and in the abatement equipment.[9]

A company may utilize equipment with a greater capacity for controlling emissions than that required by the permit. The greater capacity allows for growth and flexibility of production for the plant. Equipment may be used that controls more than one type of emission or backup equipment may be installed. The IBM plant uses a backup carbon adsorber in order to alternate from one unit to another during maintenance.

10.4.2 Special Provisions

Emissions calculations would have put IBM under PSD regulations because of the mobile emergency generators. Special provisions were written into the permit restricting the company from using more than 250,000 gallons of oil per year or 942 million cubic feet of natural gas per year, and the total fuel for the mobile generators is not to exceed 675 gallons of fuel oil per year. These restrictions ensure that plant emissions will remain below levels that require PSD regulations. Other special provisions on IBM's permit #7382 require that storage tanks for solvents and volatile organic compounds must have a permanent submerged fill pipe. This cuts down on fugitive emissions during tank filling. Storage tanks for hydrochloric acid (20 percent solution or more) must be discharged with a scrubber or a sparger (a device that agitates a liquid by means of compressed air or gas entering through a pipe) that contains water, caustic, or limestone to neutralize the acid.

10.4.3 General Provisions

General provisions, common to all TACB construction permits, provide for equivalency of methods. Any emission control, sampling, or monitoring methods that are proposed as alternatives to the permit provisions must be justified and demonstrated by the permit holder, and all alternative methods must be cleared through the TACB. Also, the permit holder must pay for and provide facilities for sampling and must apply through the Source Evaluation Section of the TACB for proper data forms and procedures. Records must be kept concerning production, operating hours, and fuels used. These must must be made available to TACB inspectors. All modifications of the manufacturing process must be approved by the TACB. Appeal to the provisions of the permit is provided for under TACB procedural rule no. 131.02.07.001, or section 6.01 of the TCAA.

10.5 IBM's Approach to Permitting

10.5.1 Good Corporate Citizenship: IBM's Environmental Impact Assessment Program

10.5.1.1 The Purpose of the Program

Corporate facilities practices have been instituted since 1970. Their purpose is to maintain a minimum acceptable standard of environmental excellence for all plant sites operated by IBM. They pertain particularly to spill containment, waste disposal, and air and water pollution abatement as well as to the more general corporate goals of efficiency and conservation.[10]

The company's internal structure shows initiative in dealing with environment-related problems. An Environmental Impact Assessment Program was set up in 1974 and initiated company-wide between 1976-1978. The program ensures that legal standards are maintained and corporate facilities practices with respect to the environment are enforced.

The Environmental Impact Assessment Program requires that any proposed change in plant operations must be examined internally for its effects on the environment, both inside and outside the plant. The proposed changes may include not only alterations in industrial processes to improve production, but also relocation of equipment or remodeling (new doors, windows, vents, etc.).

An environmental impact assessment is generated by the engineers in the area in which changes or new processes on the production line are proposed. The originating engineer is required to follow a specific format, which includes a list of the chemicals and substances involved, a materials balance, and prospects for energy conservation and recycling. This environmental impact assessment report is submitted to the Environmental Programs Department at IBM, which determines whether the proposed modifications result in increased emissions and require application for permit amendment. The report may also be reviewed by IBM medical staff, by the Industrial Hygiene Department, by the chemical coordinator, or by the Heating-Ventilation-Air Conditioning Department, which is concerned with exhaust systems and air flow.

If agency involvement is required, environmental programs engineers furnish the proper TACB or TDWR engineer with relevant information and proposed methods of dealing with the emissions. The Environmental Programs Department informs the Environmental Systems Engineering Department of the need for any new equipment and specifies the emission control efficiencies that will be required. The Environmental Systems Engineering Department is then responsible for locating the appropriate equipment that will meet these specifications. When the equipment is received from the manufacturer and its permit is approved, the device is installed and debugged by the Environmental Systems Engineering and Facilities Engineering departments.

After installation, the equipment is left in operation for a period of time long enough to acquire sufficient data regarding its operating effectiveness. It is then tested by an outside consulting firm that specializes in environmental engineering and science. If expected performance standards are not met, equipment modification or an application for permit modification may be necessary.

10.5.1.2 Responsibilities of the Environmental Programs Department

The Environmental Programs Department at the Austin plant employs six engineers and a manager. This section is responsible for permitting and regulatory interface, long-range planning involving environmental impact (including land-use planning), reporting to agencies and upper management, and monitoring to verify compliance. Environmental administration for the site is centered in this department, although other sections may design and/or implement the specific pollution abatement measures. As plant modifications are made, environmental programs engineers communicate regularly with engineers at the state agencies. Because of the high-technology nature of the plant's activities, they sometimes find it necessary to educate the agency personnel about newer processes and their effects in the plant. Agency permitting engineers must be generalists more than the IBM plant's specialists because they have to deal with so many more industrial processes.[11]

The Environmental Programs Department also conducts research on materials resource management--the possibilities for recycling wastes, both solids and vapor emissions. Practices at the Austin plant, because of its size, have a strong conservation and recycling emphasis. Solvents, in particular, may be recovered and reused within the plant by steam stripping the carbon adsorbers. This is not always possible because the emissions control equipment sometimes mixes emissions as it controls their flow. Recycled materials may be sold to outside chemical suppliers if the quantities are too small to return a worthwhile savings.

IBM is apparently willing to bear the costs of its environmental control policies. The Environmental Programs Department has the authority to recommend steps it considers necessary to ensure environmental safety and quality. These steps include buying state-of-the-art pollution abatement equipment when required, regardless of cost. Friction may occasionally exist between the Purchasing Department and the Environmental Programs Department due to differences in perspective. However, an engineer in the Environmental Programs Department stated that he has never had his requests for particular abatement devices turned down. Upper-level management, as the source of corporate facilities practices and the Environmental Impact Assessment Program, is committed to maintaining standards despite involved costs.[12]

Preliminary cost studies of required controls are a part of the Environmental Impact Assessment Program and are carried out either by the Environmental Programs Department or by the section proposing process modifications. Cost studies include installation and maintenance costs as well as the actual purchase price of equipment. The former will often cost more than the latter and may run to more than 50 percent of the total costs (for all plant equipment, not just pollution abatement equipment). Several million dollars have been invested in air pollution abatement equipment at the Austin plant. Over one million dollars has been spent on state-of-the-art Japanese carbon adsorbers.

10.5.1.3 Cross-Media Considerations at IBM

No specific provision has been made for cross-media considerations within the environmental impact assessment format. However, because these reports are reviewed by many departments and because the Environmental Programs Department is responsible for these issues and employs engineers from several disciplines (chemical, mechanical, electrical, etc.), a comprehensive investigation of the effects of a new process results.

Mass balance computations are done for most alterations in the industrial process as they are proposed to try to discover how much of the substances involved actually goes into the product or into waste or surplus and to keep track of how much is emitted. Experimental materials balance models for the plant as a whole have not been calculated; they have only been calculated for stages of the manufacturing process or for particular pieces of equipment.

Engineers in the Environmental Programs Department check the expected capacities of the equipment involved and the reactivity of the chemicals involved and try to anticipate and prevent synergistic problems. Also, they usually specify equipment efficiencies that will result in lower-than-minimum required levels. Like the environmental regulatory agencies, IBM pollution engineers adopt a "worst case" strategy when analyzing possible effects of proposed changes.[13]

The Environmental Programs Department's ability and willingness to deal with cross-media issues is demonstrated by its internal work assignment structure and its plans for a new cleaning system for some of its abatement equipment. A single engineer deals with both the wastewater and air permits. Traditional methods of steam stripping the carbon adsorbers result in trace amounts of solvents left in the resultant distilled water vapor. This water must pass through pretreatment to meet corporate facilities practices and city of Austin Wastewater Department requirements. The Environmental Programs Department plans to solve the problem internally by installing a nitrogen desorption system for new carbon adsorbers. This new technology is capable of removing the trapped solvents without contaminating water.[14]

10.5.1.4 The Importance of Planning at IBM

Because abatement can be so costly, long-range planning is crucial. In addition to the time required for the permitting itself, the company sometimes needs six months to a year of lead time in ordering abatement equipment. Company engineers anticipate long turnaround times at the TACB and they make up for this by planning ahead. Most of IBM's production line changes are not delayed by problems with permitting, although this has been known to happen.

Significant cost overruns are rare due to the detailed planning process. However, if original projected costs must be amended, a contingency fund exists for such difficulties. If problems do arise, they are most likely to involve installation--wiring or pipe connections that have to be matched and coordinated to the overall plant system.

Abatement equipment is extremely expensive for IBM because much of it must be custom built. This is common for the entire high-technology industry. For critical environmental and manufacturing equipment the purchasing department does not automatically have the authority to accept the lowest bidding vendor because these decisions are made on a technical basis. Since internal corporate facilities practices requirements may exceed federal or state regulations in some cases (in terms of pounds per hour, waste concentration in water emitted, or other efficiencies) the cost of equipment may be higher than would otherwise be required to meet estimated standards. A minimum of three quotations is required, but the engineer interviewed could not recall a single instance when the Environmental Systems Engineering Department was overruled in its decision about which equipment should be acquired.

Management also desires information about alternative control methods available. Incentive for improvement and adjustment of the processes exists. Since the company understands the environmental implications of chemical-intensive manufacturing, ongoing research is being conducted on the possibility of avoiding "wet" chemistry in circuit board manufacture by perhaps utilizing lasers and other nonchemical methods for manufacturing.

10.5.2 Compliance

10.5.2.1 Internal Monitoring

IBM maintains internal controls for compliance procedures. Much of the abatement equipment is automated and utilizes on-line monitoring of the efficiencies of emissions control. This is not true of the dust collectors, which operate at 99 percent efficiency. Continuous monitoring of these would be a waste of resources. This is an instance in which the decision is made on the basis of cost and convenience because the efficiencies more than meet regulated standards.

Monitoring data is stored for several years for internal use. Because servicing the machinery is important for keeping it at maximum operating efficiency, the data is kept as a record of the equipment's history. This data is also available to TACB or EPA inspectors. Routine plant inspections are made by four different authorities--the TDWR, the TACB, the Austin/Travis County Health Department, and the city of Austin Wastewater Department.

IBM's Environmental Programs Department keeps organic vapor analyzers, which are portable sampling and monitoring devices. Personnel from this division periodically compare the influent and effluent air streams near their abatement equipment in order to verify efficiency rates.

10.5.2.2 Availability of Backup Equipment

If there is a breakdown of the air pollution abatement system, automatic shutdown of production occurs. Backup equipment has been installed to minimize downtime. It is considered worth the extra investment. A backup carbon adsorber and a spare fume incinerator in the treater-tower area are part of the backup system. When one of the other adsorbers or incinerators breaks down, there is an automatic switchover to the backup. Dust collectors and scrubbers have no backup, however, because routine protective maintenance over the holidays and on weekends is sufficient to keep them in good working order. Also, spare parts for all the equipment are kept on hand for necessary repairs.[15]

10.5.2.3 Procedures for Prevention of Upset Recurrences

Stack sampling is conducted at least once a year on all critical equipment. This certifies the efficiencies of the equipment and gives advance notice of problems. If the corporate standard is exceeded, it must be reported to upper-level management. When state or federal standards are exceeded during an upset, the TACB must be informed. In these cases, IBM takes all possible precautions to see that the incident does not recur.

An accidental cupric chloride escape in January 1982 illustrates this caution. Environmental Programs Department personnel discovered that a small amount of the acid had been vented directly into the air when they saw a green copper stain near a ventilation shaft during an inspection of the plant's roof. By backtracking the ventilation system they learned that the upset occurred because a tank had been overfilled for some unknown reason. An extra scrubber was put in as a buffer to make certain that if the tank were overfilled again no harmful amount of acid could be sucked through the exhaust system and escape into the air.

The type of prevention chosen depends on the potential severity of an upset. Because cupric chloride is a toxic substance, extremely strict measures were taken. A contingency budget exists to deal with these types of emergencies. Detailed justification is required to use it. It appears that the greater incentive to conscientiously monitor environmental impact comes from within the company and that it is greater than the incentive that comes from the regulatory agency.

Design efficiencies for the abatement equipment in use are overdesigned for substances that are easy to remove in order to meet the minimum standards on substances that are more difficult to remove. Different contingencies are factored in to deal with variations in emissions levels, variations in temperature, and other variations in the equipment's influent characteristics.

10.6 Critical Issues and Conclusions

10.6.1 Critical Issues

The critical issues of the IBM permitting case study center around the nature of the company. Its size, its high-technology focus, the chemical-intensive nature of its production processes, and its internal organization are important factors that determine how the company interacts with the TACB throughout the permitting process.

10.6.1.1 Company Size

IBM is a multinational corporation with plants in many areas of the world, and as such it encounters many different types of environmental regulation. The great variation in environmental regulation was perhaps one of the incentives for the company's development of uniform internal policies to deal with environmental matters.

Because of IBM's large size, the company has enormous resources at its disposal to use in addressing environmental concerns. It can invest in long-term planning and therefore cope with bureaucratic delays. It can hire specialized staff to maintain environmental standards at the plant sites. It can create departments and budgets that deal only with environmental and regulatory matters.

10.6.1.2 High-Technology Focus

IBM's use of sophisticated technology in its production processes and its emphasis on high-technology products, orient the company toward the use of high-technology equipment in other areas as well. IBM is inclined to invest in new types of abatement control technology to improve emissions control efficiencies. The company is also seeking alternative production technologies that will reduce environmental hazards. A strong motivation for constant improvement of environmental protection procedures is indicated rather than seeking to meet minimal standards.

High technology has had the reputation in the past for being environmentally clean. IBM appears anxious to preserve this image. Their attitude contributes to the smooth relationship between the company and the TACB permit writers and enforcement officials.

10.6.1.3 The Chemical-Intensive Production Process

The company uses many different chemicals, some of which are volatile or hazardous, in manufacturing circuit boards, yet they take extensive special precautions with these materials to prevent spills and reactions.

10.6.1.4 IBM's Internal Organization

IBM takes responsibility for the environmentally risky aspects of its production processes and has designed a series of policies to deal with them. The length of time that the corporate facilities practices have been in place shows that IBM's upper-level management realized early that environmental legislation and regulation would be permanent and that public concerns about the environment must be dealt with. It is possible that IBM's implementation of corporate facilities practices consistently throughout its plant sites shows the company's intention to control this environmental management process as much as possible from within rather than always awaiting governmental direction. IBM's corporate policy is in contrast to Monsanto, which prefers regulatory agencies to clearly spell out all regulations that must be followed, rather than taking the initiative itself.

IBM centralizes all environmental administration tasks in one department, the Environmental Programs Department. This department is responsible for all regulatory interface. Such centralization is appropriate and effective because it prevents confusion and duplication.

However, at the same time that environmental matters are concentrated, they also involve all sectors and departments of the plant through the Environmental Impact Assessment Program. Not only is the initiating department of a proposed change required to evaluate the environmental consequences of the changes, but the impact of the proposed change is reviewed by other departments with other areas of expertise, ensuring that important details are not overlooked.

IBM's internal organization is, above all, functional. It is designed to complete legal requirements in the most efficient and complete way possible. It is also capable of adapting to new standards or to new technologies.

10.6.1.5 Cross-Media Concerns at IBM

Although intermedia transfers are not included specifically within the corporate facilities practices or the environmental impact assessment checklist, the procedures at IBM make unintended negative effects from cross-media transfers unlikely. It is perhaps appropriate that the fragmentation and media specificity at the regulatory end of the spectrum is balanced by coherence on the industry side.

10.6.1.6 Relations with the Texas Air Control Board

The IBM engineers have a favorable opinion of their TACB counterparts, believing that, given their work load, they do a very good job. They consider the permitting process to involve negotiation only in the sense of its being a dialogue, and not to the extent of compromising specific legal requirements. They believe that regulations must be interpreted and that the best method of meeting the requirement involves flexibility.

The issue of the Austin plant's stack height illustrates the negotiation aspect of the permitting procedure and shows IBM's willingness to take the initiative. IBM had requested permission during the construction phase of the permit application to lower its stacks for aesthetic reasons. No regulatory difficulty was found with this as long as the quantity of emissions remained the same. IBM eventually increased the stack height because over time engineers in the Environmental Program Department learned that under certain weather conditions--wind speed and direction, temperature, humidity, etc.--emissions would linger near the plant. Ground-level concentrations increased, and effective dispersion of the allowable emissions was not taking place. Because this could have negative consequences, the stacks were heightened.

IBM's representative, Rich Reich, emphasized that many times particular pollution abatement systems have to be tested before their actual effect can be known, despite the care and sophistication of planning and modeling. He offered a rule of thumb for industrial chemical processes--if something smells wrong, something is going wrong. His division's philosophy is that there is no substitute for doing it right the first time. In the instance of the stack height situation, the original shorter stacks were designed with enough strength to support the extra weight of increased height if it were needed.[16]

10.6.2 Conclusions

It is clear from the IBM case study that the attitude and practices of private industry can play a very positive role in the effectiveness of the permitting process. Because IBM is an active and willing participant, there have been few difficulties at the Austin plant.

It was evident throughout the case study interview that motivation for this apparently high-quality environmental performance is more a matter of internal than external pressures. Management commitment to maintaining a good reputation makes itself felt through the Environmental Program Department and in other areas of the plant.

Motivation for management to adhere strictly to these policies probably comes from an interest in controlling <u>all</u> aspects of their enterprises. As the company fulfills and even exceeds its legal obligations, it is less vulnerable to regulatory interference and control. It is clear that IBM prefers to run its environmental programs as it sees fit rather than being controlled by governmental regulatory manipulations.

Notes

[1]Telephone interview with Rich Reich, IBM Engineer, March 7, 1985.

[2]Interviews with Rich Reich, November 30, 1984, and March 7 and 14, 1985.

[3]Telephone interview with Rich Reich, March 14, 1985.

[4]Permit File 7382 and interview with Art Kellogg, November 16, 1984.

[5]Telephone interview with Rich Reich, March 14, 1985.

[6]Interview with Art Kellogg, November 16, 1984.

[7]Amendment to IBM permit being processed. Interview with Stephen Belyea, TACB Regional Engineer, December 3, 1984.

[8]IBM Permit file #7382, TACB.

[9]Interview with Art Kellogg, November 16, 1984.

[10]Interviews with P.F. Napolitano and Rich Reich, November 29, 1984, and Rich Reich, March 7, 1985.

[11]*Ibid*.

[12]Interview with Rich Reich, November 30, 1984.

[13]Interviews with Rich Reich, November 29 and 30, 1984, and March 7 and 14, 1985.

[14]Telephone interview with Rich Reich, March 14, 1985.

[15]*Ibid*.

[16]*Ibid*.

PART III: ANALYSIS AND RECOMMENDATIONS

The following is the project team's attempt to synthesize the major findings of the case studies. Based on our evaluation of the five facilities, we found that certain problems and issues were consistently appearing. They are highlighted in the chapter titled Critical Analysis of Case Studies. Recommendations on how Texas environmental agencies and the EPA can solve those problems are included in the chapter titled Recommendations.

Our findings are based on a small, select sample and may not be applicable to other permitting situations.

11. Critical Analysis of Case Studies

11.1 Introduction

The policy research project began with an attempt to identify the issues critical to the successful operation of the permitting process. Effectiveness was a primary issue. Initial discussion focused on two types of effectiveness: administrative and environmental. These areas may be further analyzed by testing the relevance of the permitting processes' design against the problems that it addresses.

Issues identified as critical to administrative effectiveness include the mechanics of the permitting procedure, the role of the permit writer, the availability of relevant information, the role of the public, and the nature of communications between the parties involved (state agencies, the applicant, and the EPA).

Environmental effectiveness is defined as the permit's ability to improve or maintain environmental quality. Critical issues identified within this category include enforcement and compliance, the effects of statutory limitations, and the adaptability of the permitting process to new pollution problems.

These critical issues as originally identified by the project team were revised based on knowledge gained from the five case studies. The results of the project indicate that some of the issues identified earlier are less significant and some more so than originally anticipated. Five general categories of critical issues were ultimately identified: (1) the administrative efficiency and effectiveness of the regulatory agency; (2) its success or failure in compliance and enforcement; (3) the nature of interactions and communications among the parties involved; (4) the extent to which the cross-media issue is addressed; and (5) the different roles played by the permit.

11.2 Administrative Efficiency of the Regulatory Agencies

Environmental administration is a concept of managing human affairs in such a way that biological health, diversity, and ecological balance will be preserved.[1] An important factor in environmental administration is the processing of permits for emissions regulated by state and federal laws. This section analyzes the efficiency of the permitting processes administered by the TACB and the TDWR based on the five case studies.

First, an environmental program should contain procedures and guidelines that staff can use on a daily basis without wasting valuable resources (i.e., reinventing the wheel every time a new permit is written). Second, procedures and guidelines should aid in achieving the goal of environmental protection. Third, the staff itself should have the competence to carry out the procedures and the ability to make effective decisions when flexibility in procedures and guidelines is encountered.

11.2.1 The Effects of Deadlines Imposed by Statutes

The execution of administrative tasks by the TACB and the TDWR appears efficient in regard to deadlines. Deadlines imposed by state statutes concerning the issuance of permits are regularly adhered to. None of the case studies reported incidents of substantial delays. However, according to the LCRA (air), IBM, and Motorola case studies, TACB engineers are not required by law to complete permits within a certain time. The LCRA case study showed this not to be a problem and noted that most air permits are completed within six months. The IBM case study reported frequent delays in the TACB's processing of permits due to the large and increasing amounts of paperwork, which tended to result in bottlenecks. IBM engineers informed TACB engineers of their current technological practices when necessary to help expedite the permit process.

The city of Austin and the LCRA (water) case studies dealt with the TDWR, which has established a 120-day deadline in which to take final action on an uncontested permit. The UIC Section of the TDWR uses a seventy-five-day deadline for issuing uncontested permits. Naturally, delays are inevitable in the case of contested permits because every comment received from the public must be accompanied by a response from either the TACB, the TDWR, or the EPA. Sometimes comments may come from citizens who are misinformed in which case the response process may be unnecessarily time-consuming. The necessity in some cases of holding hearings to respond to public protest can extend the permitting process substantially. Our study shows that the TDWR meets its deadlines on a regular basis. The three case studies mentioned above did not report any problems in administrative efficiency at the state level. However, the LCRA (water) noted that federal permitting processes set no time limits on issuing permits, which results in occasional delays. The TDWR receives an average of five applications per year for underground injection permits--a number easily managed.

11.2.2 Effects of Administrative Procedures

Administrative procedures implemented at the TDWR and the TACB seem to promote effective control of point sources of pollution. The five case studies find state and federal agencies to be efficient and effective in carrying out their mandate. The studies document that flexibility in permitting aids in solving of environmental problems raised in individual cases. There seems to be substantial effort on the part of permit-writing engineers to work with the permit applicants and staff at the permitted sites. This cooperation fosters increased efficiency in environmental control. The LCRA case study attributed increased efficiency in the permitting process to the flexibility allowed each permit writer. However, the studies also point out that differences in opinion between agency engineers and applicants may lead to delay due to requests for evidentiary hearings.

As illustrated by the city of Austin study and the case studies that examined air permits, nonpoint sources of pollution and some hazardous air pollutants are not controlled by federal or state regulations. This lack of regulation diminishes the effectiveness of environmental protection. However, it is difficult for state agencies to regulate on their own due to a lack of resources and a lack of motivation necessary to promulgate standards. In the case of hazardous air pollutants that are not regulated under NESHAPs, the lack of technical resources is a primary reason for the absence of state regulation.

An important factor affecting environmental protection is the duration of the permit. The CWA requires that permits be issued for a fixed time period of not more than five years. Any facility built to comply with CWA NSPS is protected from having to meet more stringent NSPS for ten years. The effect is similar to issuing a permit for a ten-year period. This protection applies only to technological standards and does not apply to toxic pollutant or water quality standards promulgated under the CWA.

Under the CWA, plants can be required to engage in costly retrofitting if more stringent technology standards are promulgated after the plant was permitted. If a facility fails to carry out the retrofitting and subsequently does not meet established standards, the permit renewal would be denied by the permitting agency. Under the CAA, a source must only meet the NSPS that are applicable when it is built. Because permits are nonrenewable under the CAA, plants need not engage in costly retrofitting to meet newly promulgated NSPS.

The benefits of technology forcing standards, such as renewable permits, are that the quality of the environment improves (ceterus paribus). However, this improvement may be associated with social costs such as plant layoffs or higher prices (to pay for the retrofitting).

Environmental standards enforced by renewable permits also entail other social costs. Processing permit renewals requires staff resources. The additional salaries can be paid by increasing permit fees. However, if fees are increased, they may be passed on to consumers in the form of higher prices. If the state pays the extra salaries, the costs may be passed on through increased taxes.

11.2.3 Staff Competence

All of the case studies found the staff at the TDWR and the TACB to be competent. They appear to be well-educated, concerned about the environment, and committed to seeking workable solutions when dealing with permittees and complex emissions problems. The engineers participate in educational seminars and/or receive updated information from superiors on technological advances or changes in regulations. The only notable limitation is the level of funding at these state agencies. Both the TDWR and the TACB are now subject to a hiring freeze (along with most other state agencies) in an effort to reduce the state budget deficit. The director of enforcement at the TDWR is forced to rely on only one staff person to handle compliance problems in approximately seven counties. In addition, permit writers at the TACB have very demanding workloads. Furthermore, as of February 1985, the TACB was forced to eliminate its atmospheric modeling section due to budget constraints. The TACB used to perform this modeling for the applicant. Now this will have to be done by the permittee (or environmental consultants hired for that purpose).

11.3 Compliance and Enforcement

Compliance and enforcement play an integral role in environmental protection. Evaluation of such efforts provides a measure of how well the permit is meeting its goal of promoting and maintaining environmental health and protection. This analysis addresses three questions: What are the general compliance and enforcement requirements of each agency? Are these requirements fulfilled on a regular basis? and, Are the requirements adequate to meet enforcement goals?

11.3.1 General Requirements

The TACB's system of detecting noncompliance is partially based on annual inspections. In cases of small, well-operated facilities, inspections may be less frequent.[2] Inspections are also conducted when the TACB receives written or verbal complaints from citizens. The LCRA (air), IBM, and Motorola plants all maintain emission records that are available to state and federal inspectors. Emission reports must be submitted quarterly to state officials by major sources. The minimum number of inspections to be conducted by state officials is established in the permit.

