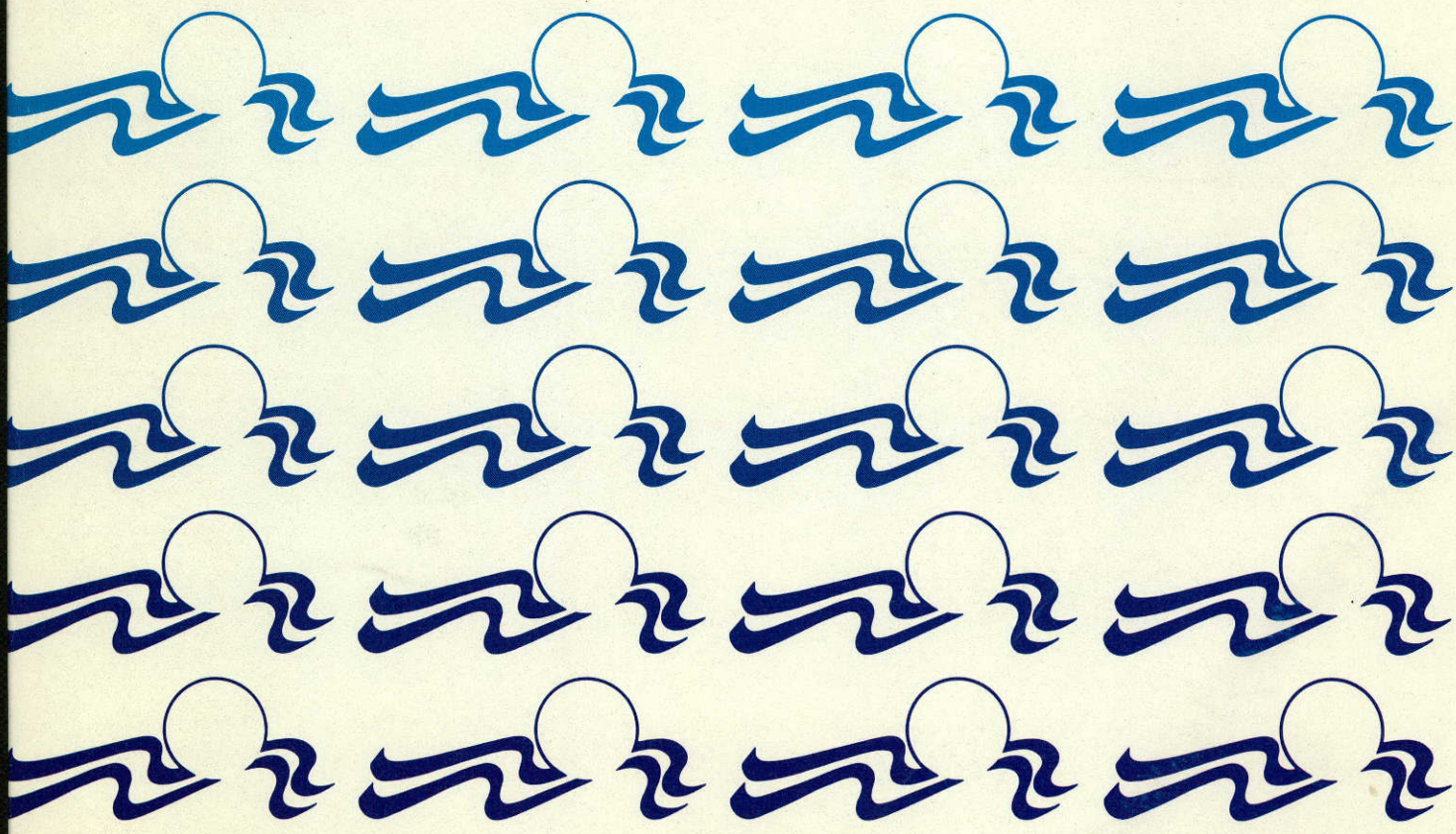
Texas Air Control Board Staff Report

Air Quality Modeling Guidelines

November 9, 1992



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December 10, 1992

TO: All Interested Parties

Enclosed you will find a copy of the Texas Air Control Board's (TACB's) Air Quality Modeling Guidelines. This document supersedes the TACB's October 1988 Air Quality Modeling Procedures. It provides guidance on models and modeling procedures that are used in support of air permitting in the State of Texas.

These guidelines have been prepared in a document-control format to enable more efficient revision of individual sections. As sections are revised, the replacement pages will be available in either a hard copy format or via electronic media.

The TACB Modeling Staff encourages comments on these guidelines and will take proposed revisions from the public into consideration when revisions are contemplated. If you have comments, please submit them in writing or call Mr. Waldon Boecker at (512) 908-1467 or myself at (512) 908-1465.

Sincerely,

James Red

James Red, Chief
Permit Modeling and Special Services
Modeling Division

Enclosure

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Texans working for clean air

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1.0 Introduction

This document describes the current Texas Air Control Board (TACB) staff air quality analysis procedures. The TACB Modeling Division periodically changes its procedures to reflect improvements in theory, to correct deficiencies that have been discovered, or to be consistent with requirements of other regulatory agencies. This document serves only as a guide to general techniques and procedures suggested by the TACB staff. A "cookbook" approach to dispersion modeling guidance is not intended for these guidelines due to the diversity of the state's topography and climate, and variations in source configurations and operating characteristics. These guidelines suggest a minimum level of analysis considered necessary to best protect the health, safety, and welfare of the public as related to the dispersion modeling evaluation. Additional analyses may be needed to ensure that the public record adequately addresses TACB case-by-case concerns and concerns raised by the public.

The procedures described herein are designed to streamline methods, eliminate unnecessary regulatory modeling, and minimize the amount of computer time required while preserving the quality of the dispersion modeling results used in each evaluation. In addition, these procedures are established to ensure that models and modeling procedures are not arbitrarily imposed and to ensure that the best model is used correctly for each regulatory application. Consistency in the selection and application of dispersion models is required to ensure a common basis for estimating pollutant concentrations, assessing control strategies, and specifying emission limits without compromising accuracy. The TACB Modeling staff may approve alternate techniques which can be demonstrated to be more appropriate than techniques recommended in this document. Such demonstration must be reviewed with the TACB Modeling staff, carefully documented, and included in Applicant's Air Quality Analysis([1]).

The Air Quality Analysis must utilize emissions data, emission point parameters, operating conditions, and other criteria consistent with representations in the permit application and the proposed permit, if any. After the TACB Permits Program staff determines that an Air Quality Analysis is necessary, applicants are required to consult with the TACB Modeling staff before initiating any regulatory modeling exercises required by the TACB to ensure that the proposed procedures are acceptable.

1 The Air Quality Analysis includes the results of the dispersion modeling evaluation and supporting documentation. For state permit applications the reporting requirements are specified in Attachment D, Reporting Requirements. For PSD permit applications, the reporting requirements are specified in the TACB/EPA Suggested Approach for PSD Modeling Protocols.

Notes

2.0 Air Quality Analysis Process

The air quality analysis process may involve a number of TACB responsibility areas depending upon the complexity of the application and the potential impact of the associated facility on air quality in Texas. The applicant should contact the TACB Permits Program staff for guidance before contacting other TACB staff.

2.1 Permits Program Coordination

The applicant must provide sufficient information to the TACB Permits Program staff to determine applicable procedures (state permit, standard exemption, federal permit, etc.) and the need for regulatory modeling. Regulatory modeling is defined as the dispersion modeling required by the TACB or U.S. Environmental Protection Agency (EPA), under the guidance of the TACB Modeling staff/EPA. The Permits Program and other TACB staff must make certain determinations before regulatory modeling guidance is finalized. These determinations include, but are not limited to, the following:

▼ Is sufficient information available to determine the applicable state and federal regulations, standards and/or guidelines?

▼ For which pollutants, if any, is modeling required?

▼ Are emission rate calculations definitive enough to determine whether or not a Prevention of Significant Deterioration (PSD) permit application and/or nonattainment review are needed? If a PSD permit is needed, different modeling procedures apply.

▼ Which on-property emission points are to be evaluated using dispersion models?

▼ Is the information regarding the physical characteristics of the emission points (stack, fugitive, flare, etc.) definitive enough for the TACB staff to provide modeling guidance?

▼ Have the worst case stack parameters been approved for normal operating conditions (this may include stack parameters at 25%, 50%, 75% and 100% load, if load conditions are expected to vary under normal operating conditions)?

▼ Is upset condition modeling required?

▼ Is disaster modeling required?

▼ Is a plot plan available specifying the existing and/or proposed locations of the emission points relative to property lines and fence lines?

▼ Is an area map available? A current United States Geological Survey (USGS), 7.5-minute topographic map with Universal Transverse Mercator (UTM) coordinates and terrain elevations is required to specify locations of property lines and fence lines. The portion of the map included in the air quality analysis should be full scale (no reduction or enlargement) covering the area within a 3,000 meter radius of the facility and showing locations of established residence(s), churches, schools, day care centers or similar facilities, dedicated public parks and other recreational areas, health care facilities and other sensitive areas (more than one map may be required).

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▼ What criteria will be used to determine whether or not all on-property sources and off-property sources require evaluation?

The TACB staff recommends that the applicant submit the state permit application and the PSD permit application, if applicable, to the TACB Permits Program with all information, except the Air Quality Analysis, to enable the above questions to be answered as soon as possible.

There are two levels of air quality analysis. The first level involves the use of screening models consisting of relatively simple techniques which provide an indication as to whether a more detailed analysis is necessary. The screening analysis is generally conducted by the Permits Program staff, or the staff may request the applicant to conduct the screening analysis. The screening analysis should be consistent with EPA guidance including, but not limited to, the following, as revised:

▼ Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, EPA-450/4-88-010;

▼ A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants, EPA-450/4-88-009; and

▼ User's Guide to Tscreen, A Model for Screening Toxic Air Pollutant Concentrations, EPA-450/4-90-013.

If a screening technique results in a finding that concentrations due to the evaluated sources exceed a standard or guideline, or percentage of a standard or guideline, the Permits Program staff may ask the applicant to conduct additional screening or refined modeling. This second level of analysis provides more detailed treatment of atmospheric processes. This analysis requires more detailed and precise input data to provide more refined concentration estimates and requires pre-modeling consultation with the TACB Modeling staff.

If the TACB Permits Program determines that regulatory modeling is necessary, an applicant should consult with the TACB Modeling staff prior to final emission rate approval to allow the modeling guidance to be developed in parallel with the technical review of emission rates and stack parameters.

This consultation should enable the emission rates/stack parameters and regulatory modeling guidance to be approved by the TACB staff at about the same time. Questions including those listed above should be answered, and results of the consultation with the TACB staff must be documented with a TACB Permit Modeling Guidance Checklist (modeling checklist) which must be signed by a TACB Modeling staff member and included in the applicant's Air Quality Analysis. A protocol defining modeling procedures in more detail than the modeling checklist is required for PSD permit applications and may be needed for complex state permit applications (in addition to the modeling checklist). If necessary, amendments to the modeling checklist and/or TACB protocol comments may be prepared by the TACB Modeling staff to document any necessary changes in

modeling guidance as the TACB/EPA technical review progresses. In any case, the Air Quality Analysis should be submitted to the TACB within six months of the date of the modeling checklist or within six months of the date of the last addendum to the modeling checklist.

The TACB recognizes the costs associated with a regulatory modeling evaluation and, therefore, recommends that no regulatory modeling be conducted prior to TACB Permits Program staff approval of emission rates and stack parameters. However, regulatory modeling, using a TACB approved ratio technique (Section 4.1.a), may be conducted if worst case stack parameters have been approved by the TACB Staff.

2.2 Coordination with Other TACB Staff

Other TACB responsibility areas may become involved in the air quality analysis process including, but not limited to, the following listed in the table below.

Responsibility Area	Information
Regional Staff	Requirements (other than modeling guidance) for Standard Exemption 6 and other applications filed with regional offices which require modeling
Coordination Services Section, Information Systems Division	Point Source Data Base (PSDB) Retrieval
Emissions Inventory Division, Air Quality Planning	Correction of errors, if any, found in PSDB
Data Management and Analysis Division, Technical Operations	Ambient air quality monitoring data and county nonattainment status
Quality Assurance Division, Technical Operations	Review and approval of monitoring Quality Assurance Plan
Effects Evaluation Division, Regulatory Operations	Effects Screening Levels and other information needed for a Health Effects Review
Legal	Legal opinions (regarding what constitutes control of property, etc.)

Notes

3.0 Types of Air Quality Analyses

TACB-required regulatory modeling can be divided into two categories. The first category is required for state permits and the second is required for PSD permits.

There are five types of analyses which may be required for state permits:

a. Preliminary Impact Analysis,
b. Property Line Analysis,
c. Health Effects Review,
d. NAAQS Analysis, and
e. Disaster Review.

The Air Quality Analysis results include the design concentration for each pollutant or the concentration that is to be compared with the NAAQS, state standard, or state guideline. The TACB design concentration for state permits is the maximum concentration located off the property controlled by the source being considered. The TACB Legal staff should be consulted if there are questions concerning what constitutes "control" of property.

For PSD permits, there are four types of analyses:

a. Monitoring Significance,
b. Area of Impact (AOI) Analysis,
c. NAAQS Analysis, and
d. Increment Analysis.

The design concentration for PSD permits is the concentration as defined in the EPA Guideline on Air Quality Models, as revised, (GAQM) and the EPA New Source Review Workshop Manual, draft dated October 1990, as revised (NSR Workshop Manual).

Notes

3.1 State Permit Applications

A number of analyses may be required for state permit applications. The first is the preliminary impact analysis which is designed to evaluate new and increased emissions and assist in determining the need for additional analyses.

Source	Emission Point	Model
New and/or Existing	New and/or Existing without Change to Existing Stack Parameters	All New Emissions with Proposed Stack Parameters and Increased Emissions with Existing Stack Parameters
Modified	New	All Emissions with Proposed Stack Parameters
Modified	Existing with Proposed Change in Stack Parameters	Proposed Emissions As Positive Numbers with Proposed Stack Parameters and Existing Emissions as Negative Numbers with Existing Stack Parameters

Notes

3.1.a. Preliminary Impact Analysis

Applicants should model all new sources and modifications to existing sources that increase emissions. Emissions from all new equipment must be modeled, even if the emissions are released through existing emission points.