With respect to wastewater treatment, the TDWR takes enforcement one step further by requiring permittees to engage in self-monitoring and to submit the results in monthly reports. In addition, the TDWR conducts annual inspections. The UIC Section of the TDWR follows the same procedures.

11.3.2 Adherence to Requirements

All five case studies portrayed companies or plants with minimal or negligible compliance problems. The LCRA, IBM, and Monsanto all use state-of-the-art pollution control devices. Because they are large and financially stable, they can finance these devices with little difficulty. The three profit-making companies--IBM, Monsanto, and Motorola--as well as the LCRA, understand that adhering to state and federal regulations is in their best interest in terms of public relations.

The state of Texas uses a flexible system to deal with noncompliance in wastewater treatment. State officials estimate that 80 percent of the municipalities and 90 percent of private industries are in compliance. The Texas system works so well that the EPA region VI office plans to base their monitoring system on the TDWR's system of self-monitored monthly reports. The flexibility in the system results from the use of administrative orders (or compliance agreements). When a permitted facility does not meet the specifications of the permit, an administrative order is issued specifying temporary permit parameters in a solution-oriented framework with deadlines for compliance. This action saves the state agency from simply imposing sanctions that may not be the solution to long-term problems. This method is effective in that it takes into consideration many factors facing facility personnel such as budget constraints, mechanical failure, unprojected or poorly planned population growth, political constraints, and unknowns in the environment.

11.3.3 Adequacy of Requirements

If the requirements for information from applicants regarding operation and emissions is sufficient and enforcement is effective, the environment should be protected to the extent of the permit design. The IBM case study reports that the TACB has chosen to restrict air emissions more stringently than the EPA requires. Conversely, the Motorola case study indicates that there is the possibility that too little action is being taken to control air pollutants because many exemptions are issued at one site. Emissions are regulated by evaluating emissions building by building, rather than for the site as a whole. The amount of emissions is small enough at each building to avoid extensive regulation, but the collective amount of emissions may be harmful.

Another consideration is whether or not the minor sources permitted by the TACB should be required to file emission reports with the TACB for review. Since the permits are not renewable and compliance reports are not required for minor sources, it seems questionable whether or not the TACB provides proper supervision. It is difficult to assess whether the TACB provides proper supervision without technical expertise in the field.

Another noncompliance reporting issue arises in the city of Austin case study. The city uses the self-reporting system. The director of enforcement at the TDWR said that he does not usually read the monthly reports until two or three months after they are submitted because of time pressures. However, wastewater treatment personnel notify him in the event of important violations. This system may leave room for various violations to go unreported at many levels.

Although administrative efficiency and effectiveness may suffer if additional requirements are imposed, there appears to be room for more substantive compliance/enforcement requirements. An in-depth investigation and assessment of these gaps may contribute to more meaningful enforcement requirements. Finally, the gains in environmental quality from increased enforcement requirements must be weighed against the costs. Traditionally, environmental programs have focused on major polluters so as to concentrate limited public resources where they could achieve the greatest results. It may be time to reevaluate this focus.

11.4 Interaction between Permitting Agencies and Applicants

The nature of communications, in the context of environmental permitting, is to a great extent determined by the permit applicant. He initiates contact. His willingness to submit information and to comply with agency requirements greatly affects the nature of any subsequent interaction. The technical aspects of the process are smoothed when participants work together without regarding each other as adversaries. The permitting process makes this possible because permits are issued on a case-by-case basis. Ideally, the permit writer and the applicant's representatives can work together to meet mandated standards. When this is not possible, delays are likely.

The issue of communications is very important in each case study, but in different ways. In the case studies of the private companies--Motorola, IBM, and Monsanto--communications between the permitting agency and the applicant appear to be fairly good. The extent of communications in the case of the air permits (Motorola and IBM) is determined by the frequency of plant modifications, because after air permits are issued they are in force until the emissions-producing process is altered in some way. Therefore, communications are infrequent, as is the case with Motorola. IBM has more frequent contact with the TACB since this company constantly updates its equipment and pollution-abatement devices. Scheduled inspections take place only once a year for air permits, so communication with compliance personnel is usually limited. Companies are required to report upsets (incidents of excessive emissions which violate permit conditions) to the TACB within ten days of their occurrence. Frequency of communication is determined more by what happens at the plant than by specific requirements or by actions taken by the air control agency. The TACB has neither the staff nor the time to initiate communications beyond this minimum level.

Communications sometimes consist of negotiation. Negotiations usually consist of both parties sharing their perspectives on a problem and resolving it by a compromise that adheres to legal requirements. Confusion over how much harmful gas the Motorola plant was actually emitting was finally resolved productively with the installation of a catalytic incinerator. A cost-effective method of control of N_2O and SO_2 at the IBM site was written into the permit as a special provision. The resolution of problems or of differences in interpretation of the permitting procedure demonstrates successful communications. In the Monsanto case, a similarly cooperative and positive working relationship was discovered. Each permit writer maintains a problem-solving attitude in his work with the UIC system and the permittee.

The three private companies selected for study are all large in terms of their economic significance and resource base. Their size probably affects the nature of their communications with their respective regulatory agencies because the companies have the resources to develop internal and centralized programs that specialize in environmental and regulatory issues. They can plan in advance to cope with bureaucratic procedures. Monsanto and IBM both have well-developed environmental programs. Motorola's environmental department has a shorter history and was developed in response to difficulties rather than through the company's foresight.

In the study of the two public organizations--the city of Austin's Walnut Creek sewage treatment plant and the LCRA's Fayette power plant--communications appear to be equally good. The LCRA in particular has shown itself to be willing to plan ahead and resolve difficulties early in the application process. Because lignite-generated power has been a sensitive issue in central Texas, the LCRA is careful to make its permitting process as smooth as possible.

Another aspect of communication that is important in environmental permitting is interaction between the environmental regulatory agencies. There is little communication between the TDWR and the TACB, which has implications for the gap in coverage of cross-media problems. Each agency is reluctant to get involved in each other's jurisdiction. Areas of authority are spelled out in the enabling legislation, and neither agency will go beyond this without legislative leadership. On the other hand, media-specific legislation allows the agencies to specialize, which can improve the quality of environmental control.

Regarding communications with the EPA, the permittees studied generally find the federal agency more difficult to deal with than the state agencies (if they have any interaction with the EPA at all). The EPA is considered somewhat high-handed, less flexible, unwilling to deal with problems on a case-by-case basis, and more bureaucratic. This is particularly true in the IBM and LCRA cases, which underwent PSD review.

11.5 Cross-Media Issues

Intermedia transfers of pollutants have recently received increased attention because of the potential for severe environmental damage (e.g., pollution of groundwater). It is sometimes appropriate to move a pollutant to a medium in which it will pose less risk, in which the concentrations will be much smaller and the accompanying hazards will be reduced, or in which concentrations are greater but better insulated from the rest of the environment. This action constitutes a voluntary cross-media transfer. Involuntary transfers, which may be undetected and have unintended negative effects, represent a gap in the permit's effectiveness in maintaining environmental quality.

Cross-media issues at each site are dependent on the nature of the processes involved. They are difficult to identify precisely because the permits are media specific. The permit documents themselves do not address intermedia problems. Emissions or the waste-producing process itself must be examined to locate areas of concern.

The air permits at the high-technology companies showed no apparent severe cross-media problems. One of the abatement technologies currently in use at IBM involves transfer of solvent emissions from the equipment into industrial wastewater through the equipment's cleaning process. IBM has plans to install new technologies that will eliminate this problem, but there is no specific water or air permit provision to deal with it. In cases like this, the TDWR does look at the cross-media issue but does not insert provisions into the permit because of lack of statutory authority. In this instance the problem is addressed by local government. The city of Austin has an industrial waste ordinance that requires pretreatment of these substances before they can flow into the city sewage system.

One of the cross-media issues raised in the LCRA air permit case concerns a similar problem of removal of calcium sulfate (gypsum) as the by-product of an SO_2 scrubber. Calcium sulfate disposal is not controlled by air permit provisions, because this is not mandated by the CAA. The LCRA plans to sell the gypsum as building material or to bury it in a landfill. The second option is controlled by a TDWR solid waste permit.

Another cross-media issue raised by construction of the LCRA Fayette power plant is the possibility of its contribution to acid rain. Neither the TACB nor the LCRA plan to deal with this contingency. A TACB study of the problem concluded that acid rain might actually improve the fertility of Texas soil, so it was not a concern even though there could be negative impacts on other states.

Cross-media effects seen in the water permit case studies varied with the nature of the process. Concerns from the LCRA case are speculative and focus on the possible evaporation or leaching of harmful substances from a storage pond. Fly ash, a waste material, is to be sold as building material, and it is not known whether or not there may be harmful effects associated with this.

The Walnut Creek sewage treatment plant displays similar potential hazards of evaporation or leaching. An older sludge lagoon has no liner other than natural clay. There are no provisions for monitoring the air near the secondary clarifiers or sludge lagoons, although there are plans for drilling monitoring wells near the older lagoon. Furthermore, there is no way to prevent toxics from passing through the system because the basic treatment process is organic and involves the natural cleaning activity of microorganisms, which are likely to be killed by high toxics levels in the incoming effluent stream.

Possible cross-media effects in the Monsanto case are unique to underground injection technology. In a sense they represent the epitome of all cross-media problems because they involve the lack of real information about what a particular technical process may do to the environment. Many of the actual effects of chemical reactions with underground conditions (such as high temperatures and pressures) are presently unknown. Underground water contamination may be a possibility. As the number of wells drilled and the quantity of wastes injected become greater, the possible effects may become more severe and more difficult to control.

It is probable that the permitting process will not address cross-media problems as long as the impacts are not fully understood and are not perceived as being seriously harmful. Agency attention increases as legislation becomes more comprehensive and as problems provoke greater public outcry. At present, agency action is severely constrained by current legislation. Without the legal authority to regulate, environmental agencies are virtually powerless. New permit conditions aimed at controlling cross-media pollution can be appealed under current law by the applicant as being overly discretionary.

11.6 The Roles of the Permit

There are at least two views on the function of environmental permits. One view of the permit is as a container of information about the site and the environmental quality to be found there. More information implies better control of the polluting processes at the site. A thorough knowledge of site characteristics can lead to a better resolution of problems and appropriate policy adaptations.

The permit may also be considered the crucial link between the institutions of government and industry. Hence, it provides the opportunity for essential communications on practical issues. In this sense, it is a policy tool that is adaptable to each particular case while adhering to agreed-upon standards.

Notes

[1]Stahrl Edmunds and John Letey, Environmental Administration (New York: McGraw-Hill, 1973), p. 1.

[2]Interview with Sabino Gomez, Acting Director of Compliance Division, Texas Air Control Board, Austin, Texas, November 26, 1984.

12. Recommendations

12.1 Introduction

This report has examined environmental permitting in Texas. Air, water, and underground permitting were examined. The report is based on five case studies and may reflect bias due to the nature of the industries and sites chosen or to the small sample size. Nevertheless, we believe the findings allow some general conclusions to be drawn about the state of environmental permitting in Texas. This chapter presents recommendations in five major areas of concern: administrative efficiency and effectiveness, compliance and enforcement, public participation, communication, and cross-media effects.

12.2 Administrative Efficiency and Effectiveness

State and federal permitting processes appear to be efficient and effective in controlling designated emissions discharged into the air, water and earth. The procedures and guidelines set forth within the applicable state and federal legislation are administered efficiently and within designated deadlines. The case studies suggest, however, that the discretion of the permit writer, the availability of resources, and industries' perception of environmental responsibility are key factors contributing to the degree of effectiveness and efficiency of permit administration.

In the cases of TACB-issued air permits and EPA-issued NPDES water permits, in which no administrative deadlines are established, time delays are attributed to technical complexities. In these cases, permits are issued within reasonable periods of time and pose no major problems for the permittees.

12.2.1 Permit Writers' Discretion

Under the authority of the CAA and the TCAA, engineers may not write permit conditions to control air pollutants that they have no mandate to control. Only six pollutants are regulated by NSPS; more are regulated under the PSD program, which remains primarily a federal responsibility. Under the authority of the CWA, there are 129 priority pollutants with designated standards, but only major pollutants common to specific industry categories require regulation. Because state and federal regulatory agencies are slow in establishing enforceable guidelines for pollutants, state and federal statutes give permit writers the authority to control water pollutants that are not explicitly specified in the regulations. Greater discretion by the permit writer allows flexibility and adaptability by enabling the permit writers to address specific problems that may arise within specific industries or localities.

There are several disadvantages to this process. Overly discretionary permit conditions requiring costly equipment or changes in plant design with little benefit in reduced emissions are generally contested by the permit applicant. The absence of underlying scientific data for setting effluent standards reduces the chance that the permit writers' decision will stand in the case of an evidentiary hearing. Furthermore, discretionary decisions hinder permit consistency and predictability, making it difficult for permittees to plan ahead.

To increase the effectiveness of environmental permitting and to reduce some of the difficulties with discretionary decisionmaking, the research team suggests that the following options be considered:

1. When the permit is written, the engineer should include an appendix or separate document containing the information upon which he is basing his decisions. This system is presently used by the water permit sections of the EPA and the TDWR and by the TACB in its technical review of PSD permit applications. It has the advantage of explicitly stating the decisionmaking criteria, which should result in greater consistency.

2. Increased interaction between the agency and the applicant could improve understanding and cooperation in areas of uncertainty and could also eliminate the development of disagreements later in the permitting process.

3. Actions should be taken to address the information gap that currently inhibits the promulgation of standards for some hazardous pollutants (i.e., organic chemicals, hazardous air pollutants, toxic chemicals, pesticides, etc.)

The research team recognizes that all of these options have some resource cost. But all of the options could help ensure more consistency and predictability in setting permit limitations.

12.2.2 The Availability of Resources

As noted in the analysis chapter, the TDWR and the TACB are now subject to a hiring freeze, and these agencies are facing budget cuts. Permit writers at the TACB face increasing workloads. With an increasing amount of permit requests, the ability of state and federal agencies to handle the additional workload is questionable. Therefore, we recommend that action be taken to increase the self-sufficiency of these agencies. The following options to increase self-sufficiency are suggested:

1. Increase permit fees to generate sufficient funds for permit processing.

2. Encourage allocation of NPDES and NSPS authority to the state of Texas. The EPA has already recognized Texas as competent to

take on partial authority in these two areas, but delegation of full authority has been extremely slow. Allocating permit authority to the states will eliminate duplicate processing and bottlenecks that occur at the federal level. This suggestion is based on the premise that more federal funds for environmental permitting would be released to the states.

3. Redesign compliance programs to include incentives that could be added to already extant sanctions and disincentives. Incentives could be offered to companies that demonstrate a commitment to go beyond mandated standards and to seek not only to minimize their negative environmental impact, but also to create ways of addressing pollution problems. Many firms increasingly recognize that commitment to environmental quality is good business practice. These firms should be encouraged to make a positive contribution to the environmental situation and an active role in understanding the effects of pollution (including those of intermedia transfers).

12.2.3 Industries' Environmental Responsibility

The effectiveness of the permitting process can be assessed in part by the ability and willingness of regulated industries to comply with the permit provisions. The willingness of the industries in this study to comply with the conditions set forth in the permits reflects their sense of environmental responsibility, the economic costs involved, and the accuracy of the information upon which the limitations are calculated.

IBM, Motorola, Monsanto and the LCRA all demonstrate a willingness to cooperate with state and federal agencies, and especially in the case of IBM to go far beyond regulations to ensure the protection of the environment. The case studies reveal a clear sense of enlightened responsibility among these major producers. We recommend that state and federal policymakers explore the reasons behind this self-control and develop a policy that encourages its recognition and proliferation.

12.3 Cross-Media Pollution

One of the difficulties in the permitting process with regard to cross media pollutants is the lack of technical and scientific information on the nature of the problem. We recommend

1. informing and educating agency engineers about cross-media transfers. Such an educational process could involve placing materials on cross-media pollutants in agency libraries, beginning a system of formal training sessions, and accessing national bases with specific information sources.

2. establishing a special section in each agency to address cross-media issues.

3. modifying permit application forms to specifically consider cross-media issues. For instance, a checklist that would include references to cross-media problems could be used when issuing permits. Of course, such modifications must recognize limitations imposed by current environmental statutes.

12.4 Compliance and Enforcement

The self-monitored reporting system requires permit holders to be responsible for submitting emission reports to the regulatory agencies and for measuring effluent levels. The case studies reveal that this system leaves room for violations to go unnoticed by the regulating agencies.

Air regulations make a distinction between major sources and minor sources. Minor sources are subject to yearly inspections, whereas major sources are subject to stringent controls, explicit monitoring procedures and schedules, and more frequent inspections. Water regulations require that monitoring schedules be written into the permits and that periodic reports be submitted, but that inspections be conducted only once a year. If certain processes are not in operation or if there is no wastewater discharge at the time of the inspection, no water samples are taken. Certain analyses can take up to five days before results are known. By then the effluent has been passed through the system unchecked. In addition, the process of determining whether or not a source is major or minor often considers only certain processes of the entire operation (as in the LCRA NPDES water permit case) or permits the processes separately (as in the case of air permits).

In light of these observations, we recommend that action be taken to address problems due to inconsistencies in the compliance and enforcement requirements of the self-monitoring system and that action be taken to reduce opportunities for permit violations. Specifically, the following actions should be considered.

1. Frequent audits of the permitting site should be conducted.

2. Unannounced or surprise inspections should be held at a minimum of once a year at all permit sites.

3. Reports should be submitted by all facilities (major and minor) to allow regulatory agencies to record the accumulated emissions.

4. Strict fines should be imposed on industries that intentionally violate their permits without informing the regulatory agency.

12.5 Barriers to Communication between Regulator and Regulatee

Many times inconsistencies in compliance and enforcement are due to a lack of communication. Often the self-reports submitted on discharges are the only communication that takes place between the regulator and the permittee. State regulatory agencies would do well to be actively concerned with improving communications with the companies they permit. While both parties should undoubtedly be concerned about communication, it is reasonable to place a heavier burden of improving communications on state agencies. In this respect we recommend more contacts between regulator and regulatee in the form of scheduled as well as informal interaction such as phone calls or personal visits, when writing or renewing permits.

12.6 Barriers to Communication between and within Agencies

The TDWR and the TACB try as much as possible not to interfere with the other's jurisdiction. However, permitting involving the control of cross-media pollution could be greatly improved with better communication between the TACB and the TDWR. In order to improve the efficiency of the permitting process and to promote a cleaner environment, we recommend

1. that each agency initiate a change in orientation to stress the importance of cross-media issues. Such a change in emphasis could facilitate increased communication between state environmental agencies. The suggested change in orientation should apply to all sections that deal with permitting (e.g., writing, enforcement) within these agencies.

2. that the agencies hold routine meetings in which engineers from both agencies meet to discuss cross-media issues concerning specific industries.

3. that a process be instituted that allows engineers to "red flag" a permit when they expect cross-media pollutants, so they can discuss potential problems with engineers from the other agency.

12.7 Public Participation

The current permitting program seems to be characterized by a low level of public participation. In certain cases, such as underground injection, the lack of involvement is attributed to the highly technical nature of the pollution control process. The LCRA has stated that growing environmental responsibility is the direct result of public awareness and concern over the discharge of wastes into the environment.[1]

However, public involvement in the permitting process can hinder the efficiency of the process because of unfounded complaints that require investigation. Operating under budget constraints, permittees (such as the LCRA) fear that they will be held responsible for responding to each and every comment received by the public. Nevertheless, a democratic form of government places an inherent value on public participation, and in any event great benefit could result from it. Effective public input, however, depends on educating the public on the permitting process.

We recommend that the regulatory agencies use public awareness programs such as the Keystone Siting Process, which is used by the TDWR in the siting of hazardous waste disposal sites, to assure that public participation is an asset rather than a hindrance. We also recommend that the agencies work with companies in developing brochures and other forms of distributing information, which can be read easily and can increase public interest in actively participating in the permitting process.

Notes

[1]Interview with H.R. Locker, Director of Water Permit Section, Lower Colorado River Authority, Austin, Texas, January 31, 1985.

PART IV. APPENDICES

Appendix 1.1

I. Plan for a Study of the Permitting Process in the State of Texas

I.1 Background

The Lyndon B. Johnson School of Public Affairs, University of Texas, in response to the task order dated January 8, 1985, submitted a workplan and budget for a study of the permitting process in the state of Texas. The workplan is reproduced below.

I.2 Organization and Duration of Work

The work will be undertaken by a policy research project (PRP) team, consisting of two faculty members and eleven graduate students (see list in attachment A). The PRP team began work in September 1984. The contract period extends from November 1, 1984, to September 30, 1985.

I.3 Study Focus

The study is designed to evaluate the environmental permitting system in the state of Texas and to formulate policy recommendations to improve the federal and state permitting process.

Specifically, the study attempts to determine if permits comprehensively manage protection of the environment. For this purpose permitting in each environmental medium (water, air, soil) will be examined in order to assess the permitting process and to determine whether intermedia transfers of pollutants are recognized and addressed. The issue is timely since media-specific regulations and permits may ignore secondary impacts on other media. Recent research has documented evidence of intermedia transfer. The study will provide insight on the extent and significance of media transfers, and will consider their impact on permitting.

I.4 Phases I and II

In phase I of the study the team will review the permitting process in the state of Texas (task 1). In phase II five individual facilities will be analyzed in detail, and recommendations will be developed for each site as well as for permitting policy (tasks 2-5).

I.5 Tasks

I.5.1 Task 1: Overview of Permitting in Texas

The PRP team will prepare an overview of environmental permitting in the state of Texas. The following steps are involved:

Appendix 1.1 (cont.)

1. review of permitting requirements under federal legislation (CAA, CWA, RCRA, SDWA);

2. review of state legislation and rules of primary Texas environmental agencies (TACB, TDWR, TRRC, TDPH);

3. interviews with permitting staff in Texas environmental agencies and examination of permit applications, supporting documents, and actual permits.

4. interviews with staff of the Environmental Services Division in the EPA's region VI office.

Interviews will be used to prepare work in phase II of the study.

A draft report will be submitted to the EPA for review and designated contacts at the EPA region VI office as well as state agencies by February 26, 1985.

Time requirements: one hundred hours.

I.5.2 Task 2: Site Selection

I. Purpose:

The policy research project (PRP) study team will be selecting five facilities in the state of Texas for use as a case study base. This number was deemed appropriate considering the number of PRP personnel (eleven).

II. Site Definition:

For the purposes of this study, a site is defined as a physical location where wastes are generated, stored, or disposed of. While this project will be examining the entire spectrum of permitting and waste disposal, sites involving only hazardous wastes will not be considered due to the status of the applicable programs. No sites in Texas for hazardous waste disposal have yet been granted final authorization to proceed under RCRA. Also, sites currently involved in litigation will be omitted due to potential problems with record and file acquisition.

III. Criteria for Selection:

The following criteria will be considered when choosing the most feasible sites for study:

Appendix 1.1 (cont.)

1. Economic Significance: measured by the number of personnel employed by potential study sites.

2. Extensiveness of permitting history: determined both by quantity of permits held and by length of time held.

3. Types of institutions: the goal being a mix of public and private institutions.

4. Likelihood of multimedia transfer of pollutants: the goal being to select sites with likelihood of intermedia transfer problems.

5. Proximity of location to Austin and cost of travel.

6. Good will: demonstrated by willingness to release information and to make company personnel available for interviews.

7. Record of compliance/noncompliance: the goal being to avoid extreme cases of noncompliance.

8. Permit writers' recommendation: After an initial screening of types of facilities, recommendations of specific permits meeting our criteria for study were requested.

IV. Decision Criteria Matrix:

A decision matrix providing a correlation between the previously stated criteria and potential study sites will be constructed to assist the PRP team in determining sites suitable for study.

V. Work Time:

The amount of time required for selection of sites is estimated to be fifty hours.

VI. Report

A memorandum on site selection criteria and sites selected will be sent February 26, 1985.

I.5.3 Task 3: Collection of Site-Specific Emission and Control Data

Emission and control data will be collected on the five facilities chosen in task 2 in order to evaluate the effectiveness of the permit, to assess the extent of cross-media transfers, and to examine how they are controlled in permitting. By documenting total emissions, the PRP team will determine the extent to which controls are adequate--that is, do

Appendix 1.1 (cont.)

controls consider all possible environmental and health hazards in all media?

Information sources will consist of the following:

1. Permit files (state agencies):
    a. Federal permits
    b. State permits
    c. Application material
    d. Monitoring data

2. Applicant's files

3. EPA:
    a. Special reports
    b. Data bases
        - National Emissions Data System (NEDS)-Air
        - Hazardous and Trace Emissions System (HTES)-Air
        - Industrial Facilities Discharge File (IFDF)-Water (Sewage Treatment Plants and Direct Discharges)
        - Needs Survey-Water (Sewage Treatment Plants)
        - Hazardous Waste Data Management Systems (HWDMS)

Strategies for obtaining information will include letter writing, personal and telephone interviews, and visits to the sites. Materials from EPA data bases will be obtained through contacts with EPA personnel at the federal and/or region VI office.

The successful completion of this task is dependent on the timely receipt of requested materials from information sources. The report of the information collected will written up under task 4.

The total time allocated for this task is approximately three hundred hours.

I.5.4 Task 4: Analysis of Permitting at Five Sites

The policy research project team will use the products of the first three tasks in its analysis of environmental permitting at the selected sites. This analysis will emphasize cross-media effects; possible violations; present enforcement and compliance methods; and potential alternatives to present procedures.

The analysis will be in two parts: individual case studies on the five

Appendix 1.1 (cont.)

facilities and a general report on permitting in Texas, which will draw on site studies and will compare the results. Similarities will be examined in light of the effectiveness of permitting in general. Differences may point to problems specific to particular types of industrial processors.

Analysis of the effectiveness of the permitting process as it exists will address such critical issues as technical capability of the regulating agencies; appropriateness of the environmental legislation; enforcement techniques employed; and interagency communications.

Other issues concern the overall design of the permitting process. These include opportunities for public participation; assignment of environmental problems to media-specific agencies instead of approaching the issue comprehensively; targeting of programs on the basis of administrative feasibility instead of the scope of the pollution problem; harmful nature of the environmental impact; and the extent of interaction between state and federal agencies and the causes for variations in the degree of interaction.