Only sources covered by the permit application are modeled at this stage. Also, sources in the permit application for which emissions are being reduced should not be included in this step of the modeling evaluation. In addition, contemporaneous increases and decreases used in the PSD permit program should not be included. Some of the possible combinations for the preliminary impact analysis are summarized in the table on the previous page.

3.1.b. State Property Line Analysis

TACB Regulations I, Control of Air Pollution From Visible Emissions and Particulate Matter; Regulation II, Control of Air Pollution From Sulfur Compounds; and Regulation III, Control of Air Pollution From Toxic Materials define property line standards for a number of pollutants for various averaging times. These are summarized in Attachment A. Net ground-level concentration should be determined by modeling all sources on the plant property that emit the subject pollutant, as required by these regulations. Concentrations are predicted at locations at and beyond the property line. The maximum predicted concentration is compared with the appropriate standard for each averaging time. Permitted sources are modeled at the permit allowables. Other sources are modeled with actual emission rates.

In many cases, the proposed source emissions may be insignificant compared to the total emissions from the plant. Therefore, in many cases, the standard procedure will be to first model the emissions from the proposed sources as described in Preliminary Impact Analysis. The need for additional analysis will be determined on a case-by-case basis by the TACB staff. Often, if the predicted maximum off-property concentration is less than two percent([2]) of the standard, then no additional modeling will be necessary.

For cases where predicted maximum concentrations are greater than two percent of a standard for a pollutant, the TACB staff may require evaluation of all sources at the plant. Such analysis should also be conducted with sources emitting at the permit allowables. For sources that do not have a defined permit allowable, the actual emissions obtained from the TACB Point Source Data Base (PSDB) retrieval should be used.

In areas where monitoring has shown that a standard for a pollutant is exceeded or where previous modeling has shown that the stan-

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2 The two percent of the state standard applies to regulatory modeling and is a guideline suggested by the TACB Modeling staff. This guideline may not apply to other evaluations conducted by other TACB staff in the permit application review process.

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dard may be exceeded, all sources of the pollutant on the plant property must be modeled (that is, the "two percent" guideline does not apply).

3.1.c. Health Effects Review

The TACB Effects Evaluation Division (EED) staff has developed a list of numerous compounds of concern. For each compound, EED has determined the ambient concentration below which adverse effects are not expected. These levels are referred to as Effects Screening Levels (ESLs) and provide guidelines to protect against adverse health effects, adverse vegetation effects, materials damage (e.g., corrosion), and nuisance conditions (e.g., odor). Applicants should consult EED to ensure use of the most recent published ESL list, to obtain additional information concerning the basis for the ESLs, and to obtain ESLs for compounds not on the published list.

An air quality analysis must be performed for each pollutant (as specified by the Permits Program staff and documented with the TACB Permit Modeling Guidance Checklist) which has a potential to cause adverse health effects, adverse vegetation effects, materials damage, nuisance conditions, or other adverse effects. The first step in the analysis is to conduct modeling to predict the maximum one-hour and annual average concentrations for each pollutant to be addressed following the procedures described in Section 3.1.a. The proposed allowable emissions from each source covered by the permit should be modeled. The resulting predicted concentrations will generally be reviewed by EED.

Frequently, if the predicted maximum off-property (or uncontrolled area) concentration is less than ten percent([3]) of the ESL, no additional modeling will be required. This decision is made on a case-by-case basis.

Applicants should consult with the Permits Program and EED staff for more detailed guidance concerning the need for evaluation of all on-property sources and off-property sources. A second step may be necessary to model all sources of certain pollutants on the plant property. In addition, in certain cases, it may be necessary to model all sources of the pollutant in the vicinity. Modeling should be performed with sources emitting at the permit allowables where permit allowables exist. Sources without a permit allowable should be modeled using actual emissions.

3.1.d. NAAQS Analysis

An applicant must first determine a radius of impact for each pollutant subject to the NAAQS analysis. This radius is the largest distance to a point off the property controlled by the applicant where

3 The ten percent of the ESL applies to regulatory modeling and is a guideline used by the TACB Modeling staff. This guideline may not apply to other evaluations conducted by other TACB staff in the permit application review process.

Notes

concentrations from the sources are predicted to be greater than (or equal to) the de minimis levels for each averaging time and for each applicable pollutant. The NAAQS significance levels or TACB de minimis levels are specified in Attachment A.

If the sources under permit review make a greater than de minimis impact off controlled property following the procedure specified in Section 3.1.a. above, a NAAQS analysis must be performed. The first step in this analysis is to obtain a "NAAQS retrieval" from the PSDB. This will identify all sources within the radius of impact and other sources outside the radius of impact which require evaluation. These sources, along with the proposed sources, should be modeled over the area of greater than de minimis impact. All permitted sources shall be modeled at permit allowables. Sources without permit allowables will be modeled with actual emission rates specified in the PSDB retrieval. Sources with proposed reductions will be modeled with parameters to reflect emissions after the reductions have been implemented. The maximum concentration, plus background (accounting for sources not modeled including, but not limited to, area and mobile sources), for each pollutant and each averaging time is to be compared to the appropriate NAAQS.

The results of long-term ambient air quality monitoring for criteria pollutants (pollutants with NAAQS) conducted by the TACB and several local air pollution control agencies can be obtained by contacting the TACB Data Management and Analysis Division (DM&A) staff. The pollutants monitored are ozone, nitrogen oxides, sulfur dioxide, carbon monoxide, particulate, and lead.

Monitoring data are primarily available for the larger metropolitan areas. Occasionally monitoring data (especially particulate) is available for less populated areas. These data are collected primarily to allow comparison with the NAAQS and represent existing air quality of the areas monitored. The TACB Modeling staff should be consulted for a case-by-case evaluation of background concentrations (contributions from sources which are not modeled).

DM&A can also provide the current attainment status for criteria pollutants at any Texas location.

If a proposed major source makes or is predicted to make a greater than de minimis impact upon an area where the standard is exceeded or predicted to be exceeded, then there are additional nonattainment requirements as specified in TACB Regulation VI, Control of Air Pollution by Permits for New Construction or Modification, including, but not limited to, Sections 116.3.(a)(7) and 116.3(A)(9), June 18, 1992, as revised. In addition, the TACB staff will generally make a determination that even a minor source cannot make a greater than de minimis impact in any area where a standard is exceeded or predicted to be exceeded.

Notes

3.1.e. Disaster Review Modeling

Applicants handling certain chemicals are required to provide information necessary for an assessment of disaster potential. These applicants may be required to conduct a disaster review if the applicant or the TACB identifies a potential for catastrophic release of any applicable air contaminant. This disaster review may include disaster modeling. The need for disaster modeling and the determination of release scenarios to be modeled will be developed on a case-by-case basis by the TACB Permits Program staff reviewing the permit application. Disaster Review Guidelines are included in TACB Form PI-1 Permit Application Instructions, Appendix F.

If the TACB Permits Program staff determines that disaster modeling is necessary, then the applicant must work closely with the TACB Modeling staff in selecting an appropriate disaster release model and in running the model properly. Interaction with the Modeling staff is particularly important in this case, as disaster modeling is inherently far more complicated than modeling of routine source emissions.

A number of models exist for disaster review applications, several of which have experienced widespread use. The applicability of these models to the possible types of release scenarios varies. Therefore, the appropriateness of a given model must be carefully considered. Once a model has been selected and its use approved by the Modeling staff, the outcome of the modeling results will depend largely on the ability of the user to implement the model properly.

The current Disaster Review Modeling Procedures document is available from the Modeling staff and includes a preliminary list of models applicable to specific types of release scenarios. The Modeling staff anticipates that it will continue to conduct an in-depth evaluation of several disaster review dispersion models. Such a continuing evaluation should facilitate the model selection process, but applicants will continue to be required to obtain approval from the Modeling staff before the results of a model will be accepted.

3.2 PSD Permit Applications

If a PSD permit is required, the applicant must submit a protocol describing procedures to be followed. A TACB/EPA Suggested Approach for PSD Modeling Protocols is available from the TACB Modeling staff. The applicant should contact the Modeling staff prior to submission of a draft protocol to discuss the proposed project and to ensure that the most recent guidance is obtained. A TACB Permit Modeling Guidance Checklist may also be completed during this consultation if the requirements specified in Section 2.0 have been met. The draft protocol should be submitted to the TACB Modeling staff member who conducted the pre-protocol meeting with a copy to EPA Region 6.

Notes

3.2.a. PSD Analyses

The applicant must address the need for preconstruction air quality monitoring if a PSD permit is required. In addition, an Area of Impact (AOI) analysis must be performed for each pollutant for which PSD is applicable and for which a significant impact level is defined in the PSD regulations. For each pollutant and for each averaging time for which the proposed sources make a significant impact, additional analyses for NAAQS and increment consumption are required. PSD analysis requirements are discussed in the EPA NSR Workshop Manual.

3.2.b. Pre-Construction Monitoring Exemptions

In addition to the PSD analyses discussed in the NSR Workshop Manual, if the applicant proposes to emit any criteria pollutant in significant amounts, continuous ambient monitoring data may be required as part of the Air Quality Analysis. The TACB has discretionary authority to exempt an applicant from this data requirement under the following conditions:

(1) The sources under review are modeled. If the design concentrations for the appropriate averaging periods are below the monitoring significance levels shown in Attachment A, a monitoring exemption can be granted, or

(2) If the sources under review cannot meet the exemption described in item (1), then a "NAAQS retrieval" is made from the PSDB. All sources identified in the NAAQS retrieval are modeled with emission rates as defined by EPA over the area where the sources under review make a significant impact. If the resultant design concentration with background (concentrations due to non-modeled sources) as defined by EPA, excluding impact from the proposed sources, is below the monitoring significance level defined in Attachment A, an exemption can be granted.

The EPA NSR Workshop Manual describes the dispersion modeling methodology to be used to determine the proposed project's effects on air quality for comparison with the monitoring significance levels. Modeling may be performed to support a request for a monitoring exemption, or the applicant can supply data from an existing monitoring network provided it meets EPA site location and time restraint criteria. The detailed monitoring acceptability criteria are included in the EPA NSR Workshop Manual and other EPA documents.

3.2.c. Monitor Site Location

If existing data are not available or are judged not to be representative, then the applicant must proceed to establish a site-specific monitoring network. The applicant should contact the TACB Modeling staff to obtain the most recent guidance related to the use of dispersion modeling to select monitoring sites.

3.2.d. Monitoring Quality Assurance (QA) Plan

If pre-construction monitoring is required, the TACB and EPA strongly recommend that the applicant prepare a Monitoring Plan and obtain TACB/EPA approval before any actual monitoring begins.

The applicant is required to prepare a monitoring QA Plan which specifies procedures for:

(1) Obtaining data of adequate quality to meet monitoring objectives and QA requirements of the permit-granting authority, and

(2) Minimizing loss of air quality data due to malfunctions or out-of-control conditions.

Guidelines and Specifications for Preparing Quality Assurance Plans for Prevention of Significant Deterioration Monitoring are available from the TACB. QA Plans must be reviewed and approved by the TACB Quality Assurance Division and the TACB Modeling Division.

Notes

4.0 Source Inventory

Modeling may be required for air pollution sources in addition to those specified in the permit application. Parameters for these additional sources are obtained from PSDB retrievals. The PSDB is a computerized data base containing information about sources of air pollutants, as defined by TACB permit and exemption activities and emission inventory surveys. Standard retrievals have been developed to obtain required source information. For the sources under review, the applicant should determine the UTM coordinates, UTM zone, and the radius of impact. This information should be provided to the TACB Coordination Services Section, Information Systems Division on the forms available from that section. The information is used in the retrieval program to locate all sources for the given pollutant which are within the radius of impact or sources which could have a significant impact within the radius of impact. For the requested pollutant, the program generates a written report that includes for each source: the source identification, TACB permit number or TACB account number, source parameters needed for modeling, and the location of the source. The TACB can provide a computer diskette with all sources found in the retrieval with the modeling parameters placed in the proper format for use with certain EPA models.

If the applicant finds errors in the PSDB retrieval, then the applicant should notify the TACB Emissions Inventory Division of such errors and specify the needed corrections.

4.1 On-Property Sources

For state permit applications, all sources to be permitted should be modeled at the maximum allowable emission rate requested in the permit application. All other source parameters must reflect source operations at this maximum emission rate. However, if worst-case impacts occur with the source operating at less than the maximum emission rate, then the Applicant is responsible for providing an analysis of load conditions (25, 50, 75, and 100 percent load) and resulting maximum off-property concentrations for each level evaluated.

4.1.a. Ratio Techniques

Since predicted ambient air quality impacts are proportional to the emission rate, it may be appropriate to use a ratio technique to simplify the evaluation of the on-property source inventory and/or reduce the number of pollutants requiring individual regulatory modeling runs to a manageable number. Please refer to Attachment B for a description of a technique(s) which has been approved by the TACB Modeling staff. The applicability of the methods described in Attachment B must be discussed with the TACB Modeling staff and the method selected documented with the TACB Permit Modeling Guidance Checklist. Other similar techniques may be approved on a case-by-case basis.

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Applicants should consult the EPA NSR Workshop Manual for guidance concerning the on-property source inventory to be used for PSD applications.

4.1.b. Collocation of Emission Points

Refined regulatory modeling should reflect the actual characteristics of the proposed or existing facility. Therefore, emission points should not be collocated, except in well justified and exceptional circumstances. For example, collocation may be appropriate when the number of sources at a large facility exceed the capability of the model. Modeling convenience or the desire to reduce model run time are not acceptable justification.

Collocation of emission points may be appropriate for the screening analysis described in Section 2.1. If the TACB staff determines that co-location of sources is justified, then a worst-case approach will be required to assure that the modeled results are conservative. This will include, but not be limited to, co-locating the emission points near the fence line and selecting the worst case stack parameters such as the shortest stack, coldest flue gas, and lowest stack velocity of the collocated sources.