Use of information in the permitting process will be analyzed in terms of the kinds and quality of information requested by the permitting agencies; utilization of this information; and identification (if possible) of additional information that could be of benefit to the regulatory agency in its attempts to control pollution.

Time required: eight hundred hours. Report to be submitted for review April 5, 1985.

I.5.4.1 Task 5: Briefing and Recommendations

We intend to make our findings available to interested parties through one or more briefings. The meetings will be used to solicit suggestions concerning the problems uncovered in dealing with the lack of comprehensiveness of data and of the permitting process, the issue of permit consolidation, and possible statutory modifications at each site.

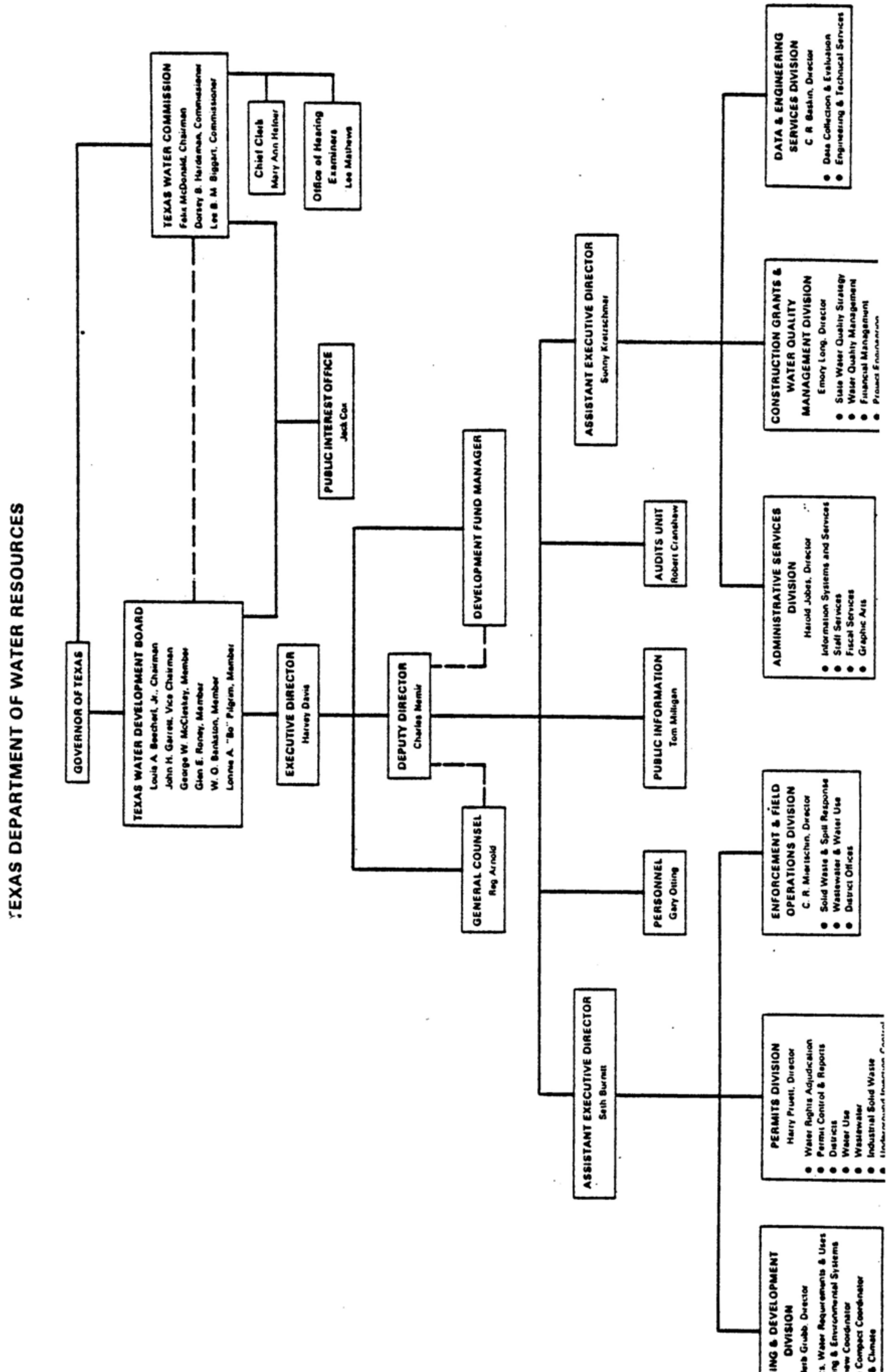
Recommendations from each of the site research teams will be collected in order to formulate overall recommendations concerning permitting and intermedia pollution. If substantial intermedia transfers are found, the research team will spell out options for handling the problem through changes in the permitting process. Some considerations may include whether or not the permit writer is sufficiently informed or whether he is allowed flexibility in the process in order to deal with cross-media transfers effectively. The question of whether present regulations encourage explicit consideration of intermedia pollution will also be considered. Possible alternatives for statutory change will be outlined.

Appendix 1.1 (cont.)

The PRP will evaluate these recommendations on political, administrative, economic, and, to some extent, technical grounds. Incidences of noncompliance will be researched with the intent to determine cause, source, and possible remedies. The final report to the EPA will summarize all recommendations and include pertinent observations concerning organizational and time constraints and limitations.

Time required: three hundred fifty hours. Draft recommendation to be submitted for review April 1, 1985.

Appendix 2.1


TEXAS DEPARTMENT OF WATER RESOURCES
GOVERNOR OF TEXAS
TEXAS WATER COMMISSION
Felix McDonald, Chairman
Dorsey B. Hardeman, Commissioner
Lee B. M. Biggart, Commissioner
Chief Clerk
Mary Ann Hefner
Office of Hearing Examiners
Lee Mathews
PUBLIC INTEREST OFFICE
Jack Cox
TEXAS WATER DEVELOPMENT BOARD
Louis A. Beecherl, Jr., Chairman
John H. Garrett, Vice Chairman
George W. McCleskey, Member
Glen E. Roney, Member
W. O. Bankston, Member
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Sunny Kretzschmar
AUDITS UNIT
Robert Crenshaw
PUBLIC INFORMATION
Tom Milligan
PERSONNEL
ASSISTANT EXECUTIVE DIRECTOR
Seth Burnitt
DATA & ENGINEERING SERVICES DIVISION
C. R. Baskin, Director
Data Collection & Evaluation
Engineering & Technical Services
CONSTRUCTION GRANTS & WATER QUALITY MANAGEMENT DIVISION
Emory Long, Director
State Water Quality Strategy
Water Quality Management
Financial Management
ADMINISTRATIVE SERVICES DIVISION
Harold Jobes, Director
Information Systems and Services
Staff Services
Fiscal Services
Graphic Arts
ENFORCEMENT & FIELD OPERATIONS DIVISION
C. R. Miertschin, Director
Solid Waste & Spill Response
Wastewater & Water Use
District Offices
PERMITS DIVISION
Harry Pruett, Director
Water Rights Adjudication
Permits Control & Reports
Districts
Water Use
Wastewater
Industrial Solid Waste
PLANNING & DEVELOPMENT DIVISION
Herb Grubb, Director
Economics, Water Requirements & Uses
Engineering & Environmental Systems
Interstate Compact Coordinator
Weather & Climate

Appendix 2.2

TEXAS DEPARTMENT OF WATER RESOURCES

INSTRUCTIONS AND PROCEDURAL INFORMATION

For Filing Application for a Permit to Discharge, Deposit or Dispose of Waste

PART I

GENERAL INSTRUCTIONS

1. A person (individual, corporation or other legal entity) who: (1) discharges waste into or adjacent to the waters in the state, (2) treats, stores or disposes of wastewater by irrigation or evaporation, (3) disposes of waste by well injection, (4) recovers minerals by solution mining methods and/or (5) stores, processes or disposes of industrial solid waste (except for on-site storage, processing or disposal of non-hazardous waste), must obtain a permit pursuant to the Texas Water Code or the Texas Solid Waste Disposal Act. In applying to the Texas Department of Water Resources, hereafter referred to as the Department, the applicant shall follow the procedures outlined below, on the application form and in the Rules of the Department.

2. The application shall be mailed to the:

   Executive Director
   Texas Department of Water Resources
   Attention: Permit Control & Reports Section
   P.O. Box 13087, Capitol Station
   Austin, Texas 78711

   and should be submitted a minimum of 180 days prior to the construction of a new or the alteration of an existing treatment facility. A permit holder requesting modification of permit terms and/or conditions, which will not involve construction or alteration of a facility, is encouraged to submit an application 180 days prior to the proposed implementation of the desired change(s).

Telephone Inquiries:	(512)	475-3318—General Permit Information
	(512)	475-6885—Technical — Municipal Permits*
	(512)	475-6368—Technical — Industrial Permits
	(512)	475-2041—Technical — Industrial Solid Waste & Hazardous Waste Permits
	(512)	475-7097—Technical — Disposal Well & In Situ Mining Permits
	(512)	475-7836—Legal

   *Includes Public and Private Sewage Treatment Plants, Water Treatment Plants and Confined Animal Operations.

   The Department's main office is located in the Stephen F. Austin Building at 1700 North Congress Avenue, Austin, Texas. A list of the Department's field offices with a map showing the counties served by each office is found on the last page of these instructions.

3. **Signature on Application:** The person who signs the application form will often be the applicant himself; when another person signs on behalf of the applicant, his title or relationship to the applicant will be shown. *In all cases,* the person signing the form must be authorized to do so by the applicant. A person signing an application on behalf of an applicant shall provide proof of authorization. An application submitted by a corporation must be signed by a principal executive officer of at least the level of vice president or by his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge(s) described in the form originates. In the case of a partnership or a sole proprietorship, the application must be signed by a general partner or the proprietor, respectively. In the case of a municipal, state, federal or other public facility, the application must be signed by a principal executive officer, a ranking elected official or another duly authorized employee.

4. An application will not be processed until all information required to properly consider the application has been obtained. If the applicant fails to submit additionally requested information in a timely manner, the application may be returned.

5. **Fees and Costs.**

   a. The fee for filing an application is \$25 *plus* the cost of required notice, which is a minimum of \$5. Therefore, a person filing an application for (1) an original permit, (2) an amended permit or (3) renewal of a permit, must submit a fee of *\$30.* (Reference § 5.182(b) Texas Water Code and 31 TAC Section 341.154).

   b. The applicant for a permit is required to bear the cost of publication of notice of the application in a newspaper as prescribed by 31 TAC Section 341.285.

6. A person may not commence construction of a treatment facility until the Commission has issued a permit to authorize the discharge of waste from the facility, except with the approval of the Commission.

7. Plans and specifications for all public sewage treatment plants must be approved by either the Department or the Texas Department of Health. The Department is the responsible agency for the review and approval of plans and specifications if the applicant is requesting financial aid for construction from the State Program of Financial Assistance for Construction of Treatment Works or the Federal Construction Grant Program.

   Plans and specifications for all other public & privately owned sewage treatment plants shall be submitted to:

   Texas Department of Health
   Division of Wastewater Technology
   1100 West 49th Street
   Austin, Texas 78756

8. In the event a permit is issued as a result of an application, the Department does hereby inform an applicant that:

   > The issuance of a permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

   Therefore, the applicant is responsible for acquiring easements, as may be necessary, for conducting the disposal operation represented by the application and for obtaining approval from local or state authorities, if necessary, for a discharge to a public right-of-way.

9. At such time the State is delegated authority, by the United States Environmental Protection Agency, to issue NPDES, RCRA or UIC permits, a permit application form provided by the Department will satisfy permit application requirements. In the interim, however, anyone who applies for a permit to discharge, deposit or dispose of waste pursuant to state law may also be required to apply for a federal permit pursuant to federal law. The appropriate federal permit application forms may be obtained by writing:

   U.S. Environmental Protection Agency
   Attention: Permits Branch
   First International Building
   1201 Elm Street
   Dallas, Texas 75270

   It will help expedite processing of the state application if a *copy* of the federal permit application is submitted with the state application. The original federal permit application MUST be submitted to the U.S. Environmental Protection Agency.

10. A request for permit amendment may be in the form of a letter provided that sufficient information is included to evaluate the request. In addition, the permittee must submit the application fee, the names and mailing addresses of persons which might be affected by the application and an affidavit that must be attached to the list of affected persons. The affidavit may be requested from the Permit Control & Reports Section.

11. **Designation of Material as Confidential.**

    a. The designation of material as confidential is frequently carried to excess. The Department is required to review each item that has been designated confidential and to make a determination as to its confidentiality. The Department has a responsibility to provide a copy of each application to other review agencies and to interested persons upon request and to safeguard confidential material from becoming public knowledge. Thus, the Department requests that an applicant (1) be prudent in the designation of material as confidential and (2) submit such material only when it might be essential to the staff in their development of a recommendation.

    b. Reasons of confidentiality include the concept of trade secrecy and other related legal concepts which give a business the right to preserve confidentiality of business information to obtain or retain advantages from its right in the information. This includes authorizations under 5 U.S.C. 5552(b)(4), 18 U.S.C. 1905, and special rules cited in 40 CFR 552.301-2.309.

    c. Each claim of confidentiality must be substantiated upon submission of the material with the application, or the material will be considered available for public review. Section 7 of the Texas Solid Waste Disposal Act does not allow an applicant for an industrial solid waste permit to claim as confidential any record pertaining to the characteristics of the industrial solid waste.

    d. The Executive Director will review each claim of confidentiality. If a claim is not approved, the applicant will be notified and informed whether the material is essential to the application. The applicant may elect to withdraw any confidential material submitted with the application.

12. At bottom center of each page of the application and on all attachments to the application, please note the name in which the application is being submitted.

PART II

PROCEDURAL INFORMATION

The Executive Director's staff will review the application for completeness of information submitted. During the review, the applicant may be contacted for clarification or additional information. When all pertinent information is present, the application or a summary of its contents will be forwarded to other state agencies and local governmental entities interested in water quality control and industrial solid waste management for their review. Following review of the application and any comments received in response to the application, a draft permit will be prepared by the Executive Director's staff unless a recommendation is made not to grant the application.

The Commission may act upon an application for a permit, permit amendment, or renewal of a permit without the necessity of holding a public hearing when:

1. (a) Notice of the application has been mailed to persons possibly affected by the proposed permit; (b) notice has been published at least once in a newspaper regularly published or circulated within each county where the proposed facility or discharge is located and in each county affected by the discharge; and (c) within thirty (30) days following publication of the Commission's notice, a commissioner, the Executive Director or an affected person has not requested a public hearing.
2. The permit holder requests a permit amendment and the request, if granted, would not result in a substantial change in the permit terms and conditions (minor amendment).

A public hearing will be scheduled on an application when requested by a Commissioner, the Executive Director, or an affected person following newspaper publication.

Requirements of Giving Notice of the Application:

1. **By the Applicant:** Every applicant for a permit, permit amendment, or permit renewal shall publish notice (See Note Below) of the application at least once in a newspaper regularly published or circulated within each county where the proposed facility or discharge is located and in each county affected by the discharge. Where a public hearing has been requested, notice will be mailed to the applicant in ample time for publication, which shall be not less than thirty (30) days prior to the date set for the hearing. The Commission will mail the appropriate notice and instructions for publication to the applicant.

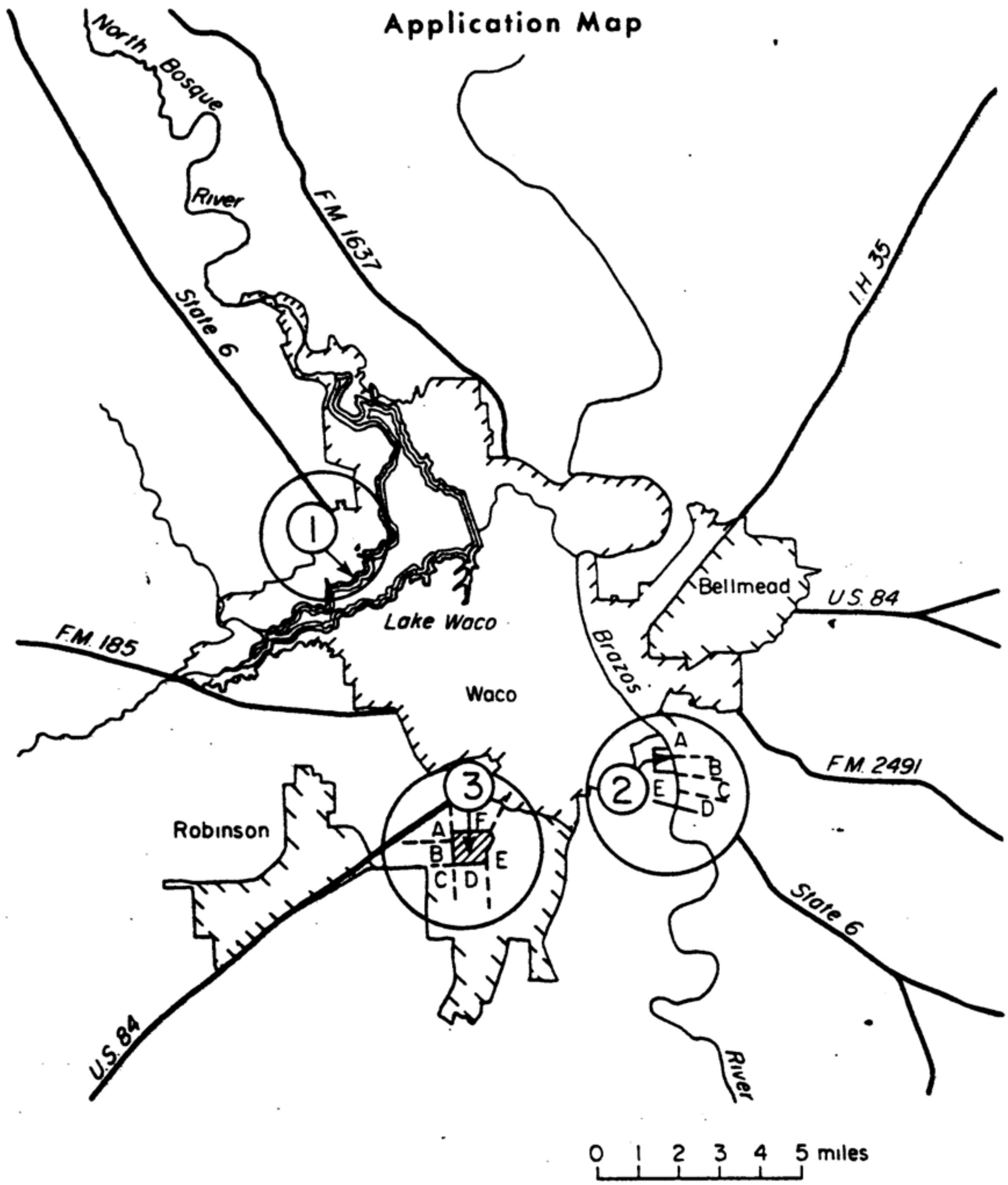
   NOTE: Additional publication and direct mail notice to affected persons will result if a public hearing is requested following newspaper publication of the notice of application. The cost of providing this additionally required publication and service of notice to affected persons will be assumed by the applicant.

2. **By the Texas Water Commission:** The Commission will mail notice of the application to affected persons and certain governmental entities. The notice will be mailed at the same time instructions for newspaper publications are mailed to the applicant.

Consideration of the Permit Application by the Commission:

The applicant will be notified by the Commission when the application is set for final consideration. If the Commission issues the permit, the applicant will be mailed a copy of the permit within one (1) month following Commission approval. (NOTE: *Only one copy is mailed to the applicant* and that copy will be sent to the official mailing address of the applicant as shown on the permit application form.)

Application Map



(1) For discharge to lake, identify all landowners for a minimum of ½ mile either side of the point of discharge.

(2) For discharge to creek or river, identify landowners for a minimum of one (1) mile downstream from point of discharge.

(3) For on-site disposal, identify all adjacent landowners.

Example of Landowner Requirements

LANDOWNERS CROSS—REFERENCED TO APPLICATION MAP

The persons identified below would be considered as affected persons in the case of Example No. 3 on the sample application map.

A. Mr. & Mrs. Edward Smith
1405 Craigmont Lane
Waco, Texas 76710

B. Mr. & Mrs. Terry L. Johnson
Star Route 1, Box 34-A
Robinson, Texas 76706

C. Mrs. Margaret Thompkins
5504 Justin Drive
Waco, Texas 76710

D. Mr. & Mrs. Ted Goldsby
2310 20th Street
Waco, Texas 76724

E. Mrs. Patricia Milsak
1703 Montclair, Apt. C
Waco, Texas 76710

F. Mr. & Mrs. Samuel L. Davis
11901 Knights Bridge
Austin, Texas 78759

TEXAS DEPARTMENT OF WATER RESOURCES
ENFORCEMENT AND FIELD OPERATIONS DIVISION
FIELD OFFICES

DISTRICT 1
3918 Canyon Drive
Amarillo, Texas 79109
806/353-9251 (TEX-AN 8-847-4264)
David Mark Gates, Supervisor

DISTRICT 2
2321-A 50th Street
Lubbock, Texas 79412
806/799-1164 (TEX-AN 8-862-0047)
Raymond L. Mittel, Supervisor

DISTRICT 3
3221 Franklin
Waco, Texas 76710
817/753-3688 (TEX-AN 8-820-1462)
Joe Morgan, Supervisor

DISTRICT 4
203 James Collins Blvd.
Duncanville, Texas 75116
214/298-6171 (TEX-AN 8-831-5650)
Charles D. Gill, Supervisor

DISTRICT 5
2807 Highway 42 North
Kilgore, Texas 75662
214/984-0636 (TEX-AN 8-214-984-0636)
Billy Boggs, Supervisor

DISTRICT 6
P.O. Box 337
1201 Childers Road
Orange, Texas 77630
409/883-2973 (TEX-AN 8-409-883-2973)
Harry Boudreaux, Supervisor

DISTRICT 7
4301 Center Street
Deer Park, Texas 77536
713/479-5981 (TEX-AN 8-850-1250)
Merton J. Coloton, Supervisor

TDWR—EPA LAB
6608 Hornwood Drive
Houston, Texas 77074
713/954-6771 (TEX-AN 8-713-954-6771)

DISTRICT 8
321 Center Street, Suite 1103
San Antonio, Texas 78202
512/226-3297 or 226-3299 (TEX-AN 8-820-1308)
Vernon R. Francis, Supervisor

DISTRICT 9
224 West Beauregard, Suite 102
San Angelo, Texas 76903
915/655-9479 (TEX-AN 8-915-655-9479)
Kenneth W. Krueger, Supervisor

DISTRICT 10
204-A West 5th Street
Odessa, Texas 79761
915/332-5122 (TEX-AN 8-844-9236)
William F. Lockey, Supervisor

DISTRICT 11
813 E. Pike Blvd.
Weslaco, Texas 78596
512/968-3165 (TEX-AN 8-828-6209)
John Sturgis, Supervisor

DISTRICT 12
Klee Square Building, Suite 515
505 South Water Street
Corpus Christi, Texas 78401
512/882-2548 (TEX-AN 8-827-6302)
Henry P. Kutchinski, Supervisor

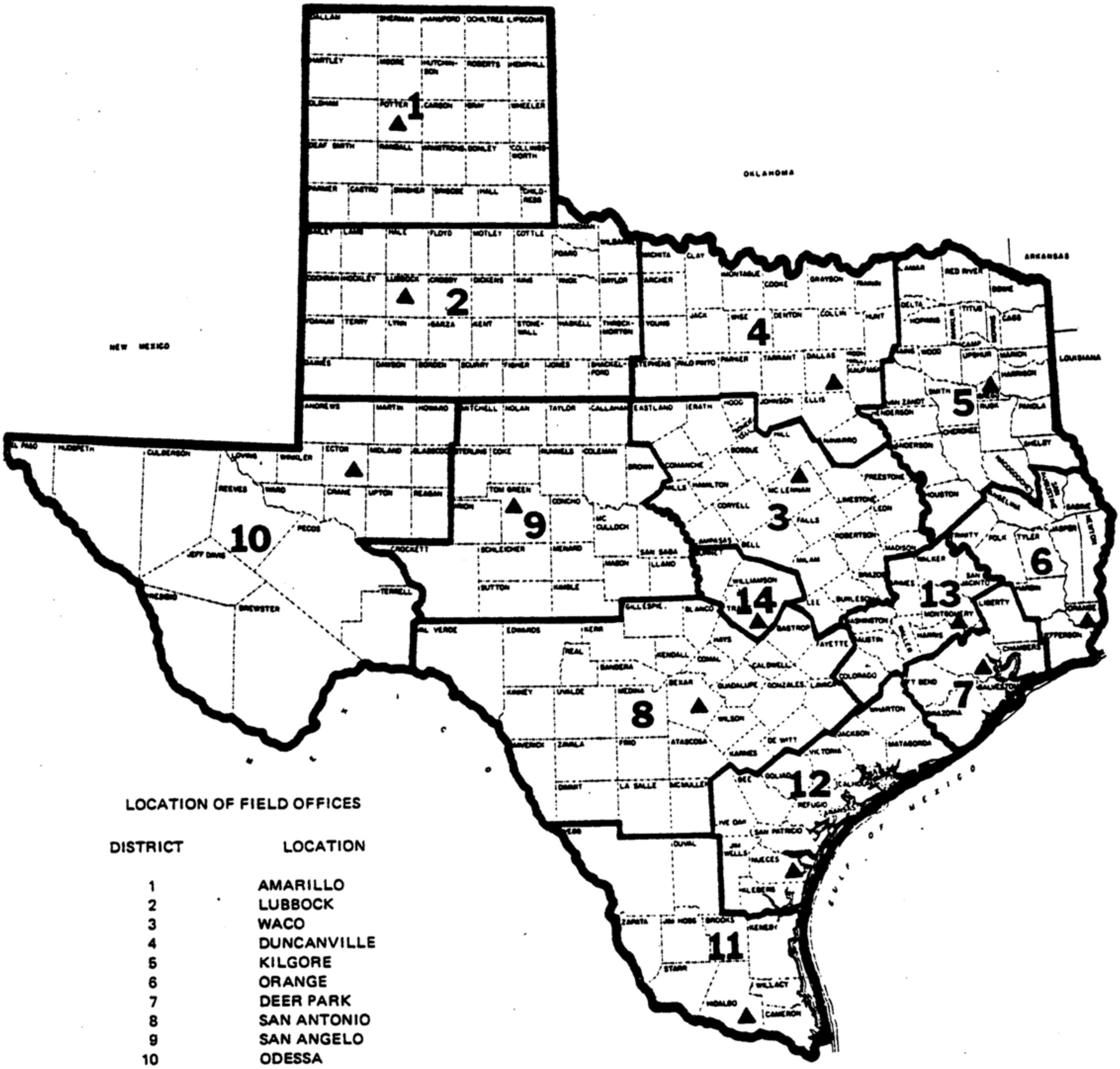
DISTRICT 13
25132 Oakhurst Drive, Suite 230
Spring, Texas 77373
713/367-9870 (TEX-AN 8-850-1225)
Gerald E. Hord, Supervisor

DISTRICT 14
1700 North Congress Avenue
P.O. Box 13087
Austin, Texas 78711
512/475-2786 (TEX-AN 8-822-2786)
W. John Young, Supervisor

RIO GRANDE WATERMASTER
811 E. Pike Blvd.
Weslaco, Texas 78596
512/968-5481 (TEX-AN 8-828-6208)
Daniel E. Havelka, Watermaster

Eagle Pass Field Office
P.O. Box 1185
1152 Ferry Street #C
Eagle Pass, Texas 78852
512/773-5059 (TEX-AN 8-512-773-5059)
James R. Stubblefield, Deputy Watermaster

Note: The addresses and telephone numbers above are current as of 8/1/83; however, they are subject to change. Telephone ahead to confirm location if planning a visit to one of the Department's field offices.