4.2 Sources for NAAQS Analysis

The sources to be modeled for the NAAQS analysis are sources being permitted and those identified by a PSDB retrieval. For the state analysis, permit allowable emission rates should be used for sources that have been permitted and actual emission rates should be used for other sources.

For the PSD analysis, the applicant should follow the guidance found in the EPA NSR Workshop Manual.

4.3 Sources for PSD Increment Analysis

The sources to be modeled for the PSD increment analysis are the sources being permitted and those identified by a retrieval made from the PSDB. The computer retrieval identifies the baseline date and selects the sources that consume PSD increment. If the PSDB does not have information required for PSD permit applications, then the applicant should develop such information. For example, the PSDB retrieval actual emission rates are calculated in a manner required for state permit application. PSD permit applications are required to follow the EPA NSR Workshop Manual modeling methodology in development of input data, including development of the increment analysis inventory and calculation of actual emission rates. The sources identified by the retrieval should be examined carefully. In some cases, the emission rate will include emissions that do not consume PSD increment.

5.0 Acceptable Dispersion Models

The models and modeling procedures to be used will be those identified in the EPA GAQM. Preferred Air Quality Models included in GAQM Appendix A are recommended for regulatory modeling associated with state permit applications, PSD permit applications, and permit applications for sources governed by the permitting requirements of the federally-designated nonattainment areas. The most recent version of each model should be obtained in all cases. The Texas Climatological Model (TCM) and the Texas Episodic Model (TEM) included in EPA GAQM Appendix B and other Texas models (including, but not limited to, Model 2 and Model 4) should not be used for modeling evaluations submitted to the TACB. In certain cases, it may be appropriate for an applicant to use a model which is in EPA GAQM Appendix B or which is not specified in the EPA GAQM (e.g. disaster models and other models, including INPUFF).

The Industrial Source Complex Short Term (ISCST2) and the Industrial Source Complex Long Term (ISCLT2) are the most commonly used models for state and PSD modeling in Texas. However, applicants are encouraged to conduct research to determine the best model and to document such research as part of their modeling protocol and Air Quality Analysis. Since ISCST2 and ISCLT2 are the most commonly used refined models, much of the following discussion applies to these models.

The ISC model is described on page A-21 of GAQM Appendix A, as follows:

> The ISC model is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. This model can account for the following: settling and dry deposition of particulates; downwash; area, line, and volume sources; plume rise as a function of downwind distance; separation of point sources; and limited terrain adjustment. It operates in both long-term and short-term modes.

If a modeling evaluation is being conducted to predict pollutant concentrations for short-term averaging periods (1-hr., 3-hr., 8-hr., 24-hr., etc.) and long-term averaging periods (quarterly, annual, etc. averages), the period option in ISCST2 should be used for calculation of the long-term averages. ISCLT should only be used for modeling evaluations conducted for pollutants with only long-term standards or guidelines (NO_2, etc.) or for multiple years of STAR data which are not required for the evaluation of pollutants with short-term averages.

5.1 Complex Terrain Models

Acceptable models for complex terrain are discussed in the EPA GAQM, as revised.

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5.2 Modification of Models

The internal source codes for EPA GAQM Appendix A models or other models should not be modified in a manner that would change the basic algorithms used by the model to calculate ground level concentrations or deposition without TACB approval for state permit applications or TACB/EPA approval for PSD permit applications. Minor modifications unrelated to model algorithms, such as re-dimensioning of arrays, do not require TACB approval.

Substantial preprocessor or post-processor programs or subroutines should be well documented and submitted to the TACB Modeling staff. For example, a substantial preprocessor program is a program used to calculate direction-specific downwash parameters for input to the ISC models. A substantial post-processor is a program that compares output from two different dispersion models, such as ISC and Complex I; selects the highest value on an hour-by-hour, receptor-by-receptor basis; then calculates concentrations for the appropriate averaging periods.

EPA has established procedures for consideration of modifications to model algorithms. Suggestions for modification of the model internal source codes should be submitted to EPA with a copy to the TACB Modeling staff.

6.0 Model Control Parameters/Input Data

Notes

The regulatory default option should be selected, unless use of other parameters is approved by the TACB Modeling staff. This option is defined in the User's Guide for the Industrial Source Complex (ISC2) Dispersion Models, (EPA-450/4-92-008), as amended or revised (ISC User's Guide), and other EPA GAQM Appendix A model user's guides.

6.1 Urban vs. Rural Dispersion Option

The selection of urban or rural dispersion coefficients should follow EPA's Auer Land Use Analysis procedures for land use classification within a three kilometer (km) radius about the source. An example Auer Land Use Analysis is available from the TACB Modeling staff. In certain cases where a large heat source is modeled in a rural area, such as an isolated petroleum refinery, it may be appropriate to use urban dispersion coefficients instead of rural. The Modeling staff should be consulted regarding specific procedures to be used in cases where the Auer Land Use Analysis results are judged by the applicant to be incorrect for selection of rural or urban coefficients.

6.2 Meteorological Data

The applicant is responsible for obtaining and/or preparing the required meteorological data. Appropriate meteorological stations for both state and PSD permit applications are listed in Attachment C, Meteorological Stations by County. Periods of records will vary and are discussed in Sections 6.2.a. and 6.2.b. Replacement of missing surface and mixing height data should follow the guidance found in Section 6.2.c.

For state permit applications, processed meteorological data may be available from the TACB Modeling staff. For PSD permit applications, some unprocessed meteorological data is available on the EPA's Support Center for Regulatory Air Models (SCRAM) Electronic Bulletin Board System (BBS). Data not available on the SCRAM may be obtained from the National Climatic Data Center (NCDC). In addition, on-site meteorological data may be used if appropriate and if obtained in accordance with EPA guidance (EPA GAQM and other EPA documents). Certain complex terrain models require on-site meteorological data.

For the commonly used Industrial Source Complex (ISC) models please refer to the ISC User's Guides for meteorological data processing and input options, including mixing height and average temperature data.

6.2.a. Short-Term Meteorological Data

Short-term meteorological data includes standard hourly surface and upper-air observations. These observations must be preprocessed before they can be used in regulatory models. For state permit

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applications, data for 1988 or 1989 should be used (as specified in Attachment C). For PSD, the most recent, readily available five years of data should be used (please refer to the EPA GAQM).

If a state permit is required in addition to a PSD permit, meteorological data used to determine compliance with state regulations should be one year of the most recent five-year period. The one year should be the year used in the PSD modeling which resulted in the maximum ambient air impact (if the same or similar sources and pollutants are evaluated for state and federal permit application) or a year approved by the Modeling staff (if there are significant differences in sources and pollutants).

If emission limits were set based on modeling for a prior PSD application, then additional meteorological data may be required.

6.2.b. Long-Term Meteorological Data

Long-term meteorological data includes joint frequency distributions of wind speed class, by wind direction sector, by stability category, known as STAR summaries (for STability ARray). For state permit applications, STAR summaries for each of five years (1985 through 1989) should be used. For PSD permit applications, STAR summaries for each of the most recent, readily available five years of data should be used.

If a state permit is required in addition to the PSD permit, the meteorological data used to determine compliance with state regulations should be the same five-year period used in the PSD permit modeling.

6.2.c. Replacement of Meteorological Data

Missing meteorological data must be replaced before this data can be preprocessed for dispersion modeling. Replacement of missing values must follow EPA guidance (Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models, Dennis Atkinson and Russell F. Lee, July 7, 1992, as revised).

Replacement of missing data must follow standard procedures. Occasionally, an applicant may propose to use meteorological data which is not available on the SCRAM BBS or data which is available on the SCRAM BBS, but not complete. In these cases, applicants must document and submit all occurrences of missing data and proposed replacement values for approval of the TACB Modeling staff before performing any modeling.

6.3 *Variable Emission Rate Option*

When sources are operating during the daytime only, the variable emission rate option may be used so that only daytime meteorology is used in the analysis. Daytime conditions are defined as one hour after

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sunrise to one hour prior to sunset. If this option is used, the permit provisions should restrict operation of the permitted unit to time periods during which emission rates are specified.

The variable emission rate option may also be used to simulate other operating conditions as necessary to design permit provisions.

6.4 Building Downwash

The effects of building wakes (building downwash) upon stack plumes is evaluated in the ISCST and ISCLT models with the Huber-Snyder and Schulman-Scire algorithms. The ISC User's Guide, as well as EPA's Guideline for Determination of Good Engineering Practice Stack Height (EPA-450/4-80-023R, as revised), should be consulted for details. The EPA GAQM must also be followed.

A number of computer programs are available to calculate direction-specific building parameters required by ISC. Applicants should be prepared to discuss the proposed program at the time guidance is requested from the TACB Modeling staff.

6.5 Receptor Grid

The applicant has the burden of proving that the maximum off-property concentration has been located. The applicant's Air Quality Analysis must include maps which demonstrate the maximum has been located.

The receptor grid must be designed with an understanding of the sometimes complex dispersion of pollutants from stacks, fugitive areas, and other sources. Too coarse a receptor spacing may result in the incorrect determination of the meteorology associated with the maximum concentration. The use of coarse grid spacing to determine the general area of the maximum concentration (followed by the use of associated worst-case meteorology and a tighter grid spacing to "zero" in on the maximum) is generally not appropriate. The use of inappropriate worst-case meteorology in refined modeling can result in the underprediction of the maximum concentration. Therefore, the TACB Modeling staff generally does not allow the use of such a receptor spacing approach.

The selection of receptor sites for the refined analysis should take into consideration factors including, but not limited to, the results of the screening analysis, release heights, proximity of sources to property lines, the location of sensitive areas (schools, day care facilities, the nearest residence(s), etc.), topography, climatology, and monitoring sites. A general set of receptor grid guidelines cannot replace the judgement and experience of an expert in modeling.

UTM coordinates should be input to the dispersion models to define receptor locations (and locations of emission points, buildings, fence lines, property lines, etc.). Arbitrary, relative, or polar grids should not be used in the refined modeling evaluation.

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Receptors should be placed to determine the maximum ground level concentration in an off-property area or an area not controlled(4) by the applicant. Receptor grid spacing generally increases with distance from the emission points being evaluated. Receptors should cover the entire area of significant impact or greater than de minimis impact, if applicable.

Modeling will be required with one or more of the following sets of receptors.

a. Tight Receptors - A receptor spacing of 25 meters will be used for the following cases:

▼ Sources not affected by building downwash with height less than 15 meters and

▼ Sources affected by building downwash with height less than 50 meters.

The tight receptors will cover a large enough area to demonstrate that the maximum concentration has been located. The extent of the receptor grid will be determined on a case-by-case basis. Tight receptors may be required as far as 500 meters from the emission points being evaluated.

b. Fine Receptors - The fine receptor spacing will be no larger than 100 meters and extend at least 1.0 km from each source being modeled.

c. Medium Receptors - The medium receptor spacing will be no larger than 0.5 km. This should cover the area that lies between 1.0 and 5.0 km from the nearest point source.

d. Coarse Receptors - The coarse receptor spacing will be no larger than 1.0 km. This should cover the area that lies beyond the medium receptors.

If a predicted concentration exceeds 75 percent of the applicable standard or guideline with an initially allowed receptor spacing larger than 50 meters, additional modeling shall be performed using receptors with a spacing of 50 meters in the vicinity of each such concentration.

When multiple sources are modeled, the most restrictive of the above must be utilized. It may be necessary to use a large receptor spacing when modeling tall stacks over a large area and to also model with a small receptor spacing located close to the property line to identify maximums caused by short stacks and fugitives. Also, if refined models are not able to predict concentrations at receptors within an off-property cavity region of a source subject to

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4 Control of the property means the surface is controlled by the applicant by owning or leasing. Owning the property and leasing the surface for use by others does not constitute control of the property. In addition, "ambient" air as defined by EPA must guide receptor location for PSD permit modeling. If the applicant has questions concerning what constitutes control of property or ambient air, such questions should be submitted to the TACB Legal Staff.

downwash, other approved models may be required to calculate concentrations for these receptors. Applicants may choose to change the proposed location(s) of emission points relative to property lines or change stack height and other parameters, rather than using other models to perform cavity calculations. These types of changes will require the approval of the TACB Permits Program staff.

In addition, at least a three-by-three receptor grid should be placed at the locations of each sensitive location (schools, day care facilities, etc.) as identified using procedures suggested by the TACB staff during pre-modeling guidance. If these locations are less than 500 meters from the nearest emission point, then a 25-meter spacing should be used. If the locations of sensitive receptors are greater than 500 meters from the emission point, then a 100-meter spacing should be used.

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7.0 Guidance for Modeling Specific Types of Sources

The guidance discussed below applies primarily to state permit applications. The EPA GAQM and the TACB/EPA Suggested Approach for PSD Modeling Protocols must be followed for PSD permit applications.

7.1 Non-Buoyant or Fugitive Emission Sources

If the Permits Program staff determines it is necessary to model fugitive emission sources and if the use of pseudo point sources is appropriate, then the following modeling parameters should be used:

- ▼ Stack exit velocity = 0.001 meter per second,
- ▼ Stack exit diameter = 1 meter,
- ▼ Stack exit temperature = 0°C, and
- ▼ Actual release height.

7.1.a. Area Sources

Screening and refined techniques are suggested as follows for wind blown emissions:

Fugitive Screening Analysis - In general, wind blown emissions from storage piles should not be included in the modeling for a screening analysis. Wind blown emissions from storage piles depend upon the wind speed, with the emission rate normally calculated based upon an average wind speed. This emission rate may over predict the wind blown emissions that occur at low wind speeds. The TACB has found that low wind speeds cause the worst-case dispersion for material handling. If the average wind blown emissions are included in a screening analysis, they may have a major influence upon the determination of the worst-case meteorology. The most practical approach is to not include the wind blown emissions from storage piles in the screening analysis.

Refined Analysis of Fugitives - If a predicted concentration from screening runs exceed 75% of the standard or guideline of concern, then a refined analysis should be performed for all applicable time periods. For each time period to be modeled, the average wind speed for each hour to be modeled should be used to recalculate all emission rates that are a function of wind speed.