LOCATION OF FIELD OFFICES

DISTRICT	LOCATION
1	AMARILLO
2	LUBBOCK
3	WACO
4	DUNCANVILLE
5	KILGORE
6	ORANGE
7	DEER PARK
8	SAN ANTONIO
9	SAN ANGELO
10	ODESSA
11	WESLACO
12	CORPUS CHRISTI
13	SPRING
14	AUSTIN
WATERMASTER	WESLACO
	EAGLE PASS

FOR DEPARTMENT USE ONLY	
Application No.	
Adm. Review By	
Administratively Complete	
Copies Sent:	

EXECUTIVE DIRECTOR
TEXAS DEPARTMENT OF WATER RESOURCES
ATTN: Permit Control & Reports Section
P.O. Box 13087, Capitol Station
Austin, Texas 78711

APPLICATION FOR PERMIT TO DISCHARGE, DEPOSIT OR DISPOSE OF WASTE

1. Applicant: ______________________________
(Individual, Corporation or Other Legal Entity)

Address: ______________________________
(Permanent Mailing Address)

City: ____________________ State: ____________ Zip: ____________

Telephone Number: ____________________

If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of the Secretary of State for Texas. ____________
Charter Number

2. (a) List those persons or firms, to include a complete mailing address and telephone number, authorized to act for the applicant during the processing of the permit application.

(b) If the application is submitted by a corporation or by a person residing out of state, the applicant must designate an Agent in Service or Agent of Service and provide a complete mailing address for the agent. The agent must be a Texas resident.

3. List the individual and his/her mailing address that will be responsible for causing notice to be published in the newspaper.

4. Type of Permit For Which Application is Submitted:

a. New ____________ Permit Number ______________________________
(Will Be Assigned By The Department)

*b. Amendment ____________ of Permit Number ______________________________

5. List any other permits, existing or pending, which pertain to pollution control activities conducted by this plant or at this location.

*Refer to item 15

6. Plant or disposal site information:

   A. Plant Name: ______________________

   B. Street Address, if available: ______________________

   C. County: ______________________

   D. Are your waste disposal operations within the incorporated limits ________ or extraterritorial jurisdiction ________ of a municipality? If so, what municipality? ______________________

   E. Give a verbal description of the plant or disposal site with respect to known or easily identifiable landmarks.
   ____
   ____
   ____
   ____

7. Type of establishment, operation or process from which wastewater(s) will emanate: (For example: sewerage facilities serving a mobile home park, office complex, subdivision/oil refinery/steam electric generating plant/etc.)

8. What estimated data will waste disposal operations begin; or if operations have begun, what date did waste diposal operations begin at the site described by this application? If the facility is to be completed in stages, include proposed design flow information for each stage and the estimated completion date for each stage.

9. Disposal Method:

   A. **Discharge Into A Watercourse:** Trace the flow of effluent from the plant site to the nearest major watercourse with a word description. (For example: "From the plant site through a six-inch pipe to an unnamed tributary of Doe Creek, then to Doe Creek, then to the Brazos River".)

   B. **Discharge Other Than Into a Watercourse:** Irrigation ________, Evaporation Pond ________,
   Other ______________ *(Include a complete description in the technical report.)*

10. Attach either a complete USGS Topographic or State Department of Highways & Public Transportation county map and identify on the map the location of the wastewater treatment facilities and/or disposal site, the point(s) of discharge and the effluent routing to the nearest identifiable watercourse. When requesting a "No Discharge" permit, show the location of any ponds and the area to be irrigated (ALL MAPS MUST INCLUDE THE SCALE).

11. Submit an application map or drawing, with scale, (more than one map or drawing may be submitted) of the site, which includes the following information:

    A. The approximate boundaries of the tract of land on which the waste disposal activity is or will be conducted *and* the area to be served by the treatment facility.

    B. The location of the point or points of discharge or disposal.

C. The general character of the areas adjacent to the place or places of disposal; for example, residential, commercial, recreational, agricultural, undeveloped, etc.

D. The boundaries of all tracts of land within a reasonable distance from the point or points of discharge, deposit or disposal. (See page 5, Application Instructions)

12. Show on the application map or on a separate list properly cross-referenced to item 11D above, the names and mailing addresses of all landowners who might consider themselves affected by the activities described by this application. (Minimum requirements are shown on the sample application map, page 5.)

13. The names and mailing addresses of persons identified as affected persons, item 12 above, were obtained from:

____

(Source: City, County, School or Water District Records or Abstract Co.)

14. Complete and attach the technical report associated with the type of permit requested. NOTE: An applicant must provide detailed information concerning plant site location, point(s) of discharge or area of application, description of treatment process, proposed volume and quality of effluent to be disposed of and any other information which would enable the staff to evaluate the application (water balance, dimension of any holding pond(s), for irrigation systems provide: acreage to be irrigated, type crops to be irrigated, application rate, annual average rainfall, measures to be implemented to prevent runoff, buffer zone considerations, etc.).

15. Please, discuss briefly the scope of the changes to the existing permit being requested by this application.

16. List and index all attachments to this application.

SECTION I: To be completed by applicant or duly authorized representative (Refer to item No. 3 of General Instructions).

I, ______________________________ , ______________________________
Typed or Printed Name — Title

certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of civil penalty and criminal fines.

Signature: ______________________________ Date: ______________________________

Note: All applications must bear the signature and seal of notary public.

SECTION II: To be completed by the applicant if the signature above is other than that of the applicant.

I ______________________________
Typed Name and Title of Applicant

hereby designate ______________________________
Typed Name of Agent

as my agent and hereby authorize said agent to sign any application, submit additional information as may be requested by the Department, and/or appear for me at any hearing or before the Texas Water Commission in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my agent in support of the application and for compliance with the terms and conditions of any permit which might be issued based upon this application.

____
Printed or Typed Name of Applicant
or Chief Executive Officer

____
Signature

Note: All applications must bear the signature and seal of notary public.

Note: The notary is attesting to the signature when only Section I is completed or to the signature is Section II when both sections are completed.

SUBSCRIBED AND SWORN to before me by the said

______________________ on this __________ day of ______________ ,19 ______.

My commission expires on the ______________ day of ______________ , 19 ______.

(Seal) ______________________________
Notary Public in and for

______________________________ County, Texas

TECHNICAL REPORT
FOR
INDUSTRIAL WASTEWATER TREATMENT FACILITIES

Technical information shall be furnished covering the items indicated below in appropriate detail to understand the project. (Attach separate reports as necessary)

1. Source of raw water supply: ____

   ____

2. Proposed effluent volume:*

   Monthly average flow (gallons per day) ____

   Daily maximum flow (gallons per day) ____

   Treatment plant design flow (gallons per day) ____

3. Sources and characteristics of wastewater:

   A. Submit plot plans and flow diagrams to identify the sources and volumes of the various classes of wastewater (for example: cooling water, wash water, condensate, sanitary, product-contaminated storm water, etc.) and include estimates of total plant area, process area, and material storage areas.

   B. Describe predicted wastewater characteristics for which application is made.

Proposed Quality (as applicable):*	NOT TO EXCEED	
	Monthly Average	**Daily Maximum**
Total Suspended Solids, mg/l	________	________
Biochemical Oxygen Demand, mg/l	________	________
Chemical Oxygen Demand, mg/l	________	________
Total Organic Carbon, mg/l	________	
Oil and Grease, mg/l	________	________
Ammonia-Nitrogen, mg/l	________	________
Phenols, mg/l	________	________
Sulfides, mg/l	________	________
pH (max. and min.)	________	________
Total Residue, mg/l	________	________
Chlorides, mg/l	________	________
Sulphates, mg/l	________	________
Chromium, mg/l	________	________
Zinc, mg/l	________	________
Other Hazardous/Toxic Materials or Heavy Metal which may be present in the proposed discharge (Please list)	________	________
	________	________
	________	________
	________	________
	________	________
	________	________

*If more than one (1) outfall, attach separate report for each outfall.

4. Industrial Technical Report:

A. Describe the products manufactured at this facility: ______________________________

____

____

B. Describe the treatment method(s) to be employed (include considerations of segregation of certain wastes, in-plant waste reduction, etc.). Submit the results of treatability studies, if applicable, to define the treatment system to be employed.

C. Define treatment process design. This may be in a preliminary form, but should be comprehensive enough to:

(1) Establish treatment objectives.

(2) Provide flexibility for continuous treatment under conditions of various production cycles and under all expected climatic conditions.

(3) Describe disposal methods for solid wastes including wastewater and water treatment plant sludges, process solid wastes and byproducts.

(4) Describe hydraulic features of the wastewater collection and treatment system, including capacity limitations, control and operating procedures during emergencies, flood protection analysis, flow measurement devices, whether discharge is continuous or intermittent, length and frequency of discharge, whether effluent is pumped or gravity fed, etc.

(5) Describe the method of final disposal, if other than discharge to watercourse. In case of land irrigation, describe the operation procedure for both normal and wet weather conditions, type of crop, acreage available, etc.

(6) Describe storm water handling system, including extent of segregation from process wastewaters, diversion or retention structures and discharge points.

(7) Earthen Structures:

(a) If wastes are held or treated in earthen structure(s), describe the type, dimensions, capacity, and type of lining, if any, of the structure(s) and the type of waste contained by the structure(s).

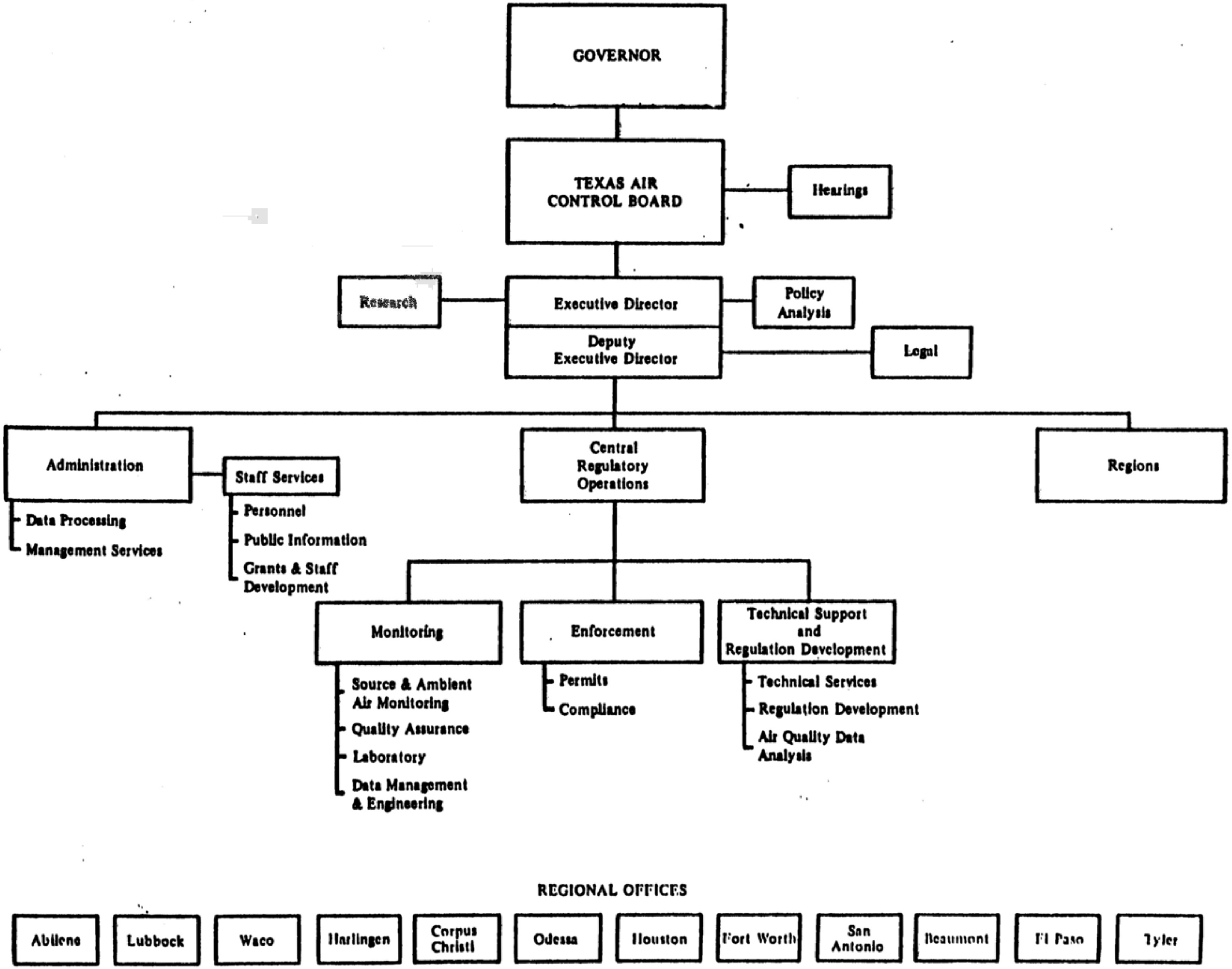
(b) If any unlined earthen structure(s) contain strong wastes, submit information concerning the possibility of ground-water contamination, including permeability data of soil from which structure is constructed, geology and permeability of underlying layers, and location of known ground-water sources and wells in the vicinity.

5. Are the proposed facilities to be located above the 100-year frequency flood level? Yes ____ No ____ If not, what protective measures are to be used?

____

____

Appendix 3.1


GOVERNOR
TEXAS AIR CONTROL BOARD
Hearings
Research
Executive Director
Policy Analysis
Deputy Executive Director
Legal
Administration
Data Processing
Management Services
Staff Services
Personnel
Public Information
Grants & Staff Development
Central Regulatory Operations
Regions
Monitoring
Source & Ambient Air Monitoring
Quality Assurance
Laboratory
Data Management & Engineering
Enforcement
Permits
Compliance
Technical Support and Regulation Development
Technical Services
Regulation Development
Air Quality Data Analysis
REGIONAL OFFICES
Abilene
Lubbock
Waco
Harlingen
Corpus Christi
Odessa
Houston
Fort Worth
San Antonio
Beaumont
El Paso
Tyler

Appendix 3.2

TEXAS AIR CONTROL BOARD
FORM PI-1, GENERAL APPLICATION

1-1-83

All the information requested herein must be completed and submitted before public notification procedures may be initiated.

I. PERMIT TO BE ISSUED TO: ______________________________
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Information (Person, title, address): ______________________________

____

Telephone: ______________ Principal Company Product or Business: ______________

II. LOCATION OF PERMIT UNIT (Latitude and Longitude must be to the nearest second) : Zip Code of Permit Unit Site: ________

Name of plant or site: ______________ Street Address (if applicable) ______________

Nearest City: __________ County: __________ Latitude: __________ Longitude: __________

III. TYPE OF OPERATION OR PROCESS OF PERMIT UNIT:

A. Name of operation or process of permit unit: ______________________________

B. Applicants unit identification number: ______________________________

C. Type (check one): ☐ Permanent ☐ Portable

D. Operating schedule: __________ Hours/day; __________ Days/week; __________ Weeks/year.

E. Proposed or actual start dates: Construction: __________(P/A) Operation: __________ (P/A)

IV. PERMIT UNIT CLASSIFICATION (Check applicable blocks):

A. ☐ New Permit Unit

B. ☐ Modification of Facility (See Section 1.03(9) of the Texas Clean Air Act)

C. ☐ Change in Location (Present Location ______________)

D. ☐ Change in Ownership (Requires Release Letter from Previous Owner)

☐ Facility Not Permitted
☐ Present Permit No. ________

V. If Items IV.A,B, or C were checked, submit the following information under either A or B:

A. Data requested in B1, B2, B3, B4 and B5 has been previously submitted under Permit No. __________ (Update may be required).

B.1. Submit an area map to approximate scale showing the location of the property, geographical features such as highways, roads, streams and significant landmarks (including buildings and residences), distance to the center of nearest city or town if located outside an incorporated municipality. If the property is located within a town or city, a city map may be used to present this information, and if outside a town or city, a county highway map may be used.

B.2. Give a legal description of the tract of land upon which the plant or facility is located. The term "legal description" means either a metes and bounds description, or the block and lot number of a platted subdivision which would be suitable to effectuate the transfer of title to real property.

B.3. Submit a plot plan of the property, to scale, showing the boundaries, plant bench mark (latitude-longitude), the location of all emission points of any air contaminants on the property, true north direction. Identify the emission points by numbers; use the same numbers for those emission points in this permit that will be consistent with the flow diagram process description and emission inventory questionnaire.

B.4. Submit emission data and stack parameters on Table I. Include fugitive emissions on Table 1 and submit information showing how the fugitive emissions were estimated.

B.5. Submit the estimated installed capital and operating costs for any and all abatement equipment associated with the permit unit.

VI. Submit the following information (See instructions concerning submission of confidential information).

A. Process Flow Diagram. Prepare and attach a flow diagram identifying significant individual processes and/or operations. Identify by number, points where raw materials, chemicals, and fuels are introduced, where gaseous emissions and/or airborne particulate matter may be discharged, including intermediate releases, where finished products are obtained, and location of pollution control devices.

B. Description of Process. Prepare and attach a written description of each process and of the function of the equipment in the process. (Identify items of equipment by numbers corresponding to flow diagram numbers.) The description must be in sufficient detail to determine the general operation of the process including emission sources and abatement equipment functions.

C. Material Balance. Submit Table 2 showing all materials used or produced by the permit unit.

D. Permit Fee. Attach required fee and cost certification, or furnish explanation why fee is not required. (See Regulation VI, Rule 116.11)

VII. A copy of the application is being sent to the Regional Office of the Texas Air Control Board - ☐ Yes ☐ No
A copy of the application is being sent to the local city or county air pollution control program - ☐ Yes ☐ No
If answer is no, submit three copies of the application.

VIII. I, ______________________ ______________________
(Name) (Title)

state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Clean Air Act, Article 4477-5, Vernon's Texas Civil Statutes, as amended, or any of the Rules and Regulations of the Texas Air Control Board or any local governmental ordinance or resolution enacted pursuant to the Texas Clean Air Act.

DATE ______________________ SIGNATURE ______________________
(Owner, Plant Manager, President, Vice President)

Appendix 3.3

EXAMPLE OF A PUBLIC NOTIFICATION

TO ALL INTERESTED PERSONS AND PARTIES:

You are hereby notified of the opportunity for written public comment concerning the Construction Permit Application No. C-0000 by ExRex Chemical to construct a Barite Grinding Plant in Galveston, Galveston County, Texas. The proposed location is 3500 International Boulevard. This facility proposes to emit the following air contaminants: Barite, Sulfur dioxide, and particulate dust. The Executive Director of the Texas Air Control Board has made the preliminary determination to issue this permit. <u>Before a permit can be issued for this facility, all emission sources must demonstrate compliance with all Rules and Regulations of the Texas Air Control Board and all applicable Federal Regulations. This includes the application of "best available control technology" to each emission source and compliance with all ambient air quality standards</u>.

A copy of all materials submitted by the applicant including the preliminary analysis thereof is available for public inspection at the Texas Air Control Board Region 7 office at 5555 West Loop, Suite 300, Bellaire, Texas 77401, and at the Texas Air Control Board, 6330 Highway 290 East, Austin, Texas 78723. All interested persons may inspect these materials and submit written comments to the Executive Director of the Texas Air Control Board. All comments received in writing by November 29, 1978, shall be considered by the Board in making its decision on the application. All comments will be made available for public inspection at the Texas Air Control Board office in Austin.

NOTES:

1. The underlined statements may be added at the option of the applicant. Underlining should not be used in the actual notification.
2. Office address of regional office of TACB must be address of the Region in which the facility will be located.
3. Thirty-day comment period begins after last date of publication.
4. The description of the location for the permit unit should be in terms easily understood by the general public such as a street address or distance and direction from a public road or intersection.
5. Try to be accurate. Certain errors may be cause for re-publication with subsequent delays in permit processing.

Appendix 3.4

PROMULGATED NEW SOURCE PERFORMANCE STANDARDS

FEDERAL REGISTER SUBPART	SOURCE CATEGORY	APPLICABLE CONSTRUCTION MODIFICATION DATE	PROMULGATION DATE
D	Fossil fuel fired steam generators	8/17/71	12/23/71
E	Incinerators	8/17/71	12/23/71
F	Portland cement plants	8/17/71	12/23/71
G	Nitric acid plants	8/17/71	12/23/71
H	Sulfuric acid plants	8/17/71	12/23/71
I	Asphalt concrete plants	6/11/73	3/8/74
J	Petroleum refineries	6/11/73	3/8/74
K	Storage vessels for petroleum liquids	6/11/73	3/8/74
L	Secondary lead smelters	6/11/73	3/8/74
M	Secondary brass and bronze ignot production plants	6/11/73	3/8/74
N	Iron and steel plants	6/11/73	3/8/74
O	Sewage treatment plants	6/11/73	3/8/74
P	Primary copper smelters	10/16/74	1/15/76
Q	Primary zinc smelters	10/16/74	1/15/76
R	Primary lead smelters	10/16/74	1/15/76
S	Primary aluminum reduction plants	10/23/74	1/26/76
T	Phosphoric acid plants, wet process	10/22/74	8/6/75
U	Superphosphoric acid plants	10/22/74	8/6/75
V	Diammonium phosphate plants	10/22/74	8/6/75
W	Triple superphosphate plants	10/22/74	8/6/75
X	Granular triple superphosphate storage facilities	10/22/74	8/6/75
Y	Coal preparation plants	10/21/74	1/15/76
Z	Ferroalloy production facilities	10/21/74	5/4/76
AA	Steel plants: Electric arc furnaces	10/21/74	9/23/75

FEDERAL REGISTER SUBPART	SOURCE CATEGORY	APPLICABLE CONSTRUCTION MODIFICATION DATE	PROMULGATION DATE
BB	Kraft pulp mills	9/24/76	2/23/78
DD	Grain elevators	1/12/77	8/3/78
HH	Lime Mfg. plants	5/3/77	3/7/78

PROMULGATED NESHAPS

FEDERAL REGISTER SUBPART		PROMULGATION DATE
B	Asbestos	April 6, 1973
C	Beryllium	April 6, 1973
D	Beryllium Rocket Motors	April 6, 1973
E	Mercury	April 6, 1973
F	Vinyl Chloride	October 21, 1976

Proposed New Source Performance Standards

Federal Register Subpart	Source	Proposed Rule Notice in Federal Register
Da	Electric Utility Steam Generating Units	9/19/78
GG	Stationary Gas Turbines	10/3/77

TEXAS AIR CONTROL BOARD
APPLICATION FOR PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT
FORM PSD-1

Submit three copies of this form and of each attachment to: Texas Air Control Board, 6330 Highway 290 E, Austin, Texas 78723, Attention: Permits Division. All of the information requested hereon must be submitted before this application is considered to be complete. The "Texas Air Control Board Prevention of Significant Deterioration (PSD) Guidance Manual" should be used in preparing this application. Incomplete applications will not be processed. Assistance in completing this form and copies of the TACB PSD Guidance Manual are available from any TACB regional office or the Austin office.

I. PERMIT TO BE ISSUED TO: ______________________________
(Corporation, Company, Government Agency, Firm, etc.)
Contact (Name, title, address, telephone): ______________________________
____
Principal Product or Business: ______________________________

II. DESCRIPTION OF PERMIT UNIT
Name of Permit Unit: ______________ Name of plant or site: ______________ Street Address (if applicable): ______________
Nearest City: ______________ Distance to City ______ County ______
Latitude: ______________ Longitude: ______________ Construction start date: ______________ Start operation date: ______________

III. OTHER PERMIT APPLICATIONS:
When did you, or when will you, apply for a TACB construction permit for the construction covered by this PSD application? ______________
____
(If a TACB Construction permit has been/will be submitted, give date of submittal of permit application and TACB permit number, if known. If more than one permit is involved, give permit numbers and the names and numbers of the emission points associated with each permit.

IV. SOURCE INFORMATION:

A. General Description: Attach a general description of the proposed source/modification. Include a description of the changes in the emissions of all pollutants. If a modification, describe both the entire source being modified and the modification itself. (See 40 CFR 52.21 (b) and the TACB PSD Guidance Manual for definitions of source and modification) Include type of facility, location, design capacity, hours of operation, etc. Identify and attach description as Attachment IV-A.

B. Area Map: Attach an area map (a copy of the map submitted with the TACB construction permit application form PI-1, if applicable). This map should show the location of the property on which the source/modification is or will be located, the geographic features, towns, roads, etc. The scale and true north direction should also be shown. Identify and attach map as Attachment IV-B.

C. Plot Plan: Attach a plot plan (a copy of the plan submitted with the TACB form PI-1, if applicable). Show property boundaries and all emission points. Identify emission points by numbers and use the same numbers elsewhere in this application (and in the TACB construction permit application). For an existing facility, the numbers must agree with previously submitted inventory and/or permit application information. Identify the true north direction, indicate scale of plan, and give the geographic coordinates of some reference point on the plan, either in Latitude and Longitude or UTM coordinates. Identify and attach as Attachment IV-C.

IV. SOURCE INFORMATION (continued)

D. Flow Diagram: Attach a flow diagram (a copy of the diagram submitted with the TACB construction permit application form PI-1 may be used, if applicable). The diagram should identify individual processes/operations. If a modification, distinguish between the existing plant and the addition. Identify points where raw materials, chemicals, and fuels are introduced, where pollutants may be discharged, and where finished products are obtained, using the same numbering system used in the plot plan. Identify all pollution control equipment. Identify and attach flow diagram as Attachment IV-D.

E. Process Description: Describe each process, the function of each item of equipment involved in the process, and all emission points. Identify items using the same numbering system used in the plot plan and flow diagram. If a modification, distinguish between the existing plant and the addition. Identify and attach process description as Attachment IV-E.

V. PERMIT UNIT CLASSIFICATION DATA:

A. Type of Construction: Applying the definitions found in 40 CFR 52.21 (b), is this permit unit a new source? ______ A modification? ______

B. Emissions Levels: Are potential emissions (emissions at maximum source capacity, considering any federal enforceable emission limitations) of any pollutant from the source (if a modification, potential emissions from the source before the modification) greater than 100 tons per year (tpy)? ______ greater than 250 tpy? ______ Pollutants exceeding 100 tpy: ______________________________ Pollutants exceeding 250 tpy: ______________________________ Were fugitive emissions included in determining these emissions? ______ If so, would emissions exceed 100 tpy if fugitive emissions were not included? ______.

C. Area classification: Is the source located (to be located) in a designated nonattainment area? ______. If yes, for which pollutants? ______________________________.

D. Emission Rates and Discharge Parameters: Use TACB Table 1a to list emissions of all regulated pollutants (see Table A-2 of Guidance Manual) for each emission point, assuming the proposed best available control technology (BACT). Include the emission rate in pounds per hour and tons per year, emission point identification (from Plot Plan), UTM coordinates of emission point, height of emission point above ground and above structures, diameter of exit stack or vent, exit gas velocity and exit gas temperature.

For fugitive emissions, include the length and width of a rectangular area encompassing all emission points.

If application concerns a modification, list the required data for the affected emission points as they are before the modification and also as they will be after the modification is operational. If any emissions are temporary in nature, explain in a footnote. For modifications, enter before-modification data in parentheses in the same data block used for corresponding post-modification data. Identify and attach as Attachment V-D.

V. PERMIT UNIT CLASSIFICATION DATA (continued)

E. Contemporaneous Changes: If this is a modification with any significant emission increase (see 40 CFR 52.21 for definition), list the contemporaneous emissions changes used to determine the net emission change. Include operational dates, the numbers of all associated TACB permits, descriptions of units involved, operating and emission rates for last two years of any operation that has been/will be shut down, etc. (See TACB PSD Guidance Manual and 40 CFR 52.21 (b) (03) for additional information and guidance.) Identify and attach as Attachment V-E.

F. Emission Summary: Provide a summary of the emissions (in tons per year) associated with this application. For each pollutant emitted, list emission levels before, and the emission increases resulting from any proposed modification and contemporaneous changes, as well as the emission levels after the proposed construction/modification. Identify and attach as Attachment V-F.

VI. AIR QUALITY MONITORING:

A. No Air Quality Monitoring by Applicant: If air quality monitoring data were not obtained for this project, attach an explanation as to why monitoring data are not considered necessary.

If TACB or local air pollution control agency monitoring data are used in lieu of applicants own monitoring data, provide the location of the monitors used relative to the proposed source, the period (normally one year) covered by the data, and the highest and second highest recorded values for each applicable averaging time and pollutant. Identify and attach as Attachment VI-A. Go to VII.

B. Air Quality Monitoring Performed - Approved Monitoring Plan: Date of approval of Monitoring Plan by TACB ________________. Attach a list of pollutants monitored, dates and frequency of monitoring, monitor locations relative to proposed source/modification (include map), highest and second highest values recorded by each monitor for all applicable averaging times, and the percentage of possible averaging periods for which valid data were obtained. Identify and attach as Attachment VI-B. Go to VII.

C. Air Quality Monitoring Performed - No Approved Plan: If monitoring was performed without a TACB approved Monitoring Plan, attach the same data required in Section VI-B, and also include a complete description of the monitoring and quality assurance procedures used to ensure accurate and representative data. Include information on the equipment used, detailed information on the site location, and climatological wind data for the area. Identify and attach as Attachment VI-C.

VII. BEST AVAILABLE CONTROL TECHNOLOGY (BACT):

Propose a BACT system (for each emission point for each pollutant for which the analysis is required) that will provide the maximum emissions reductions, taking into account environmental and economic impacts and energy and other costs. Include the emission levels proposed in terms of pounds per hour, and tons per year. In addition, include the levels of emissions in terms related to the design of the unit, i.e. pounds per million BTU heat input, grams per horsepower-hour, etc. Use Chapter B of the TACB PSD Guidance Manual for guidance. Identify and attach as Attachment VII.

III. AIR QUALITY ANALYSIS:

The Texas Air Control Board will perform all dispersion modeling to assess increment and NAAQS impacts of this permit application. If the permit applicant wants to perform this modeling for information purposes, the necessary data may be obtained by contacting the TACB.

IX. ADDITIONAL IMPACTS ANALYSIS:

Describe the probable impacts of the proposed new source/modification and associated growth on soils, vegetation, visibility, and Class I PSD areas. Also describe the probable air quality impacts of area economic growth associated with the proposed project. Include the name of the nearest Class I area(s) and the distance from the source. Use Chapter D of the TACB PSD Guidance Manual for guidance. Identify and attach as Attachment IX.

X. CERTIFICATION:

I, ______________________ ______________________________
(NAME) (TITLE)

state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief.

DATE ________________ SIGNATURE ____________________________
(Owner, Plant Manager, Pres., Vice Pres.)

EXECUTIVE DIRECTOR
TEXAS DEPARTMENT OF WATER RESOURCES
ATTN: Permit Control & Reports Section
P.O. Box 13087, Capitol Station
Austin, Texas 78711

FOR DEPARTMENT USE ONLY	
Application No.	
Permit No.	
Adm. Review By	
Administratively Complete	
Copies Sent:	

APPLICATION FOR PERMIT TO DISCHARGE, DEPOSIT OR DISPOSE OF WASTE

1. Applicant: City of Austin, Water and Wastewater Department
(Individual, Corporation or Other Legal Entity)

Address: P.O. Box 1088
(Permanent Mailing Address)

City: Austin State: Texas Zip: 78767

Telephone Number: (512) 477-6511

If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of the Secretary of State for Texas. N/A
Charter Number

2. (a) List those persons or firms, including a complete mailing address and telephone number, authorized to act for the applicant during the processing of the permit application.

Mr. James E. Thompson, Director
Water and Wastewater Department
P.O. Box 1088
Austin, Texas 78767

(b) If the application is submitted by a corporation or by a person residing out of state, the applicant must designate an Agent in Service or Agent of Service and provide a complete mailing address for the agent. The agent must be a Texas resident.

N/A

3. List the individual and his/her mailing address that will be responsible for causing notice to be published in the newspaper.

Mr. James E. Thompson, Director
Water and Wastewater Department
P.O. Box 1088
Austin, Texas 78767

4. Type of Permit For Which Application is Submitted:

a. New ______ Permit Number ______
(Will Be Assigned By The Department)

*b. Amendment X of Permit Number 10543-11

5. List any other permits, existing or pending, which pertain to pollution control activities conducted by this plant or at this location.

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JUL 20 1984
PERMIT CONTROL
TDWR

NPDES Permit #TX0046981

*Refer to item 15

11. Submit an application map or drawing, with scale, (more than one map or drawing may be submitted) of the site, which includes the following information:

A. The approximate boundaries of the tract of land on which the waste disposal activity is or will be conducted *and* the area to be served by the treatment facility.

See Attachments No. 1 & 2

B. The location of the point or points of discharge or disposal.

See Attachment No. 1

C. The general character of the areas adjacent to the place or places of disposal; for example, residential, commercial, recreational, agricultural, undeveloped, etc.

See Attachment No. 3 & 3A

D. The boundaries of all tracts of land within a reasonable distance from the point or points of discharge, deposit or disposal. (See page 5, Application Instructions)

See Attachment No. 4

12. Show on the application map or on a separate list properly cross-referenced to item 11D above, the names and mailing addresses of all landowners who might consider themselves affected by the activities described by this application. (Minimum requirements are shown on the sample application map, page 5.)

See Attachment No. 5

13. The names and mailing addresses of persons identified as affected persons, item 12 above, were obtained from:

City of Austin Tax Office

(Source: City, County, School or Water District Records or Abstract Co.)

14. Complete and attach the technical report associated with the type of permit requested. NOTE: An applicant must provide detailed information concerning plant site location, point(s) of discharge or area of application, description of treatment process, proposed volume and quality of effluent to be disposed of and any other information which would enable the staff to evaluate the application (water balance, dimension of any holding pond(s), for irrigation systems provide: acreage to be irrigated, type crops to be irrigated, application rate, annual average rainfall, measures to be implemented to prevent runoff, buffer zone considerations, etc.).

15. Please, discuss briefly the scope of the changes to the existing permit being requested by this application.

Discharge flow limitation would be increased from 25 MGD to 38 MGD. Effluent discharge limitations for BOD, SS, etc. would remain unchanged.

Interim improvements consisting of polymer feed facilities and enhanced flocculation will begin construction this year and will serve to improve final settling and maintain treatment levels until the full expanded facilities come on line in 1987.

16. List and index all attachments to this application.

Attachment No.	Title
1	Walnut Creek WWTP Location (Map)
2	City of Austin Service Areas (Map)
3	Current Zoning in the Lower Walnut Creek Watershed (Map)
4	Possibly Affected Downstream Landowners (Map)
5	Possibly Affected Downstream Landowners (List)
6	Technical Support Supplement (Report)
7	Detailed Answer to Question #10 of Technical Report Questionaire.

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SECTION I: To be completed by applicant or duly authorized representative (Refer to item No. 3 of General Instructions).

I, James E. Thompson, P.E. , Director Water and Wastewater Department

Typed or Printed Name — Title

certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of civil penalty and criminal fines.

Signature: James E. Thompson Date: 7/20/84

Note: All applications must bear the signature and seal of notary public.

SECTION II: To be completed by the applicant if the signature above is other than that of the applicant.

I ______________________________

Typed Name and Title of Applicant

hereby designate ______________________________

Typed Name of Agent

as my agent and hereby authorize said agent to sign any application, submit additional information as may be requested by the Department, and/or appear for me at any hearing or before the Texas Water Commission in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my agent in support of the application and for compliance with the terms and conditions of any permit which might be issued based upon this application.

____

Printed or Typed Name of Applicant or Chief Executive Officer

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JUL 20 1984

____

Signature

PERMIT CONTROL

TDWR

Note: All applications must bear the signature and seal of notary public.

Note: The notary is attesting to the signature when only Section I is completed or to the signature is Section II when both sections are completed.

SUBSCRIBED AND SWORN to before me by the said James E. Thompson on this 20th day of July, 19 84.

My commission expires on the 21st day of October, 19 85.

Notary Public in and for

Travis County, Texas

(Seal)

Application Form-Municipal and Private Domestic

TDWR-0022 (Rev. 8-1-83)
Page 12 of 16

TECHNICAL REPORT FOR MUNICIPAL & PRIVATE DOMESTIC WASTEWATER TREATMENT FACILITIES

Technical information shall be furnished covering the items indicated below in appropriate detail to understand the project. (Attach separate reports as necessary)

1. *Proposed Volume: If the plant is to be constructed in stages, identify projected requirements for each stage and include a projected date for commencement of construction. *Only* these facilities projected for construction during the ensuing five (5) years may be considered for incorporation into or permit developed based on this application.

	1st Stage	2nd Stage	Projected
	~~XXXXX~~/*Existing*	*Intermediate*	*Final*
**Design Flow (MGD) (Daily Average):	25		38
**Daily Maximum Flow (MGD):			100
**2-Hr. Peak Flow (MGD):			128
Design Population Equivalent:			
Existing and/or Projected Population To Be Served:			
Construction Estimated to Commence			1984

2. Proposed Quality (30-Day Average): BOD_5 mg/l 20 TSS, mg/l 20

   Other

   Disinfection:

   Chlorine 1 mg/l after 20 minutes detention at peak flow

   Other

3. Proposed facilities major treatment units (list and attach a simplified flow diagram. Show sizes of individual units):

   See attached Technical Report Supplement

4. Existing facilities major treatment units (list and show sizes of those units which will be retained).

   See attached Technical Report Supplement

*The volumes shown will be considered for incorporation in a permit. If the facilities actually constructed are rated at a lesser capacity as determined by the Department or the Texas Department of Health, the permit may be amended without notice to reflect the lesser flow.

**In an attached report, explain the derivation of these flows.

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JUL 20 1984

PERMIT CONTROL
TDWR

5. **Existing facilities to be abandoned** ______, expanded X, modified ________. Explain: See attached Technical Report Supplement

6. Explain the need for the proposed facility or facility modification: See attached Technical Report Supplement

7. Are wastes other than normal domestic sewage to be treated at this facility? No X, Yes ______. If yes, list sources, volumes and quality by separate attachment. Specify percent residential, multiresidential, light industrial, commercial, etc. waste that will be treated by the facility.

8. Identify and show on an area map all wastewater treatment plants within one mile of the proposed facility. Explain why the subject area is not served by these facilities.

   None

9. Are the proposed facilities to be located above the 100-year frequency flood level? Yes X; No ______ If not, what protective measures are to be used? Source(s) used to determine 100-year frequency flood level: 1980 Study by U.S. Army Corp. of Engineers

10. Describe design features (auxiliary power, standby and duplicate units, holding tanks, storm water clarifiers, etc.); and functional arrangements (flexibility of piping and of valves to control flow through the plant, reliability of power source, etc.) to prevent bypassing or overflows of untreated wastewater which might result from (Use separate sheet.): (A) Excess infiltration, (B) Power failure, (C) Equipment malfunction, (D) Plant unit maintenance and repair, of (E) Any other. See Attachment No. 7

11. Will the project be funded with the assistance of federal construction grants? Yes ______; No X If so, what stage is the application in and what project number has been assigned? Step ________ and Project Number __________

12. **Siting Analysis:** Attach a map with scale showing the location of the plant and a description of the surrounding area for a distance of ¼ mile with particular reference to its proximity to new and future housing developments, industrial sites, highways and/or public thoroughfares, water plants, water supply wells, parks, schools, recreational areas, shopping centers, etc. Show the direction of the prevailing winds. Show provisions made for buffer zones as specified in the Design Criteria for Sewerage Systems, and specify the distance to the nearest residential property from any treatment unit. See Attachment No. 3

13. If effluent is disposed of by land application, submit technical information in accordance with the Department's Design Criteria for Sewerage Systems.

    N/A

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14. Is there a surface water intake for domestic drinking water supply located within five (5) miles downstream from the point of discharge? Yes ______ No __X__ If yes, identify ______

15. Source of raw water supply: City of Austin

16. Sludge Treatment and Disposal:

A. Treatment process generating sludge: Primary clarification and activated sludge facilities

B. Intermediate sludge processing units: gravity thickener (1)

Sludge Disposal: (Complete applicable portions)

A. N/A Land Filling:

(1) Site name and license number: ______

(2) Owner/operator: ______

(3) Location: ______

(4) Transported by (truck, train, pipe, other): ______

(5) Name of hauler: ______

(6) Describe method of controlling infiltration of ground and surface water from entering site: ______

(7) Method of preparation of sludge (drying, etc.) for land filling: ______

B. N/A Incineration:

(1) Location of incinerator: ______

(2) Owner/operator: ______

(3) Ashes disposed of: ______

C. N/A Lagooning:

(1) Surface area: ______ Depth: ______

(2) Location: ______

(3) Pond lining or plans for lining: ______

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D. ____N/A____ Land Application of sludge:

(1) ____ Reclamation; ____ Soil Conditioning; ____ Spray Irrigation

(2) Transported by ____

(3) Transported in: ____ liquid; ____ semi-liquid; ____ semi-solid; ____ solid state

(4) Location of disposal site and name of owner: ____

(5) Previous use of disposal site: ____

(6) Disposed on ____ acres (locate on map)

(7) Reserve acreage: ____ acres

(8) Crop types: ____

(9) Name of commercial hauler: ____

(10) Method and rate of application: ____

(11) Frequency of sludge disposal: ____; months in which it will occur: ____

(12) Describe tailwater control facilities and operations: ____

(13) Describe methods to prevent extraneous surface water from entering site: ____

(14) Explain adjacent land use: ____

E. ____X____ Transported to another plant for further treatment and disposal.

(1) Identity of plant to receive sludge: Hornsby Bend Wastewater Facility

(2) Transported by (truck, pipe, etc.): Pipe

(3) Attach a written statement that the plant identified above will accept the sludge from the proposed plant.

17. Attach any other technical information considered relevant to the development of the permit for this application.

See attached Technical Report Supplement.

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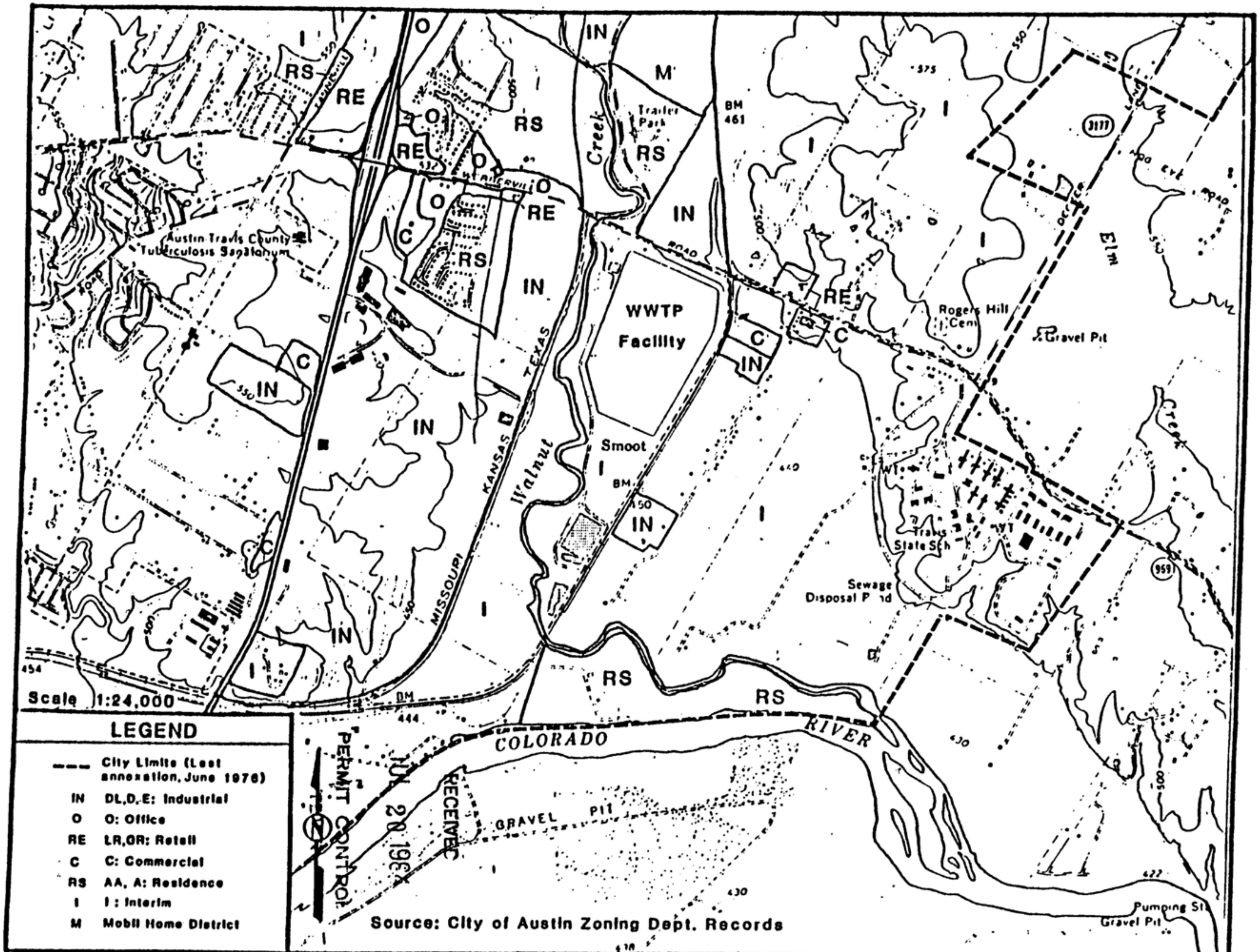
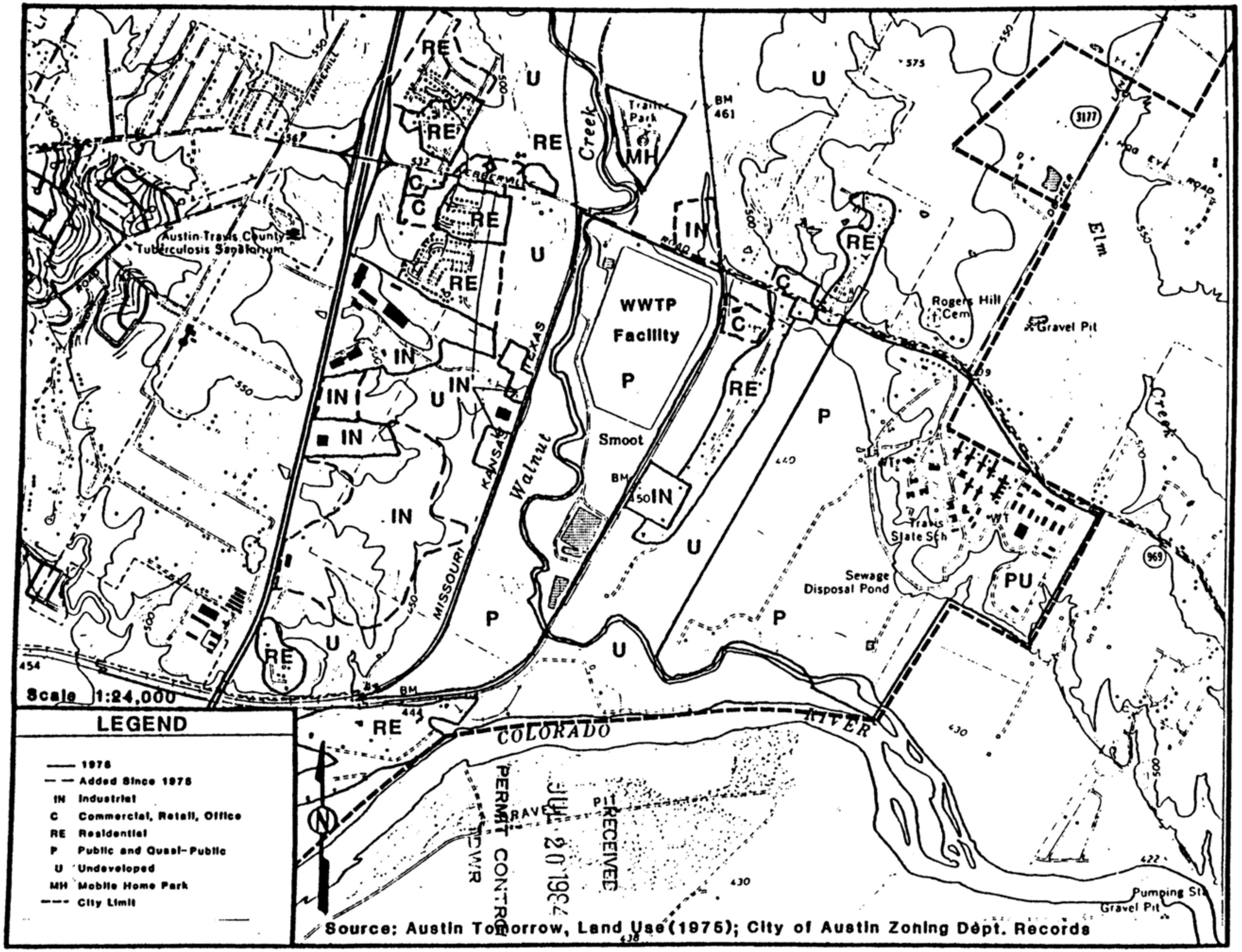
Appendix 6.1 (cont.)

Attachment No. 3



Current Zoning in the Lower Walnut Creek Watershed



Land Use in the Vicinity of the Walnut Creek Treatment Plant (1975 and 1984).

Attachment No. 6

City of Austin

Walnut Creek Treatment Facility

Technical Report Supplement

CAMP DRESSER & McKEE INC.

June 1984

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PERMIT NO. 10543-11
(corresponds to
NPDES PERMIT NO. TX0046981)

This permit supersedes and replaces Permit No. 10543-11, approved May 7, 1979.

TEXAS WATER COMMISSION
Stephen F. Austin State Office Building
Austin, Texas

PERMIT TO DISPOSE OF WASTES
under provisions of Chapter 26
of the Texas Water Code

The City of Austin

whose mailing address is

Water & Wastewater Department
P. O. Box 1088
Austin, Texas 78767

is authorized to dispose of wastes from the Walnut Creek Wastewater Treatment Plant

located at 7113 Martin Luther King Boulevard (Farm-to-Market Road 969) Travis County, Texas

to Walnut Creek; thence into the Colorado River in Segment No. 1428 of the Colorado River Basin

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein. This permit is granted subject to the rules of the Department, the laws of the State of Texas, and other orders of the Commission. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the herein described discharge route. This includes property belonging to but not limited to any individual, partnership, corporation or public entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the herein described discharge route.

This permit and the authorization contained herein shall expire at midnight, five years after the date of Commission approval.

APPROVED, ISSUED AND EFFECTIVE this ______________ day of ________________, 19___.

ATTEST: ______________________________ ______________________________
For the Commission

City of Austin 10543-11

Special Conditions

1. Effluent Limitations

a. Interim Effluent Limitations I

During the period beginning upon date of issuance and lasting through completion of the polymer units the permittee is authorized to discharge subject to the following effluent limitations:

The arithmetic running average of the daily flows from the treatment facility for any consecutive 12 months period shall not exceed 25.0 MGD. Nor shall the maximum discharge on any given day exceed 62.5 MGD.