Area sources for which emission rates can be quantified are often modeled as "pseudo point sources." One or several point sources can be designated to simulate an area source. Care should be taken to ensure that the placement of the pseudo point sources will result in a conservative estimate of off-property impacts. It is not appropriate to group stacks into an area source or to model most process or material handling emissions as an area source.

The TACB Modeling staff and EPA have identified deficiencies in the ISC2 area source algorithm. This algorithm should not be used until deficiencies are corrected. In certain cases the ISC2 volume source algorithm or other model algorithms may be used in the

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refined analysis of area sources. The applicant must demonstrate that the ISC User's Guide and other related guidance has been correctly applied in such cases and includes related documentation in the Air Quality Analysis.

7.1.b. Roads

Determining an emission rate for dust generated by traffic on roads may be difficult. Calculations to determine these emission rates have a number of variables, most of which are not readily determined in an accurate manner. In addition, the values for these variables can vary over a wide range and, in many cases, depend upon recent meteorological events (rainfall, etc). AP-42, EPA's document on calculating emission rates, indicates that, unless site-specific information is used, a low confidence level is placed upon these short-term emission rates. Due to this and other factors, the TACB staff may not require that short-term emissions from roadways be evaluated with modeling. However, AP-42 assigns the highest confidence level available to annual emission rates from traffic on roads. Accordingly, the TACB staff requires that road emissions be modeled on an annual basis. The road emissions can be divided into a number of point sources. The TACB Modeling staff should be consulted for assistance in determining the placement and height of the point sources. These will be determined on a case-by-case basis, but will generally follow the guidance given in the ISC2 User's Guide.

In certain cases, the ISC2 volume source algorithm or other model algorithms may be used in the refined analysis of roadways. The applicant must demonstrate that the ISC2 User's Guide and other related guidance has been correctly applied in such cases and include related documentation in the Air Quality Analysis.

7.1.c. Other Release Types

There are a number of sources that must be modeled which do not release to the atmosphere through standard stacks. Examples are stacks or vents with rain caps and stacks or vents with horizontal releases. These release points must be modeled as if they are stacks, so the stack parameters used must cause the model to correctly simulate the way the release is dispersed in the atmosphere. Release points that have rain caps or that do not release vertically must be modeled with the fugitive parameters specified in Section 7.1. The TACB Modeling staff must approve the use of nonstandard parameters that are to be used in the models. In certain cases, the ISC volume source algorithm or other model algorithms may be used in the refined analysis of these types of sources. The applicant must demonstrate that the ISC2 User's Guide and other related guidance has been correctly applied in such cases and includes related documentation in the Air Quality Analysis.

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7.2 Flares

Flares are a special type of elevated source which may be modeled as a point source. In a flare, the velocity of the effluent being burned and the flare temperature do not directly affect the amount of plume rise. The TACB suggests use of certain parameters and a formula to calculate the effective stack diameter based upon the heat release and the average molecular weight of the compounds being burned, as follows:

If a flare is to be treated as a point source, accurate determination of all stack parameters is not possible. Since combustion occurs at or beyond the flare tip in the atmosphere, appropriate values for stack exit temperature and stack exit velocity cannot be accurately determined. The diameter of the pipe leading to the flare tip is not a factor in determining plume rise.

To predict dispersion for flare type sources, the point source algorithm can be used with arbitrary values assigned for stack exit velocity (20 m/s) and stack exit temperature (1273°K).

A stack height equal to the height of the flare tip is suggested for flares.

The effective stack diameter is determined using the following equation:

$$D = \sqrt{(10^{-6} q_n)}$$

where:

$$q_n = q(1\text{-}0.048\sqrt{MW})$$

and

q = gross heat release in cal/sec

MW = weighted (by volume) average molecular weight of the mixture being burned.

Enclosed vapor combustion units should not be modeled with the above parameters, but instead with stack parameters which reflect the physical characteristics of the unit.

8.0 Reporting Requirements

The state Air Quality Analysis must be accompanied by a clear, concise written discussion covering the project, the modeling performed, and the results relative to applicable standards or guidelines. This analysis must contain at least the elements listed in Attachment D. In some instances, additional information may be required.

The PSD Air Quality Analysis must contain at least the elements listed in the TACB/EPA Suggested Approach for PSD Modeling Protocols. In some instances, additional information may be required.

Reporting requirements for state and PSD permit applications include the TACB Permit Modeling Guidance Checklist as shown in Attachment E. The Air Quality Analysis submitted for state or federal permit applications should be a "stand-alone document" (that is, references to other documents should be avoided).

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Air Pollutant	Average Time	NAAQS Primary (ug/m³)	NAAQS Secondary (ug/m³)	TACB Regulations	PSD Monitoring Significance (ug/m³)	TACB De minimis and PSD NAAQS Significant (ug/m³)	PSD Increment Class II Area (ug/m³)
Sulfur Dioxide	30-Min.	—	—	0.4 ppm [1] (1021 ug/m³)			
	3-Hr.	—	1300	—	—	25	512
	24-Hr.	365	—	—	13	5	91
	Annual	80	—	—	—	1	20
Total Suspended Particulate Matter	1-Hr.	—	—	400 ug/m³	—	—	—
	3-Hr.	—	—	200 ug/m³	—	—	—
	24-Hr.	—	—	—	10	5	37
	Annual	—	—	—	—	1	19
Inhalable Particulate (PM_{10})	24-Hr.	150	150	—	10	5	—
	Annual	50	50	—	—	1	—
Nitrogen Dioxide	Annual	100	100	—	14	1	25
Carbon Monoxide	1-Hr.	40,000	—	—	—	2,000	—
	8-Hr.	10,000	—	—	575	500	—
Lead	Calendar Quarter	1.5	—	—	—	—	—
	3-Mo.	—	—	—	0.1	—	—
Ozone	1-Hr.	235	235	—	—	—	—
Floride (HF)	3-Hr.	—	—	6 ppb (4.9 ug/m³)	—	—	—
	12-Hr.	—	—	4.5 ppb (3.68 ug/m³)	—	—	—
	24-Hr.	—	—	3.5 ppb (2.86 ug/m³)	0.25 (Total F)	—	—
	7-Day	—	—	2.0 ppb (1.63 ug/m³)	—	—	—
	30-Day	—	—	1.0 ppb (0.82 ug/m³)	—	—	—
Hydrogen Sulfide	30-Min.	—	—	0.08 ppm[2]	—	—	—
				0.12 ppm[3]	—	—	—
	1-Hr.	—	—	—	0.2	—	—
Sulfuric Acid	1-Hr.	—	—	50 ug/m³	—	—	—
	24-Hr.	—	—	15 ug/m³	—	—	—

(Over)

(Continued)

Air Pollutant	Average Time	NAAQS Primary (ug/m³)	NAAQS Secondary (ug/m³)	TACB Regulations	PSD Monitoring Significance (ug/m³)	TACB De minimis and PSD NAAQS Significant (ug/m³)	PSD Increment Class II Area (ug/m³)
Total Reduced Sulfur	1-Hr.	—	—	—	10[4]	—	—
Reduced Sulfur Compounds	1-Hr.	—	—	—	10[4]	—	—
Beryllium	24-Hr.	—	—	0.01 ug/m³	0.001	—	—
Mercury	24-Hr.	—	—	—	0.25	—	—
Other Hazardous and Odorous Pollutants	30-Min.	—	—	[5]	—	—	—
	Annual	—	—	[5]	—	—	—

ug/m³ - *micro grams per cubic meter*

ppb - *parts per billion*

ppm - *parts per million*

1 Conversion from ppm to ug/m³ assuming temperature = 90°F. Standard is 0.28 ppm for Galveston and Harris Counties and 0.32 ppm (net ground level concentration from all sources on-property) for Jefferson and Orange Counties.