	Effluent Concentrations			Effluent Loading
	Unit of Measurement	30-day Average	7-day Average	30-day Average
Biochemical Oxygen Demand (5-day)....	mg/l	20	30	BOD_5.. 1892 kg/day BOD_5.. 4170 lbs/day
Suspended Solids...	mg/l	20	30	TSS.. 1892 kg/day TSS.. 4170 lbs/day

The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes (based on peak flow).

City of Austin 10543-11

b. Interim Effluent Limitations II

During the period beginning upon completion of the polymer units and lasting throug completion of expansion, the permittee is authorized to discharge subject to the following effluent limitations:

The arithmetic running average of the daily flows from the treatment facility for any consecutive 12 months period shall not exceed 30.0 MGD. Nor shall the maximum discharge on any given day exceed 62.5 MGD.

	Effluent Concentrations			Effluent Loading	
	Unit of Measurement	30-day Average	7-day Average	30-day Average	
Biochemical Oxygen Demand (5-day)....	mg/l	20	30	BOD_5..	2270 kg/day
				BOD_5..	5000 lbs/day
Suspended Solids..	mg/l	20	30	TSS...	2270 kg/day
				TSS...	5000 lbs/day

The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes (based on peak flow).

c. Final Effluent Limitations

During the period beginning upon completion of the 38.0 mgd facility and lasting through completion of expansion, the permittee is authorized to discharge subject to the following limitations:

The arithmetic running average of the daily flows from the treatment facility for any consecutive 12 month period shall not exceed 38.0 MGD. Nor shall the maximum discharge on any given day exceed 100.0 MGD.

Page 2a of 19

City of Austin 10543-11

	Effluent Concentrations			Effluent Loading		
	Unit of Measurement	30-day Average	7-day Average	30-day Average		
Biochemical Oxygen Demand (5-day)....	mg/l	20	30	BOD_5..	2875	kg/day
				BOD_5..	6338	lbs/day
Suspended Solids..	mg/l	20	30	TSS...	2875	kg/day
				TSS...	6338	lbs/day

The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes (based on peak flow).

c. The following definitions apply:

(1) The 30-day average, other than for fecal coliform bacteria, is the arithmetic mean of the values for all effluent samples collected in a period of 30 consecutive days. The 30-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected in a period of 30 consecutive days.

(2) The 7-day average, other than for fecal coliform bacteria is the arithmetic mean of the values for all effluent samples collected in a period of 7 consecutive days. The 7-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected in a period of 7 consecutive days.

(3) A 24-hour composite sample consists of several effluent portions collected over equally spaced intervals in a 24-hour period and composited according to flow. For fecal coliform bacteria, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

d. The pH of the effluent shall not be less than 6.0 nor greater than 9.0 at any time. The pH limitation is not subject to averaging.

e. An equivalent method of disinfection may be substituted with the prior approval of the permitting authority.

f. The permittee shall not discharge floating solids nor shall the discharge of the effluent result in the existence of persistent foam beyond the immediate vicinity of the outfall(s).

*2. Monitoring, Recording and Reporting (See Footnote for Applicable State Requirements)

a. Monitoring - The permittee shall effectively monitor the operation and efficiency of all treatment and control facilities and the quantity and quality of the treated discharge.

b. Samples for effluent analysis shall be collected immediately following the last treatment unit, unless special locations are specified under Collecting of Samples below.

*This section does not apply to permits issued by the Texas Water Commission. Until notified by the Executive Director, Texas Department of Water Resources or the Commission to do otherwise, the permittee shall comply with the reporting requirements of 31 TAC Sections 329.1-329.12.

(2) Monitoring shall be in accordance with Schedule C as follows:

Flow	BOD5 mg/l	Total Suspended Solids, mg/l	Settleable Solids ml/l	Chlorine Residual	pH	Fecal Coliform
The daily flow measured by a totalizing meter	One per day	One per day	One per day	One every day of the week	One per day	One per day

N.P.D.E.S. REQUIREMENTS ONLY

Collecting of Samples

The laboratory test excepting the chlorine residual test and the fecal coliform test shall be made on 24-hr. composite samples collected in at least 12 individual portions. If any sample analysis required by the foregoing monitoring schedule exceeds the effluent limitations specified in Special Condition No. 1, the permittee shall report the excursion to the Regional Administrator within three days. The Regional Administrator may at his discretion require additional sampling, reporting or monitoring including but not limited to the taking of at least one twenty-four-hour composite sample and/or increased frequency of sampling. Any 30-day or 7-day average reported in the required monitoring report, which is in excess of the effluent limitation specified in Special Condition No. 1, shall constitute evidence of violation of such effluent limitation and of this permit.

(3) Monitoring information required by this permit shall be summarized monthly and recorded on Discharge Monitoring Report form EPA 3320-1.

N.P.D.E.S. REQUIREMENTS ONLY

b. Reporting - The permittee shall make and maintain records of all information resulting from the monitoring activities required by this permit.

(1) The permittee shall record for each measurement or sample taken pursuant to the requirements of this permit the following information: (a) the date, exact place and time of sampling; (b) the dates analyses were performed; (c) who performed the analyses; (d) the analytical techniques or methods used; and (e) the results of all required analyses, (f) the instantaneous flow at grab sample collections.

(2) If the permittee monitors any parameters more frequently than is required by this permit, he shall include the results of such monitoring in the calculation and reporting of the values required in the Discharge Monitoring Report form (EPA Form 3320-1 (10-72). Such increased frequency shall be indicated on the Discharge Monitoring Report form.

(3) The permittee shall retain for a minimum of three years all records of monitoring activities and results including all records of calibration and maintenance of instrumentation and original recording charts from continuous monitoring instrumentation. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the State water pollution control agency or the Regional Administrator.

N.P.D.E.S. REQUIREMENTS ONLY

c. Report of Monitoring Information. Monitoring information required shall be submitted on Discharge Monitoring Report forms EPA 3320-1. Each quarterly submittal (see next paragraph) shall include separate forms for each month of the reporting period.

(1) Duplicate original Discharge Monitoring Report forms, for each month of the reporting period, properly completed and signed (as per paragraph (c) below), must be submitted quarterly to:

(a) Executive Director
Texas Department of Water Resources
P. O. Box 13087, Capitol Station
Austin, Texas 78711

(b) Environmental Protection Agency
First International Bldg., 1201 Elm Street
Dallas, Texas 75270

(c) Each submitted Discharge Monitoring Report shall be signed as follows:

1 If submitted by a corporation, State or Federal agency, or other public entity, by a principal executive officer, ranking elected official, commanding officer, or other employee duly authorized by principal executive officer;

N.P.D.E.S. REQUIREMENTS ONLY

2 If submitted by a corporation, by a principal executive officer of at least the level of Vice President, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the Discharge Monitoring Report originates;

3 If submitted by a partnership, by a general partner;

4 If submitted by a sole proprietor, by the proprietor.

(2) The first Discharge Monitoring Report shall be submitted within 75 days after the effective date of this permit. Thereafter reporting periods shall end on the last day of the months March, June, September and December, unless requested by the Regional Administrator to be submitted more frequently. The permittee shall submit a Discharge Monitoring Report postmarked no later than the twenty-eighth day of the month following each completed reporting period.

N.P.D.E.S. REQUIREMENTS ONLY

(3) The minimum and maximum values called for on EPA form 3320-1 shall be the lowest and highest daily values determined during the month.

(4) Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for five-day Biochemical Oxygen Demand (BOD_5) where the permittee can demonstrate long-term correlation of the method with BOD_5 values. Details of correlation procedures employed must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correction continues to exist after approval.

(5) Guidelines establishing test procedures for the analysis of pollutants, pursuant to Section 304 (g) of the Federal Water Pollution Control Act, as amended, were promulgated on October 3, 1973 and published in the Federal Register under Title 40 Part 136, on October 16, 1973. All sampling and analytical methods used to meet the monitoring requirements specified above shall conform to these guidelines. If the Title 40 Part 136 guidelines do not specify that procedures for any pollutants required to be monitored by this permit, sampling and analytical methods used to meet the monitoring requirements specified in this permit shall, unless otherwise specified by the State water pollution control agency or Regional Administrator, conform to the latest edition of the following references:

N.P.D.E.S. REQUIREMENTS ONLY

(a) Standard Methods for the Examination of Water and Wastewater, American Public Health Association, New York, New York 10019.

(b) A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

(c) Methods for Chemical Analysis of Water and Wastes, Environmental Protection Agency Water Quality Office, Analytical Quality Control Laboratory, NERC, Cincinnati, Ohio 45268.

(6) The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals frequent enough to insure accuracy of measurements and shall insure that both calibration and maintenance activities shall be conducted.

N.P.D.E.S. REQUIREMENTS ONLY

(7) Failure to submit any report or information required by this permit shall constitute a violation of this condition and a violation of Section 308 (a) of the Federal Water Pollution Control Act of 1972.

3. <u>Noncompliance with Effluent Limitation</u>

a. If for any reason the permittee is responsible for or contributes to an unpermitted discharge, or the permittee does not comply with or will be unable to comply with any effluent limitation specified in this permit, the permittee shall provide the State water quality agency and the Regional Administrator with the following information in writing within five days of becoming aware of such condition:

(1) A description of the noncomplying discharge including its impact upon the receiving waters;

(2) Cause of noncompliance;

(3) Anticipated time the condition of noncompliance is expected to continue, or if such condition has been corrected, the duration of the period of noncompliance;

(4) Steps taken by the permittee to reduce and eliminate the noncomplying discharge; and

(5) Steps to be taken by the permittee to prevent recurrence of the condition of noncompliance.

b. Permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitation specified in this permit.

c. Nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities or penalties established pursuant to any applicable State Law or regulation under authority preserved by Section 510 of the Act.

4. Compliance Schedule and Conditions

a. Facility Operation and Quality Control Compliance Program

(1) All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

(a) At all times, all facilities shall be operated as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants.

(b) The permittee shall provide an adequate operating staff which is duly qualified to carry out the operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

(c) Maintenance of treatment facilities that results in degradation of effluent quality shall be pursuant to a schedule as approved by the Executive Director. No deliberate degradation of effluent quality is authorized under any circumstances without prior written approval of the Executive Director.

*(2) The permittee shall submit the following information 90 days from the date of permit issuance to demonstrate the adequacy of present treatment practices;

(a) A schematic drawing of all waste treatment units showing flow pattern; flow (maximum and average) and load capacities of each unit; bypass arrangements (as may exist) and point of discharge.

(b) A location map or drawing showing the latitude-longitude of each discharge point. Identify the receiving streams and the path of flow from those streams to a major waterway.

(c) A design analysis which describes the capability of the existing treatment facilities to produce an effluent which will meet conditions of this permit throughout the term of the permit. This analysis must identify the effluent quality that could reasonably be expected from existing facilities with present loading and projected future loadings at one-year increments. This analysis must also identify any improvements needed in staffing, operation, maintenance or equipment replacement to achieve and maintain compliance at the point in time when the improvements are needed.

*Subparagraphs (2), (a), (b) and (c) are conditions placed in NPDES permits and are not applicable to this permit issued by the Texas Water Commission. Information requested by these subparagraphs are obtained by other means.

N.P.D.E.S. REQUIREMENTS ONLY

(3) In order to meet the final effluent limitations set forth in Special Condition 1.b, the permittee shall comply with the following schedule:

N.P.D.E.S. REQUIREMENTS ONLY

(a) Not later than 120 days following issuance of this permit, the permittee shall submit a progress report to the Regional Administrator. The report shall include test results of data collected during a 30-day period prior to submittal of the report. These test results shall represent at least one 24-hour composite sample made up of three portions collected no closer together than one hour, with the first sample collected no earlier than 10:00 a.m. or made up as described in Special Condition 2.a.(2), whichever is more stringent.

(b) Not later than 180 days following issuance of this permit, the permittee shall have completed an operation and maintenance program which provides for maximum efficiency of existing facilities. The permittee shall at this time submit a report to the Regional Administrator demonstrating the improvements to effluent quality and shall include test results of data collected during a 30-day period prior to submittal of this report. These test results shall represent at least one 24 hour composite sample per week during the 30-day period. Composite samples shall be made up of at least three portions collected no closer together than one hour, with the first sample collected no earlier than 10:00 a.m. or made up as described in Special Condition 2.a.(2) above, whichever is more stringent.

N.P.D.E.S. REQUIREMENTS ONLY

(c) If the improved operation and maintenance results in compliance with the final effluent limitations stated in 1.b above, those limitations will become effective and the remainder of this compliance schedule will not apply. However, should construction be required to comply with the final effluent limitations in 1.b above, the following schedule shall apply, provided that, should the permittee apply for and receive Federal grant assistance under Title 2 of the Act for facilities construction which may be conditional on a more stringent schedule, more stringent schedule shall apply:

Within 180 days from the date of this permit, an engineering design report must be submitted to the State water quality

* Subparagraphs 3(a), (b), and (c) are conditions placed in NPDES permits and are not applicable to this permit issued by the Texas Water Commission.

control agency and the Regional Administrator which describes in detail the facilities needed. The design report must be in conformance with the applicable facilities plan for the area, as required under Sections 201, 204 and 212 of the Act.

2 Within 270 days from the date of this permit, the permittee shall obtain approval of proposed treatment facilities modifications from the state water quality control agency and the Regional Administrator and initiate the engineering design.

3 Within 1.0 year from the date of this permit, the permittee shall report on the progress of the engineering design.

4 Within 1.5 years from the date of this permit, the permittee shall obtain approval of final plans and specifications on proposed modifications from the State water quality control agency and the Regional Administration and let all bids related to these plans and specifications.

5 Within 2.0 years from the date of this permit, the permittee shall report on the progress of construction.

6 Within 2.5 years from the date of this permit, the permittee shall complete construction of proposed modifications to obtain at least secondary treatment.

7 Not later than July 1, 1977 all construction necessary to meet the conditions of this permit shall be completed and operational. Adequate time shall be allowed prior to this date to incorporate the new facilities into total operation and verify the production of the required effluent.

N.P.D.E.S. REQUIREMENTS ONLY
N.P.D.E.S. REQUIREMENTS ONLY

General Conditions

1. Discharge Limitations

a. All discharges authorized herein shall be consistent with the terms and conditions of this permit.

b. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit, shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in Chapter 26 of the Texas Water Code.

c. Prior to any facility modifications, additions, and/or expansions that will increase the plant capacity, the permittee shall apply for a permit amendment and receive written approval from the permitting authority of the permit amendment before commencing construction.

d. Any change in the facility discharge, including any new significant discharge or significant changes in the quantity or quality of existing discharges to the treatment system that will result in new or increased discharges of pollutants must be reported to the permitting authority. Modifications to the permit may then be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants not identified and limited herein. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary suspension or permanent elimination of the permitted discharge.

3. This permit shall be revised or modified in accordance with the following circumstances:

a. Modification of Water Quality Standards which affect the conditions of this permit.

b. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit.

4. The permittee is hereby notified that the State and/or local governments specifically reserve all rights of entry and inspection granted them by the law.

The permittee shall allow the Regional Administrator and/or his authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises or other premises under the control of the permittee, where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;

b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;

c. To inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

d. To sample at reasonable times any discharge of pollutant; or

e. To perform at reasonable times an operation and maintenance inspection of the permitted facility.

5. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations; nor does it obviate the necessity of obtaining Federal or local assent required by law for the permitted discharge.

6. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

*7. This permit does not authorize or approve any agriculture, silvaculture, or aquaculture project in connection with wastewater reuse.

*This is a General Condition placed in NPDES permits and is not applicable to this permit issued by the Texas Water Commission. In some instances, the Commission may authorize and approve waste treatment operations which utilize controlled agriculture and silvaculture projects in conjunction with wastewater disposal.

8. The Executive Director shall from time to time review the terms and conditions of this permit and if changes are justified, he shall recommend to the Commission that the permit be modified in accordance with the appropriate regulation to reflect any necessary changes in permit terms or conditions.

9. Solids Disposal

Collected screenings, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into state waters or their tributaries.

10. Electric Power Failure

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures either by means of alternate power sources, standby generators or retention of inadequately treated effluent. Should the treatment works not include the above capabilities at time of permit issuance, the permittee must furnish within 120 days to the permitting authority, for approval, plans for such facilities and an implementation schedule for their installation.

11. Prohibition of Bypass of Treatment Facilities

The diversion or bypass of any discharge from facilities utilized by the permittee to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance, or (iii) where authorized under a program of preventive or corrective maintenance as approved by the Executive Director of the Texas Department of Water Resources. The permittee shall within 72 hours notify the permit issuing authority in writing of each unauthorized diversion or bypass in accordance with the procedure specified for reporting noncompliance.

12. Change in Control or Ownership of Facility

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the State water pollution control agency and the Regional Administrator.

13. Severability of Conditions

The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

14. Except for data determined to be confidential under 31 TAC Section 26.134, and Section 308 of the Act, all monitoring reports required by this permit shall be available for public inspection at the office of the State water quality control agency and the Regional Administrator. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided in State law.

15. Nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities or penalties established pursuant to any applicable State law or local regulation under authority preserved by Section 510 of the Act.

OTHER REQUIREMENTS

1. Interim Effluent Limitations

a. Each pollutant concentration in a grab sample in excess of the value shown for such pollutant in Column 2 of Table 1 constitutes a violation of the permit.

When three, four, or five consecutive grab samples have been collected at various times on separate days by the same entity, the existence of concentrations of any specific pollutant in more than two samples in excess of the value shown for the specific pollutant in Column 1 of Table 1 is a violation.

Table 1

Pollutant	Column 1	Column 2
BOD_5 mg/l	35	65
Suspended Solids mg/l	35	65

The foregoing requirements shall be applied with judgment and in the context of the other information available.

b. Each pollutant concentration in a 24-hour composite sample in excess of the value shown for such pollutant in Column 1 of Table 2 constitutes a violation of the permit.

Table 2

Pollutant	Column 1
BOD_5 mg/l	45
Suspended Solids mg/l	45

OTHER REQUIREMENTS

2. Final Effluent Limitations

a Each pollutant concentration in a grab sample in excess of the value shown for such pollutant in Column 2 of Table 3 constitutes a violation of the permit.

When three, four, or five consecutive grab samples have been collected at various times on separate days by the same entity, the existence of concentrations of any specific pollutant in more than two samples in excess of the value shown for the specific pollutant in Column 1 of Table 3 is a violation.

Table 3

Pollutant	Column 1	Column 2
BOD_5 mg/l	35	65
Suspended Solids mg/l	35	65

The foregoing requirements shall be applied with judgment and in the context of the other information available.

b. Each pollutant concentration in a 24-hour composite sample in excess of the value shown for such pollutant in Column 1 of Table 4 constitutes a violation of the permit.

Table 4

Pollutant	Column 1
BOD_5 mg/l	45
Suspended Solids mg/l	45

3. These public sewerage facilities shall be operated and maintained by a sewage plant operator holding a valid certificate of competency issued under the direction of the Texas Department of Health as required by Section 20(a) of Article 4477-1, Vernon's Texas Civil Statutes.

4. The plans and specifications for the waste collection and treatment works associated with the discharge authorized by this permit must be approved pursuant to state law, and failure to secure approval before commencing construction of such works or making a discharge therefrom is a violation of this permit and each day of discharge is an additional violation until approval has been secured.

5. This permit is granted subject to the policy of the Department to encourage the development of areawide waste collection, treatment and disposal systems. The Commission reserves the right to amend this permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an areawide system, should such be developed, to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such areawide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

6. Items stamped N.P.D.E.S. REQUIREMENTS ONLY do not apply to this permit and are retained in this permit to preserve the form and numbering system of a National Pollutant Discharge Elimination System permit. The items stamped N.P.D.E.S. REQUIREMENTS ONLY in this permit were secured from a standard U. S. Environmental Protection Agency permit format existent in February, 1974, and they may or may not be identical to the requirements or conditions of the actual N.P.D.E.S. permit applicable to the facility covered by this permit. It is necessary to examine the issued N.P.D.E.S. permit authorizing discharge to determine the actual N.P.D.E.S. requirements.

7. A flow measuring device and readily accessible sampling point shall be provided by the permittee.

City of Austin 10543-11

PART III

OTHER REQUIREMENTS:

8. The permittee shall immediately notify the Austin Office and the District 14 Office of the Texas Department of Water Resources in writing upon completion of the new facilities.

9. The sludge from the treatment process shall be piped to the City of Austin Hornsby Bend Wastewater Treatment Plant (Permit No. 10543-04) to be digested and then disposed of with the bulk of the sludge from the latter plant.

10. During the period this permit is in effect, the permittee shall maintain a running average of the daily flows from the treatment facility. This running average shall consist of the arithmetic average of the daily flows for the twelve month period immediately preceding the date the average is computed. This average, as well as the 30-day average, shall be reported monthly to the Department as required in 31 TAC Sections 329.1 - 329.12.

DEFINITIONS

All definitions contained in Section 26.001 of the Texas Water Code and Paragraph 502 of the Act shall apply to this permit and are incorporated therein by reference. Additional definitions of words or phrases used in this permit are as follows:

1. The term "Act" means the Federal Water Pollution Control Act, as amended, Public Law 92-500 (33 USC 1251 et seq).

2. The term "Environmental Protection Agency" means the U. S. Environmental Protection Agency.

3. The term "Administrator" means the Administrator of the U. S. Environmental Protection Agency.

4. The term "Regional Administrator" means one of the Regional Administrators of the U. S. Environmental Protection Agency.

5. The term "National Pollutant Discharge Elimination System" (hereinafter referred to as "NPDES") means the system for issuing, conditioning, and denying permits for the discharge of pollutants from the point sources into the navigable waters, the contiguous zone, and the oceans, by the Administrator of the Environmental Protection Agency pursuant to section 402 of the Federal Water Pollution Control Act, as amended.

6. The term "applicable effluent standards and limitations" means all State and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.

7. The term "applicable water quality standards" means all water quality standards to which a discharge is subject under the Act and which have been (a) approved or permitted to remain in effect by the Administrator following submission to him pursuant to Section 303(a) of the Act, or (b) promulgated by the Administrator pursuant to Section 303(b) or 203(c) of the Act.

8. The term "sewage" means human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes.

9. The term "sewage sludge" shall mean the solids and precipitates separated from wastewater by unit processes.

10. The term "treatment works" means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 201 of the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances; extension, improvement, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment.

11. The term "grab sample" means an individual sample collected in less than 15 minutes.

12. The term "uncontaminated water" means water which has no direct contact with any product or raw material and which does not contain a level of constituents detectably higher than that of the intake water.

13. The term "permitting authority" means the State water quality control agency or the Environmental Protection Agency, who physically issues the permit.

14. The term "running average" means the arithmetic average of the daily flows for the twelve month period preceding the date that the average is computed.

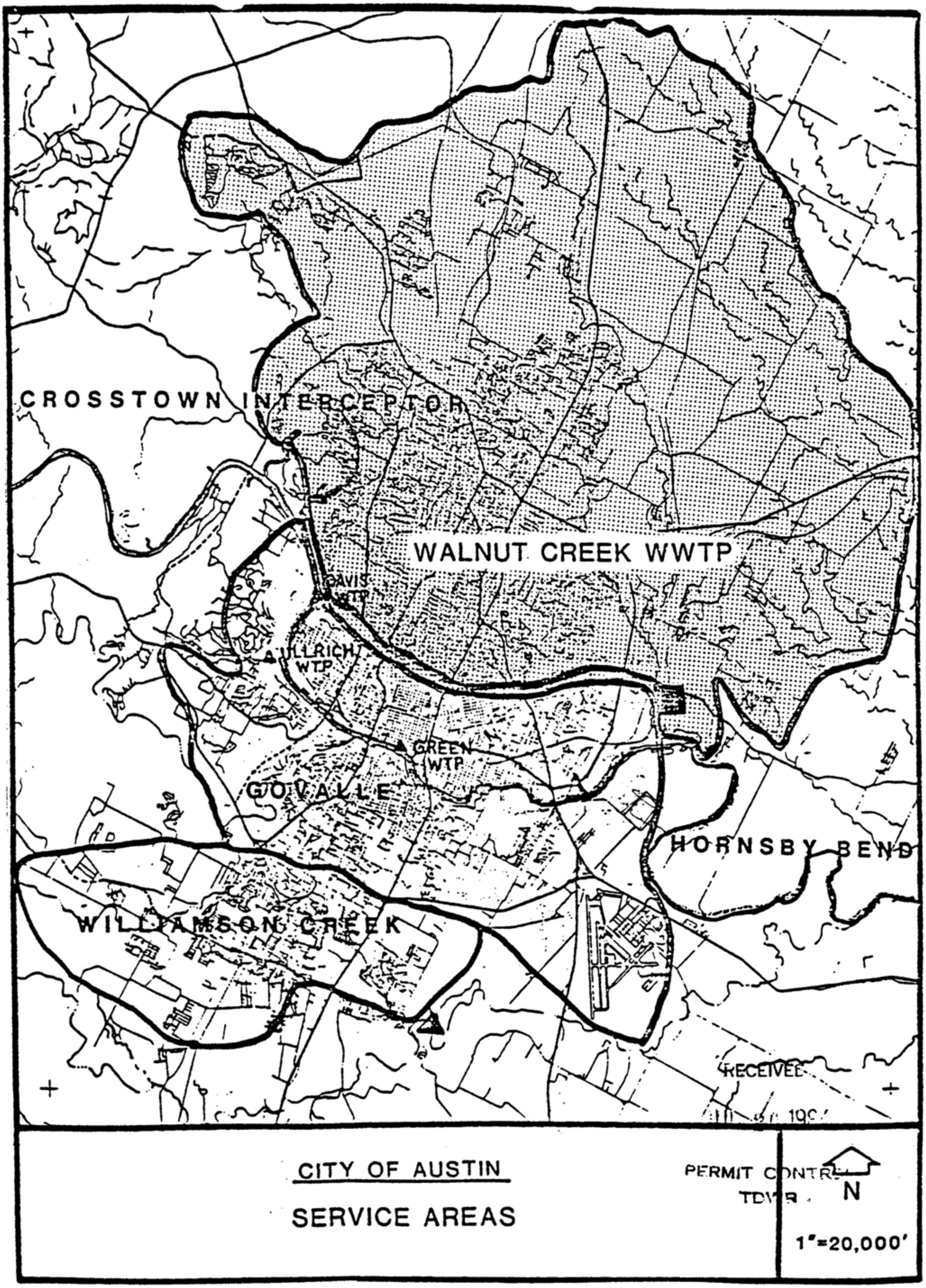
TECHNICAL SUMMARY

January 14, 1985

The City of Austin (Walnut Creek Wastewater Treatment Plant) has applied to the Texas Department of Water Resources for an amendment to Permit No. 10543-11 in order to increase the treated domestic wastewater discharge to 38.0 million gallons per day and to change from monthly to annual average on flow. The existing permit authorizes a discharge of 25.0 gallons per day and was issued May 7, 1979. The applicant proposes to expand the existing treatment facilities to handle the expected increase in flow due to growing population. The facility will utilize the complete mix activated sludge process. The plant site is located at 7113 Martin Luther King Boulevard (Farm to Market Road 969) in Travis County, Texas. The effluent is discharged to Walnut Creek; thence into the Colorado River in Segment No. 1428 of the Colorado River Basin. The receiving water uses deemed desirable are contact recreation, noncontact recreation, propagation of fish and wildlife and domestic raw water supply.

Louis C. Herrin III

Louis C. Herrin III

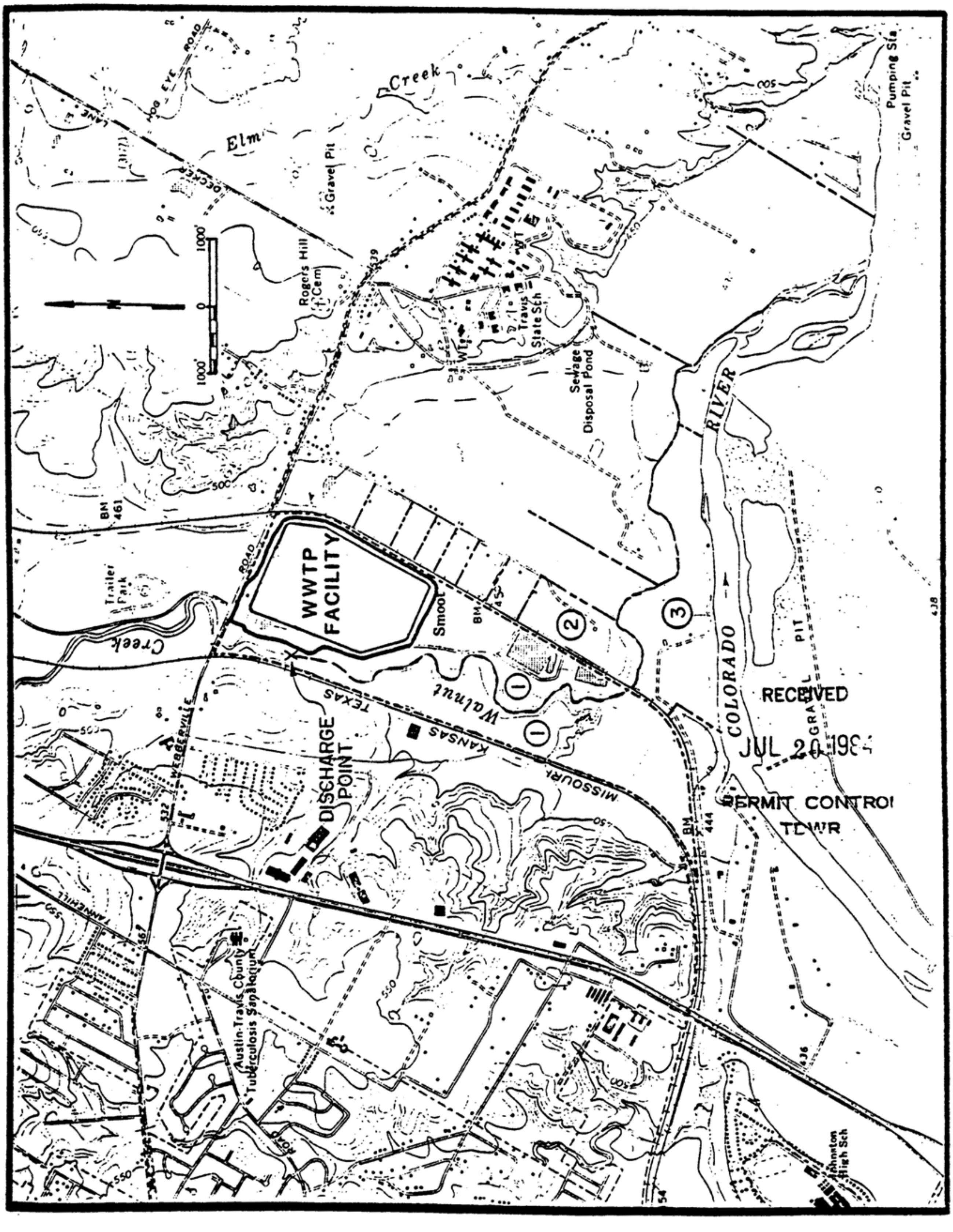


CITY OF AUSTIN

SERVICE AREAS

Appendix 6.1 (cont.)

Attachment No. 4



POSSIBLY AFFECTED DOWNSTREAM LANDOWNERS

Appendix 7.1

TEXAS AIR CONTROL BOARD

A CONSTRUCTION PERMIT
IS HEREBY ISSUED TO

LOWER COLORADO RIVER AUTHORITY

AUTHORIZING CONSTRUCTION OF

Lignite Mine Loading and Overland Conveyor System
FPP Unit #3

TO BE LOCATED AT
LaGrange, Fayette County, Texas
Lat. 30°55'02" Long. 96°45'02"

and which is to be constructed in accordance with and subject to the Texas Clean Air Act, as amended (Article 4477-5, VATS), and all Rules, Regulations and Orders of the Texas Air Control Board. Said construction is subject to any additional or amended rules, regulations and orders of the Board adopted pursuant to the Act, and to all of the following conditions:

1. This permit may not be transferred, assigned, or conveyed by the holder and applies only to the location specified herein.
2. This permit is automatically void if construction is not begun within one year of the date of issuance.
3. This permit is automatically void when an operating permit is issued or denied.
4. The facility covered by this permit shall be constructed as specified in the application for permit to construct.
5. The Board shall be notified prior to the start-up of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present at the time of start-up.
6. The Board shall be notified prior to the start of any required monitoring of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present during monitoring.
7. This permit is not a guarantee that the facility will receive an operating permit at the end of the construction period, nor does it absolve the holder from the responsibility for the consequences of non-compliance with all Rules and Regulations and orders of the Texas Air Control Board or with the intent of the Texas Clean Air Act.
8. Emissions from this facility must not cause or contribute to a condition of 'air pollution' as defined in Section 1.03 of the Texas Clean Air Act or violate Section 4.01 of the Texas Clean Air Act, Article 4477-5, V.A.T.S. If the Executive Director of the Texas Air Control Board determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
9. Special Provisions: See attachments labeled "General Provisions C-9231," 1-5, and "Special Provisions C-9231," 1-2.

Acceptance of the permit constitutes an acknowledgement and agreement that the holder will comply with all Rules, Regulations and Orders of the Board issued in conformity with the Act and the conditions precedent to the granting of this permit. Failure to comply with all special provisions of this permit will subject the holder to the enforcement provisions of the Texas Clean Air Act, Article 4477-5, V.A.T.S.

PERMIT NO. C- 9231 DATE 12-22-83

EXECUTIVE DIRECTOR
TEXAS AIR CONTROL BOARD

Eli Bell
(~~Deputy~~ Director, Control & Prevention)

GENERAL PROVISIONS

C-9231

1. Equivalency of Methods - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of this permit.

2. Sampling Requirements - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.

3. Appeal - This permit may be appealed pursuant to Rule 103.81 of the Procedural Rules of the Texas Air Control Board Section 6.01 of the Texas Clean Air Act. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit.

4. Construction Progress - Start of construction, construction interruptions exceeding 45 days and completion of construction shall be reported to the appropriate regional office of the Texas Air Control Board not later than ten (10) working days after occurrence of the event. This provision shall not apply to operating permits.

5. Record Keeping - Information concerning production, operating hours, fuel type and fuel sulfur content if applicable shall be maintained at the plant site and made available at the request of personnel from the Texas Air Control Board or the local air pollution control agency.

SPECIAL PROVISIONS

C-9231

1. The total emissions of air contaminants from any of the sources shall not exceed the values stated on the attached table entitled "Emission Sources - Maximum Allowable Emission Rates."

2. This facility shall comply with all requirements of Environmental Protection Agency Regulations on Standards of Performance for New Stationary Sources promulgated for coal preparation plants in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Subparts A and Y.

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES 8/79

C-9231

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by permit. The emission rates shown are those derived from information submitted as part of the application fo and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may requir application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	SOURCE NAME (2)	AIR CONTAMINANT DATA – EMISSION RATES* VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7)		(7)	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T
M-1	Truck Unloading							24	52.5				
M-2	Reclaim							.1	.22				
M-3	Feeder/Braker							.1	.22				
M-4	Transfer Point							.1	.22				
M-5	Transfer Point							.1	.22				
M-6	Transfer Point							.1	.22				
M-7	Transfer Point							.1	.22				

Permit Number C-9231 C-9232 C-9233 Engineer Crocker

(1) Emission point identification - either specific equipment designation or emission point number from plot plan
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs./day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

TEXAS AIR CONTROL BOARD

A CONSTRUCTION PERMIT
IS HEREBY ISSUED TO

LOWER COLORADO RIVER AUTHORITY

AUTHORIZING CONSTRUCTION OF

Inplant Lignite Storage and Handling System

TO BE LOCATED AT
LaGrange, Fayette County, Texas
Lat. 30°55'02" Long. 96°45'02"

and which is to be constructed in accordance with and subject to the Texas Clean Air Act, as amended (Article 4477-5, VATS), and all Rules, Regulations and Orders of the Texas Air Control Board. Said construction is subject to any additional or amended rules, regulations and orders of the Board adopted pursuant to the Act, and to all of the following conditions:

1. This permit may not be transferred, assigned, or conveyed by the holder and applies only to the location specified herein.
2. This permit is automatically void if construction is not begun within one year of the date of issuance.
3. This permit is automatically void when an operating permit is issued or denied.
4. The facility covered by this permit shall be constructed as specified in the application for permit to construct.
5. The Board shall be notified prior to the start-up of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present at the time of start-up.
6. The Board shall be notified prior to the start of any required monitoring of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present during monitoring.
7. This permit is not a guarantee that the facility will receive an operating permit at the end of the construction period, nor does it absolve the holder from the responsibility for the consequences of non-compliance with all Rules and Regulations and orders of the Texas Air Control Board or with the intent of the Texas Clean Air Act.
8. Emissions from this facility must not cause or contribute to a condition of 'air pollution' as defined in Section 1.03 of the Texas Clean Air Act or violate Section 4.01 of the Texas Clean Air Act, Article 4477-5, V.A.T.S. If the Executive Director of the Texas Air Control Board determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
9. Special Provisions: See attachments labeled "General Provisions C-9232," 1-5, and "Special Provisions C-9232," 1-3.

Acceptance of the permit constitutes an acknowledgement and agreement that the holder will comply with all Rules, Regulations and Orders of the Board issued in conformity with the Act and the conditions precedent to the granting of this permit. Failure to comply with all special provisions of this permit will subject the holder to the enforcement provisions of the Texas Clean Air Act, Article 4477-5, V.A.T.S.

PERMIT NO. C- 9232 DATE 12-22-83

EXECUTIVE DIRECTOR
TEXAS AIR CONTROL BOARD

Eli Bell
(Deputy Director,
Control & Prevention)

GENERAL PROVISIONS

C-9232

1. Equivalency of Methods - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of this permit.

2. Sampling Requirements - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.

3. Appeal - This permit may be appealed pursuant to Rule 103.81 of the Procedural Rules of the Texas Air Control Board Section 6.01 of the Texas Clean Air Act. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit.

4. Construction Progress - Start of construction, construction interruptions exceeding 45 days and completion of construction shall be reported to the appropriate regional office of the Texas Air Control Board not later than ten (10) working days after occurrence of the event. This provision shall not apply to operating permits.

5. Record Keeping - Information concerning production, operating hours, fuel type and fuel sulfur content if applicable shall be maintained at the plant site and made available at the request of personnel from the Texas Air Control Board or the local air pollution control agency.

SPECIAL PROVISIONS

C-9232

1. The total emissions of air contaminants from any of the sources shall not exceed the values stated on the attached table entitled "Emission Sources - Maximum Allowable Emission Rates."

2. This facility shall comply with all requirements of Environmental Protection Agency Regulations on Standards of Performance for New Stationary Sources promulgated for coal preparation plants in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Subparts A and Y.

3. The lignite storage piles shall be treated with water and/or chemicals if necessary to control the emissions of particulate matter.

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES 8/79
C-9232

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by permit. The emission rates shown are those derived from information submitted as part of the application fo and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	SOURCE NAME (2)	AIR CONTAMINANT DATA — EMISSION RATES*											
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7)		(7)	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/
3-1F	Transfer & Feeder							.96	2.1				
3-2F	Transfer Point							.48	1.05				
3-3F	Active Lignite Storage (8)							3.7	16.1				
3-4F	Transfer Point							.6	1.05				
3-5F	Transfer & Feeder							1.2	2.1				
3-6F	Crusher & Feeder							1.2	2.1				
3-7F	Transfer & Feeder							1.2	2.1				
3-8F	Transfer Point							.3	.52				
3-9F	Transfer Point							.3	.52				
3-10F	Transfer Point							.3	.52				
3-11	Transfer Point							.3	.52				
3-12	Inactive Lignite Storage (8)							.97	4.27				
3-13	Transfer Point							.6	.02				

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs./day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

TEXAS AIR CONTROL BOARD

A CONSTRUCTION PERMIT
IS HEREBY ISSUED TO

LOWER COLORADO RIVER AUTHORITY

AUTHORIZING CONSTRUCTION OF

4735 MM Btu/Hr Lignite Fired Steam Generator
Unit #3

TO BE LOCATED AT

LaGrange, Fayette County, Texas
Lat. 30°55'02" Long. 96°45'02"

and which is to be constructed in accordance with and subject to the Texas Clean Air Act, as amended (Article 4477-5, VATS), and all Rules, Regulations and Orders of the Texas Air Control Board. Said construction is subject to any additional or amended rules, regulations and orders of the Board adopted pursuant to the Act, and to all of the following conditions:

1. This permit may not be transferred, assigned, or conveyed by the holder and applies only to the location specified herein.
2. This permit is automatically void if construction is not begun within one year of the date of issuance.
3. This permit is automatically void when an operating permit is issued or denied.
4. The facility covered by this permit shall be constructed as specified in the application for permit to construct.
5. The Board shall be notified prior to the start-up of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present at the time of start-up.
6. The Board shall be notified prior to the start of any required monitoring of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present during monitoring.
7. This permit is not a guarantee that the facility will receive an operating permit at the end of the construction period, nor does it absolve the holder from the responsibility for the consequences of non-compliance with all Rules and Regulations and orders of the Texas Air Control Board or with the intent of the Texas Clean Air Act.
8. Emissions from this facility must not cause or contribute to a condition of 'air pollution' as defined in Section 1.03 of the Texas Clean Air Act or violate Section 4.01 of the Texas Clean Air Act, Article 4477-5, V.A.T.S. If the Executive Director of the Texas Air Control Board determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
9. Special Provisions: See attachments labeled "General Provisions C-9233", 1-5, and "Special Provisions C-9233", 1-5.

Acceptance of the permit constitutes an acknowledgement and agreement that the holder will comply with all Rules, Regulations and Orders of the Board issued in conformity with the Act and the conditions precedent to the granting of this permit. Failure to comply with all special provisions of this permit will subject the holder to the enforcement provisions of the Texas Clean Air Act, Article 4477-5, V.A.T.S.

PERMIT NO. C- 9233 DATE 12-22-83

EXECUTIVE DIRECTOR
TEXAS AIR CONTROL BOARD

Eli Bell
(Deputy Director,
Control & Prevention)

MA39-1/83

GENERAL PROVISIONS

C-9233

1. Equivalency of Methods - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of this permit.

2. Sampling Requirements - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.

3. Appeal - This permit may be appealed pursuant to Rule 103.81 of the Procedural Rules of the Texas Air Control Board Section 6.01 of the Texas Clean Air Act. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit.

4. Construction Progress - Start of construction, construction interruptions exceeding 45 days and completion of construction shall be reported to the appropriate regional office of the Texas Air Control Board not later than ten (10) working days after occurrence of the event. This provision shall not apply to operating permits.

5. Record Keeping - Information concerning production, operating hours, fuel type and fuel sulfur content if applicable shall be maintained at the plant site and made available at the request of personnel from the Texas Air Control Board or the local air pollution control agency.

SPECIAL PROVISIONS

C-9233

1. Sampling ports and platform(s) shall be incorporated into the design of the steam generator stack according to the specifications set forth in the attachment entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the Executive Director of the Texas Air Control Board.

2. A. The holder of this permit shall perform stack sampling and other testing as required to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the steam generator stack. Sampling must be conducted in accordance with appropriate procedures of the Texas Air Control Board Compliance Sampling Manual and in accordance with applicable EPA Code of Federal Regulations procedures. Sampling for particulate, sulfur dioxide and nitrogen oxides shall be in accordance with EPA reference method number 19 (determination of sulfur dioxide removal efficiency and particulate, sulfur dioxide and nitrogen oxide emission rates from electric utility steam generators). Any deviations from those procedures must be approved by the Executive Director prior to sampling. The Executive Director or his designated representative shall be afforded the opportunity to observe all such sampling.

   B. Air contaminants to be tested for include (but are not limited to) particulate matter, nitrogen oxides, sulfur dioxide, carbon monoxide, sulfuric acid mist, volatile organic compounds, mercury and berylium.

   C. Sampling shall occur within one-hundred eighty (180) days after startup of the facility.

   D. The Texas Air Control Board shall be notified thirty (30) days prior to sampling in such a manner that a representative of the Board may be present during sampling and the notice shall include:

      1. Date sampling will occur.
      2. Name of firm doing sampling.
      3. Type of sampling equipment to be used.
      4. Method or procedure to be used in sampling.

SPECIAL PROVISIONS
C-9233
Page 2

E. Three copies of these reports shall be forwarded to the Texas Air Control Board Austin office or the reports shall be distributed as follows:

One copy to the Texas Air Control Board Austin office.
One copy to the appropriate Texas Air Control Board regional office.
One copy to each appropriate local air pollution control program.

3. This facility shall comply with all requirements of Environmental Protection Agency Regulations on Standards of Performance for New Stationary Sources promulgated for electric utility steam generating units in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Subparts A and Da.

4. The total emissions of air contaminants from any of the sources shall not exceed the values stated on the attached table entitled "Emission Sources - Maximum Allowable Emission Rates."

5. Fuel for this steam generator shall be lignite and/or coal with a maximum sulfur content of 2.75 percent by weight and a maximum ash content of 28.11 percent by weight.

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

C-9233

8/79

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	SOURCE NAME (2)	AIR CONTAMINANT DATA — EMISSION RATES*											
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7) CO		(7) H_2SO_4	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y
3-1B	Steam Generator,												
	Lignite Fired	38.4	168	2820	12352	4735	20739	142 (9)	622	600	2628	218	955

Note: Compliance with the maximum hourly emission rates for sulfur dioxide and nitrogen oxides is based on a 30-day rolling average in accordance with EPA NSPS requirements.

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.
(9) As determined by EPA Method 5.

* Emission rates are based on the following operating schedule:
Hrs./day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

5/83

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

C-9233

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

AIR CONTAMINANT DATA

EMISSION POINT ID (1)	SOURCE NAME (2)	EMISSION RATES*											
		VOC (3)		NOX (4)		SO2 (5)		PART (6)		Mercury (7)		Beryllium (7)	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/
3-1B	Steam Generator,												
	Lignite Fired									.029	.127	.00125	.0055

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rules 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs/day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

TEXAS AIR CONTROL BOARD

A CONSTRUCTION PERMIT
IS HEREBY ISSUED TO

LOWER COLORADO RIVER AUTHORITY

AUTHORIZING CONSTRUCTION OF

Limestone and Ash Handling System
Unit #3

TO BE LOCATED AT
LaGrange, Fayette County, Texas
Lat. 30°55'02" Long. 96°45'02"

and which is to be constructed in accordance with and subject to the Texas Clean Air Act, as amended (Article 4477-5, VATS), and all Rules, Regulations and Orders of the Texas Air Control Board. Said construction is subject to any additional or amended rules, regulations and orders of the Board adopted pursuant to the Act, and to all of the following conditions:

1. This permit may not be transferred, assigned, or conveyed by the holder and applies only to the location specified herein.
2. This permit is automatically void if construction is not begun within one year of the date of issuance.
3. This permit is automatically void when an operating permit is issued or denied.
4. The facility covered by this permit shall be constructed as specified in the application for permit to construct.
5. The Board shall be notified prior to the start-up of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present at the time of start-up.
6. The Board shall be notified prior to the start of any required monitoring of the facility authorized by this permit in such a manner that a representative of the Texas Air Control Board may be present during monitoring.
7. This permit is not a guarantee that the facility will receive an operating permit at the end of the construction period, nor does it absolve the holder from the responsibility for the consequences of non-compliance with all Rules and Regulations and orders of the Texas Air Control Board or with the intent of the Texas Clean Air Act.
8. Emissions from this facility must not cause or contribute to a condition of 'air pollution' as defined in Section 1.03 of the Texas Clean Air Act or violate Section 4.01 of the Texas Clean Air Act, Article 4477-5, V.A.T.S. If the Executive Director of the Texas Air Control Board determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
9. Special Provisions: See attachment labeled "General Provisions C-9234," 1-5, and "Special Provision C-9234," 1.

Acceptance of the permit constitutes an acknowledgement and agreement that the holder will comply with all Rules, Regulations and Orders of the Board issued in conformity with the Act and the conditions precedent to the granting of this permit. Failure to comply with all special provisions of this permit will subject the holder to the enforcement provisions of the Texas Clean Air Act, Article 4477-5, V.A.T.S.

PERMIT NO. C-9234 DATE 12-22-83

EXECUTIVE DIRECTOR
TEXAS AIR CONTROL BOARD

Eli Bell
(~~Deputy Director~~, Control & Prevention)

GENERAL PROVISIONS

C-9234

1. Equivalency of Methods - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of this permit.

2. Sampling Requirements - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.

3. Appeal - This permit may be appealed pursuant to Rule 103.81 of the Procedural Rules of the Texas Air Control Board Section 6.01 of the Texas Clean Air Act. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit.

4. Construction Progress - Start of construction, construction interruptions exceeding 45 days and completion of construction shall be reported to the appropriate regional office of the Texas Air Control Board not later than ten (10) working days after occurrence of the event. This provision shall not apply to operating permits.

5. Record Keeping - Information concerning production, operating hours, fuel type and fuel sulfur content if applicable shall be maintained at the plant site and made available at the request of personnel from the Texas Air Control Board or the local air pollution control agency.

SPECIAL PROVISION

C-9234

1. The total emissions of air contaminants from any of the sources shall not exceed the values stated on the attached table entitled "Emission Sources - Maximum Allowable Emission Rates."

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

C-9234

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by thi permit. The emission rates shown are those derived from information submitted as part of the application for p and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

AIR CONTAMINANT DATA												
EMISSION POINT ID (1)	SOURCE NAME (2)	EMISSION RATES*										
		VOC (3)		NOX (4)		SO2 (5)		PART (6)		(7)		
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR
	ASH											
3-1A	Ash Collection							.15	.28			
3-2A	Ash Transport							2.4	4.48			
	LIMESTONE											
3-1L	Limestone Unloading							.38	.06			
3-2L	Limestone Reclaim							.38	.06			
3-5L	Silo Transfer							.8	.57			

(1) Emission point identification - either specific equipment designation or emission point number from plot plan
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rules 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs/day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

Appendix 7.2

Permit Number PSD-TX-486

AUTHORIZATION TO CONSTRUCT AND OPERATE A NEW OR MODIFIED FACILITY PURSUANT TO THE PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS IN 40 CFR 52.21 et seq

In accordance with the provisions of the Clean Air Act, as amended, 42 U.S.C. 7475 and 40 CFR 52.21, as amended August 7, 1980,

Lower Colorado River Authority
Post Office Box 220
Austin, Texas 78767

is authorized to modify its Fayette Power Project located two miles east of highway 71 on County Road 121 approximately seven miles east of

LaGrange
Fayette County, Texas

subject to the emission limitations, monitoring requirements and other conditions set forth hereinafter.

The permit shall be effective on January 24, 1984, unless a petition to the Administrator for review of the permit is filed in accordance with the requirements of 40 CFR 124.19.

This permit and authorization to construct shall expire at midnight on July 24, 1985, unless physical onsite construction has begun by such date or binding agreements or contractual obligations to undertake a program of construction of the source are entered into by such date.

Signed this 24th day of January, 1984

Jack S. Divita
for Allyn M. Davis, Director
Air and Waste Management Division
United States Environmental
Protection Agency, Region 6

GENERAL PROVISIONS

PSD-TX-486

1. **<u>Equivalency of Methods</u> - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director of the Texas Air Control Board prior to their use in fulfilling any requirement of this permit.**

2. **<u>Sampling Requirements</u> - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.**

3. **<u>Construction Progress</u> - Start of construction, construction interruptions exceeding 45 days, completion of construction and startup shall be reported to the Texas Air Control Board, not later than ten (10) working days after occurrence of the event.**

4. **<u>Record Keeping</u> - Information concerning production, operating hours, fuel type and fuel sulfur content if applicable shall be maintained at the plant site and made available at the request of personnel from the Texas Air Control Board, the local air pollution control agency, or the Environmental Protection Agency.**

SPECIAL PROVISIONS
Lower Colorado River Authority
PSD-TX-486

1. The total emissions of air contaminants from any of the sources shall not exceed the values stated on the attached table entitled "Emission Sources - Maximum Allowable Emission Rates."

2. This facility shall comply with all requirements of Environmental Protection Agency Regulations on Standards of Performance for New Stationary Sources promulgated for coal preparation plants in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Subparts A and Y.

3. The lignite storage piles shall be treated with water and/or chemicals as necessary to control the emissions of particulate matter.

4. This facility shall comply with all requirements of Environmental Protection Agency Regulations on Standards of Performance for New Stationary Sources promulgated for electric utility steam generating units in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Subparts A and Da.

5. Sampling ports and platforms shall be incorporated into the design of the steam generator stack according to the specifications set forth in the attachment entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the Executive Director of the Texas Air Control Board.

6. A. The holder of this permit shall perform stack sampling and other testing as required to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the steam generator stack. Sampling must be conducted in accordance with 40 CFR, Part 60, Appendix A, Test Method 5, "Determination of Particulate Emissions from Stationary Sources", Method 7, "Determination of Nitrogen Oxide Emissions from Stationary Sources", Method 8, "Determination of Sulfur Dioxide and Sulfuric Acid Mist Emissions from Stationary Sources", Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources", Method 25, "Determination of Total Gaseous Nonmethane Emissions from Stationary Sources" (Method 25a or 25b may be utilized as an alternative), and 40 CFR Part 61, Method 101, "Determination of Particulate and Gaseous Mercury Emissions from Stationary Sources (Air Streams)", and Method 104, "Determination of Beryllium Emissions from Stationary

Sources". In lieu of using Method 7 for sampling nitrogen oxides and Method 8 for sampling sulfur dioxide, the holder of this permit may elect to use Method 19, "Determination of Sulfur Dioxide Removal Efficiency and Particulate, Sulfur Dioxide and Nitrogen Oxides Emission Rates from Electric Utility Steam Generators." Any deviations from those procedures must be approved by the Executive Director prior to sampling. The Executive Director or his designated representative shall be afforded the opportunity to observe all such sampling.

B. Air contaminants to be tested for include (but are not limited to) particulate matter, nitrogen oxides, sulfur dioxide, carbon monoxide, sulfuric acid mist, mercury, beryllium, and volatile organic compounds.

C. Sampling shall occur within one hundred eighty days after startup of the facility.

D. The Texas Air Control Board shall be notified thirty days prior to sampling in such a manner that a representative of the Board may be present during sampling and the notice shall include:

1. Date sampling will occur.
2. Name of firm doing sampling.
3. Type of sampling equipment to be used.
4. Method or procedure to be used in sampling.

E. Two copies of these reports shall be forwarded to the Texas Air Control Board Austin office.

7. The opacity from Emission Point 3-1B shall not exceed 10%. The opacity from any other emission point covered by this permit shall not exceed 20%.

8. Fuel for this steam generator shall be lignite and/or coal with a maximum sulfur content of 2.75 percent by weight and a maximum ash content of 28.11 percent by weight.

9. The permittee shall report the sulfur dioxide performance test data and continuous monitor data in the manner prescribed in 40 CFR 60.49, except that the data shall consist of 3-hour rolling averages considering each hour and the two preceeding hours rather than 30-day rolling averages. Compliance with the sulfur dioxide emission rates will be based upon the 3-hour rolling averages.

CHAPTER 2

STACK SAMPLING FACILITIES

General

Most sampling for representative results requires minimum sampling facilities for which the TACB has established the guidelines presented in this chapter. Stack sampling operations utilize a system of equipment to traverse a cross-section of the stack or duct through ports located such that a representative sample can be obtained. Normally, a monorail structure is erected so the cross-section of the stack may be traversed on two diameters for circular stacks and on a matrix layout for rectangular or other shaped stacks.

These guidelines cannot anticipate all situations, and special cases will occur. Non-standard or alternate installations are therefore evaluated on an individual basis, and in such instances detailed plans should be sent to the TACB for review and approval before the construction of stack sampling facilities is initiated.

Existing sources with stack sampling facilities approved previously by the TACB may not normally be required to meet these additional specifications described in this chapter. The 220-volt, 50-amp electrical outlet at the stack base as described in the Power Supply section of this chapter may, however, be necessary in certain cases due to the increased power requirements of TACB monitoring systems. The following guidelines constitute minimum requirements for safe and accessible stack sampling facilities:

Physical Features

Before consideration is given to the installation of sampling ports and platforms, certain dimensions and other features of the stack and stack gas must be verified in order that a representative sample is possible.

- Stack diameter must be at least one foot.
- Stack gas velocity head must be at least 0.1 inches of water.
- The stack must have at least 2-1/2 diameters of uniform undisturbed cross-section.

Sampling Ports

Port location

The optimum location of sampling ports is at least eight stack diameters downstream of any bends, inlets, constrictions, abatement equipment, straightening vanes, or other flow disturbance; and at least two stack diameters upstream of the stack exit or other flow disturbance. Hydraulic diameter is used for non-circular stacks and is defined later in this chapter. This location permits a sample traverse to be taken using a minimum of twelve sampling points. A greater number of sampling points is necessary on stacks which fail to meet this location criteria. For a valid sample traverse to be obtained, however, sampling ports must be located at least two stack diameters downstream and at least one-half stack diameter upstream from any disturbance. If a 2-1/2 diameter length of uniform undisturbed stack cross-section is not available, stack modification must be made or an alternate sampling location must be chosen which will satisfy this criteria.

To minimize the increase in the number of sampling points required on stacks with undisturbed cross-section less than 10 but greater than 2-1/2 stack diameters in length, the sampling ports should be located such that the distance from the ports to the nearest upstream disturbance is four times the distance from the ports to the nearest downstream disturbance (see Figure 2-3 for minimum number of sampling points required).

Port Size

Ports are minimum three-inch ID standard industrial flanged pipe with six-inch bolt circle diameter and closed by a removable blind flange. Larger port sizes are necessary on large diameter, double-walled stacks which necessitate longer ports. These ports should also be standard industrial flanged pipe. Ports no smaller than four inches inside diameter must be provided on stacks greater than ten feet in diameter.

Port Installation

Ports shall be installed flush with the interior stack wall and shall extend outward from the exterior stack wall no less than three inches nor more than eight inches unless additional length is required for gate valves. Gate valves should be installed only when extreme stack conditions and/or the presence of hazardous materials require such devices for the safety of personnel. Ports shall be installed no less than five feet nor more than six feet above the floor of the platform and the clearance zone described later in this chapter must be maintained.

Number and Location of Ports on Circular Stacks

A minimum of two ports shall be installed on diameters 90° apart if the stack diameter plus one port length (stack inside wall to end of port extension) is less than ten feet. Four ports shall be installed on diameters 90° apart if the stack diameter plus one port length is equal to or greater than ten feet.

Number and Location of Ports on Non-Circular Stacks

The same upstream and downstream distance requirements discussed previously apply to non-circular stacks. The hydraulic diameter (four times the area divided by the perimeter) is used in place of the circular diameter. This becomes (2AB) ÷ (A+B) for a rectangular stack, where A and B are the cross-sectional dimensions of the stack. The streamwise location of the sampling ports is determined in the same manner as for circular stacks using the hydraulic diameter. The hydraulic diameter is used only for determining the location of sampling ports and the required number of sampling points. Hydraulic diameter is not used in data reduction.

The cross-stream location of the sampling ports is dependent upon the total number of sampling points required. Figure 2-3 is used to determine the required minimum number of sampling points by reading the curve corresponding to the number of upstream hydraulic diameters (B) and downstream hydraulic diameters (A) and selecting the higher number. A mathematical representation of the curve is also shown for convenience.

The stack cross-section of square or rectangular stacks is divided into a matrix (i,j) of equal area rectangles such that $i = j$ or $i = j \pm 1$ and $i + j$ is equal to or greater than the total number of sampling points required. The number of sampling ports required is either i or j located along one side of the stack such that the centerline of each port is colinear with the centroid of each row of sampling points.

Stacks with cross-sections which are not circular or rectangular must be equipped with an adequate arrangement of sampling ports so that the stack cross-section may be divided into a sufficient number of area increments for a representative sample. If equal area increments are not possible, time weighting of the sample at the various sampling points may be necessary. Detailed plans of such installations should receive advance approval by the TACB.

Monorail Support Structure

The installation of a permanent monorail support structure is recommended to reduce set-up time and to eliminate the load-bearing requirements for the sampling ports. Figure 2-1 shows a drawing of the monorail support structure including the relative position of the bracket to the sampling port. This bracket is intended to be compatible with several types of sampling equipment. The loading requirements for ports or the monorail support structure are shown below.

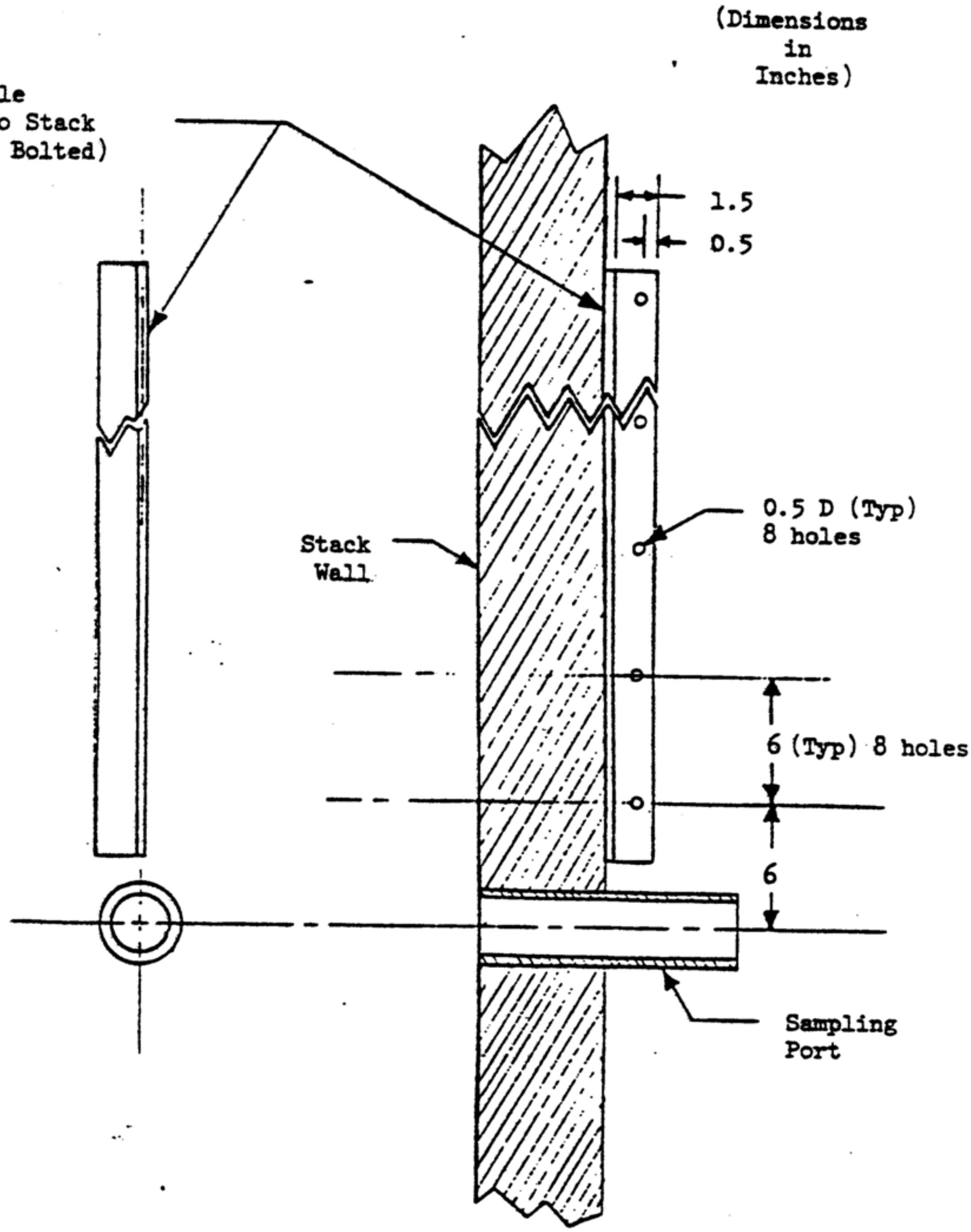


Figure 2-1

Monorail Support

Port or Monorail Support Loading

The port or monorail support installation shall be capable of supporting the following loads:

- Vertical load of 200 pounds
- Horizontal load of 200 pounds
- Radial load of 1000 pounds (along stack diameter)

Work Platform

A work platform shall be provided around the stack circumference between the sampling ports and extending at least three feet beyond each port. If four ports are required, the work platform shall extend around the entire circumference of the stack. The minimum platform width shall be at least three feet measured radially with stack diameter. The work platform must be capable of supporting at least 2000 pounds.

Safe and easy access to the work platform shall be provided via ladder, stairway,or other suitable means. Safe guardrails shall be provided around the platform. Angular rather than round rail members should be used if possible. No open ladder well, stairwell, or other such opening shall be located within three feet of any sampling port. Ladder wells shall be covered at the platform and any opening to the platform shall be equipped with a safety bar or chain at the opening.

A temporary work platform for sampling operations is acceptable if proper safety and accessibility is provided. All other requirements detailed in this chapter such as for monorails, ports, loading, clearance, and power must be met by the temporary facilities.

Clearance Zone

A three-dimensional obstruction-free clearance zone shall be provided around each sampling port. The zone shall extend one foot above the port, two feet below the port, and two feet to either side of the port. The zone shall extend outward from the exterior wall of the stack at least one stack diameter plus one port length (inside wall to end of port extension) plus three feet. The clearance zone is illustrated in Figure 2-2.

Power Supply

Electrical power outlets shall be provided as follows:

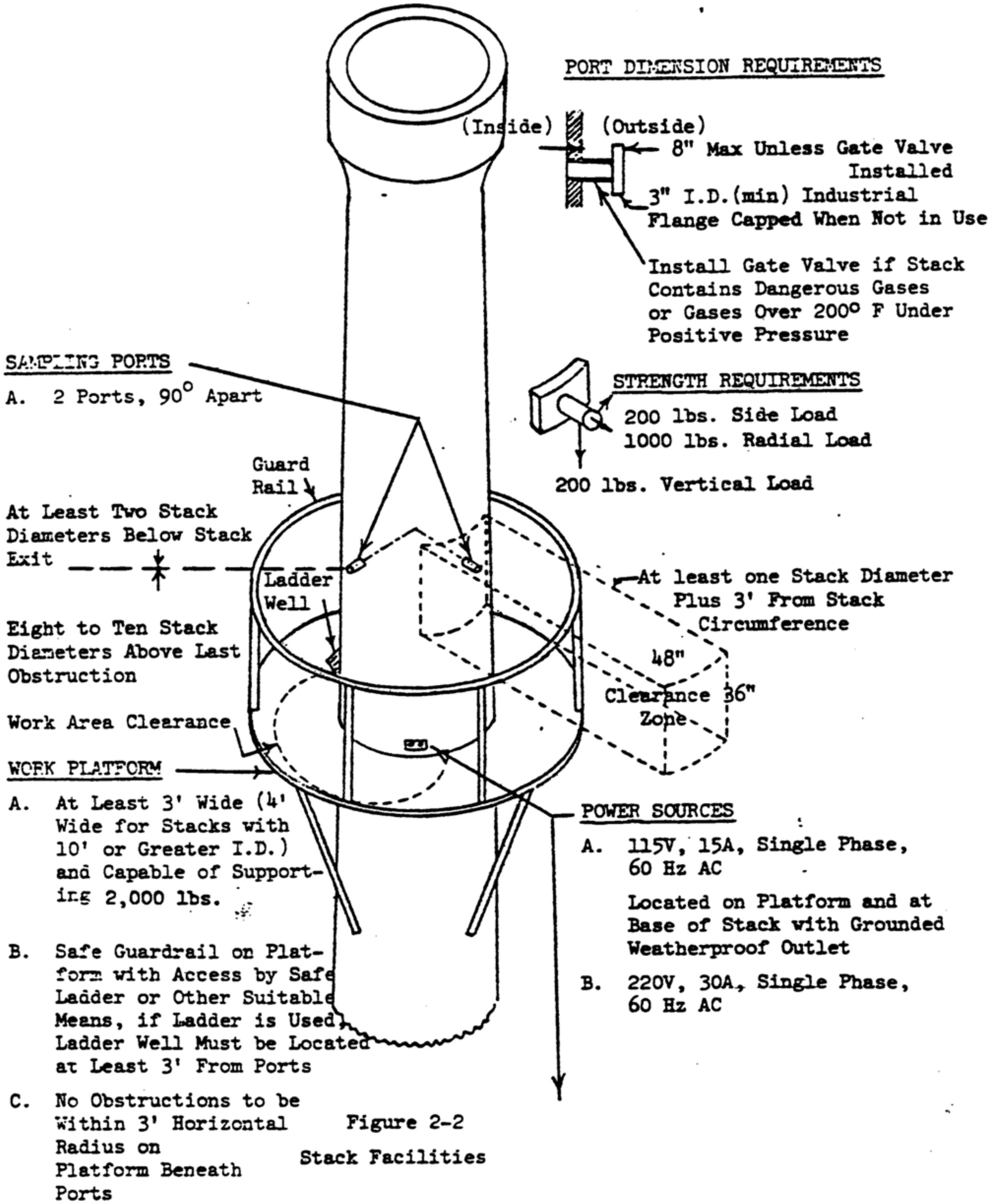


Figure 2-2

Stack Facilities

Platform

One 115-volt, 15-amp, single phase, 60 hertz alternating current circuit with a grounded two-receptacle weather-proof outlet. Receptacles shall accept standard three-prong grounded household-type plugs or suitable adapters shall be provided.

Stack Base

Two 115-volt, 15-amp, single phase 60 hertz alternating current circuits with grounded two-receptacle weather-proof outlets. Receptacles shall accept standard three-prong grounded household-type plugs or suitable adapters shall be provided.

One 220-volt, 50-amp, single phase alternating current circuit with standard 50-amp plug or suitable adapters capable of being wired to TACB power cord.

Vehicle Access and Parking

The stack sampling will be coordinated and controlled from a van or trailer parked near the base of the stack for the duration of the sampling except for situations in which sampling operations must be conducted from a rooftop or other location. Vehicle access and parking space must be provided since various umbilical, communications, and equipment transport lines will be strung from the van or trailer to the stack platform and will remain in position throughout the sampling period.

Gaseous Sampling - Concentration Only

Standard sampling ports and platforms are normally necessary for gaseous sampling because a velocity traverse is needed for flow rate determination in most cases. In sampling situations for which only pollutant concentration is needed or for which an accurate flow rate is available by other approved means, less elaborate sampling facilities may be acceptable. All facilities must, however, meet strength and safety requirements.

Gaseous sampling facilities for concentration only shall be sufficient for collection of a sample of stack gas according to standard gaseous sampling procedures. Adequate minimum facilities such as a one inch nipple shall be installed in the stack at a location where sufficient turbulence exists (no stratification) to insure a representative sample. Proper clearance must be provided for sampling operations or a permanent probe and sample line can be installed at the port location and extended to a more accessible sampling location. The probe and sample line must be installed so that leak checks can be made.

Permanent Monorail Systems

Source operators are encouraged to install permanent monorail systems on large stacks. Monorails must extend the full radial length of the clearance zone described previously, and must be capable of supporting a 200 pound load anywhere along the monorail track. Rollers must be properly lubricated and maintained in working condition. The sample box attachment hooks should be six inches above the port centerline. If the monorail is installed with the hooks more than six inches above the port centerline, suitable adapters must be provided.

Miscellaneous Requirements

In addition to the specific requirements detailed in this chapter, other miscellaneous requirements are as follows:

- Power hoists shall be provided for sampling platforms 200 feet or more above ground level.
- Non-circular horizontal ducts should have provisions for vertical sampling. Circular horizontal ducts should have one vertical and one horizontal port. Suitable work platforms are necessary in both cases.
- Heat insulation shall be installed as necessary on high temperature stacks for safety in the vicinity of the work platform.
- The source operator is responsible for maintaining all sampling facilities in safe, useable condition at all times.

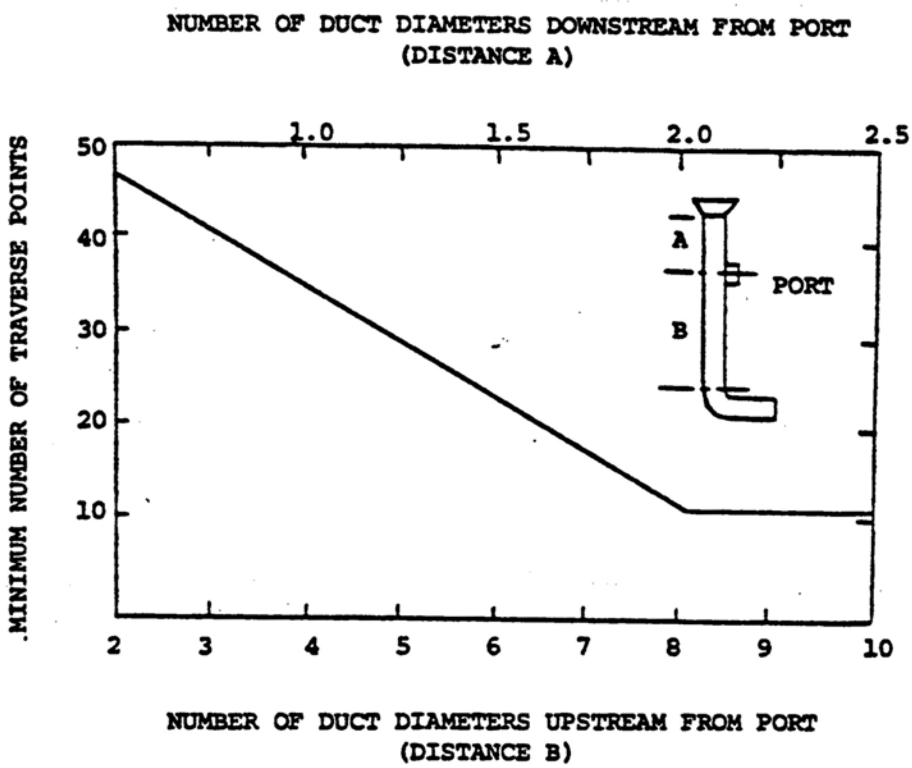
Excess Air

Additional facilities may be necessary for determining the composition and flow rates of feed stock and fuel on certain processes such as incinerators. This information, obtained at the time of sampling, is necessary to calculate the amount of air in the stack effluent in excess of stoichiometric.

Cyclonic Flow

Cyclonic or swirling flow may be encountered in a stack or duct due to certain circumstances such as cyclone collectors or tangential duct entry. Corrective measures such as straightening vanes may be necessary to alleviate the cyclonic condition.

The existence of cyclonic flow may be determined as described in Chapter 4. A method for sampling cyclonic flow is described in Appendix H, but advance approval should be obtained concerning its applicability for determining compliance status.



1) 12
2) 6 (10−B)
3) 12 (5−2A)

A = Number of Diameters Downstream
B = Number of Diameters Upstream

The minimum number of traverse points is the largest number of the three numbers calculated by equations 1, 2 and 3.

Figure 2-3
Minimum Number of Traverse Points

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

PSD-TX-486

8/79

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	AIR CONTAMINANT DATA												
	SOURCE NAME (2)	EMISSION RATES*											
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7) CO		(7) H_2SO_4	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y
3-1B	Steam Generator,												
	Lignite Fired	38.4	168	2,820	12,352	4,735	20,739	142(9)	622	600	2,628	218	955
	(4735 MM Btu/hr)												

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific. carbon monoxide, sulfuric acid.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.
(9) As determined by EPA Method 5.

* Emission rates are based on the following operating schedule:
Hrs./day______ Days/week______ Weeks/year______ or Hrs/year 8760

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

PSD-TX-486

8/79

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	SOURCE NAME (2)	AIR CONTAMINANT DATA — EMISSION RATES*											
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7) mercury		(7) beryllium	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y
3-1B	Steam Generator,												
	Lignite Fired									0.029	0.127	0.00125	0.0055
	(4735 MM Btu/hr)												

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs./day ______ Days/week ______ Weeks/year ______ or Hrs/year 8760

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

PSD-TX-486

8/79

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	SOURCE NAME (2)	AIR CONTAMINANT DATA											
		EMISSION RATES*											
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7)		(7)	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y
M-1	Truck Unloading							24.0	52.5				
M-2	Reclaim							0.1	0.22				
M-3	Feeder/Braker							0.1	0.22				
M-4	Transfer Point							0.1	0.22				
M-5	Transfer Point							0.1	0.22				
M-6	Transfer Point							0.1	0.22				
M-7	Transfer Point							0.1	0.22				
3-1F	Transfer & Feeder							0.96	2.1				
3-2F	Transfer Point							0.48	2.1				
3-3F	Active Lignite Storage (8)							3.7	16.1				
3-4F	Transfer Point							0.6	1.05				
3-5F	Transfer & Feeder							1.2	2.1				
3-6F	Crusher & Feeder							1.2	2.1				
3-7F	Transfer & Feeder							1.2	2.1				
3-8F	Transfer Point							0.3	0.52				
3-9F	Transfer Point							0.3	0.52				

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs./day______ Days/week______ Weeks/year______ or Hrs/year 8760

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

PSD-TX-486

8/79

This table lists all sources of air contaminants on applicant's property emitted by the facility covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

EMISSION POINT ID (1)	AIR CONTAMINANT DATA													
	SOURCE NAME (2)	EMISSION RATES*												
		VOC (3)		NOx (4)		SO2 (5)		PART (6)		(7)		(7)	
		#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y	#/HR	T/Y
3-10F	Transfer Point							0.3	0.52				
3-11	Transfer Point							0.3	0.52				
3-12	Inactive Lignite Storage (8)							0.97	4.27				
3-13	Transfer Point							0.6	0.2				
	ASH												
3-1A	Ash Collection							0.15	0.28				
3-2A	Ash Transport							2.4	4.48				
	LIMESTONE												
3-1L	Limestone Unloading							0.38	0.06				
3-2L	Limestone Reclaim							0.38	0.06				
3-5L	Silo Transfer							0.8	0.57				

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) Volatile organic compounds as defined in General Rule 101.1 including methyl chloroform and Freon 113.
(4) Total oxides of nitrogen.
(5) Sulfur dioxide.
(6) Particulate matter.
(7) Other contaminants not listed; should be specific.
(8) Fugitive emissions are an estimate only and should not be considered as a maximum allowable emission limit.

* Emission rates are based on the following operating schedule:
Hrs./day______ Days/week______ Weeks/year______ or Hrs/year 8760

Appendix 7.2 (cont.)

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