2 If it affects a residential area, business, or commercial property.

3 If it affects only property used for other than residential, recreational, business, or commercial purposes.

4 40CFR 52.21 (i)(8)(i). Acceptable monitoring techniques may not be available at this time.

5 Not defined in a specific regulation but determined on a case-by-case basis. The TACB Effects Evaluation Division should be contacted to obtain the current guidelines.

Ratio Technique 1

Each emission point is evaluated with a "generic" emission rate (1 gram per second or 1 pound per hour) with actual coordinates of each source input to the model and actual stack parameters approved by the Permits Program staff and/or modeling stack parameters approved by the TACB Modeling staff. The maximum predicted concentrations for each source are then multiplied by the TACB-approved emission rate for each source and for each pollutant. The sum of maximums (for each pollutant, independent of time and space) is then compared with the ESL for each pollutant. If the sum for any pollutant is greater than the ESL, then the actual emission rates for this pollutant should be input to the refined model for additional evaluation so that time and space are considered. This additional evaluation may include consideration of other on-property and off-property sources.

The technique is illustrated in the table below.

Ratio Technique 2

One pollutant is modeled for all sources with TACB-approved emission rates and stack parameters. Other TACB-approved pollutant emission rates are then compared with the modeled pollutant emission rate to determine the source which has the maximum ratio. This maximum ratio is then multiplied by the predicted maximum off-property concentration for the pollutant modeled. If the resulting maximums exceed an ESL, then additional refined modeling may be needed.

	EPN 1	EPN 2	...N		
ug/m³ with 1 g/s emission rate	x1	x2			
Pollutant A - g/s	y1	y2			
Pollutant A - ug/m³	x1 * y1	x2 * y2		$\sum_{1}^{N} xiyi$	ESL A
Pollutant B - g/s	z1	z2			
Pollutant B - ug/m³	x1 * z1	x2 * z2		$\sum_{1}^{N} xizi$	ESL B
...Each Pollutant to be Evaluated					

Meteorological Stations By County

A composite listing of meteorological stations and counties was developed to standardize the selection of meteorological data for Texas permit application modeling. Appropriate surface, upper-air, and STAR stations are specified for each county. The required year for short-term state modeling is 1988 or 1989 for surface stations paired with Longview. The required years for long-term state modeling are 1985 through 1989. Required years for PSD modeling are the most recent, readily available five years for both short-term and long-term modeling.

For example, meteorological data to use for permit modeling in Anderson County would be as follows:

State Permits

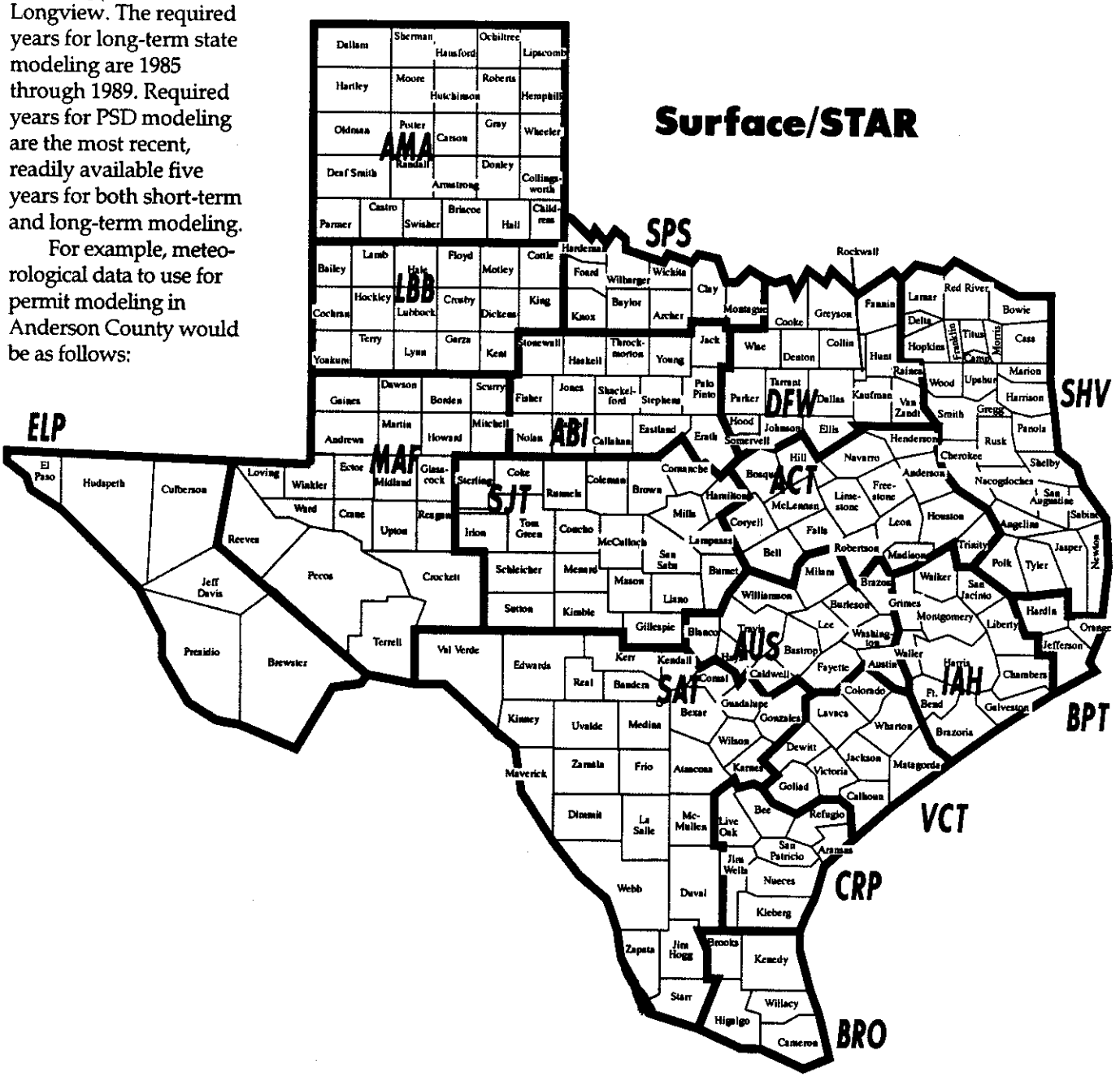
Short-term - Waco (ACT) surface and Longview (GGG) upper-air data from 1989;

Long-term - Waco STAR data for each year of the five-year period from 1985 through 1989.

PSD Permits

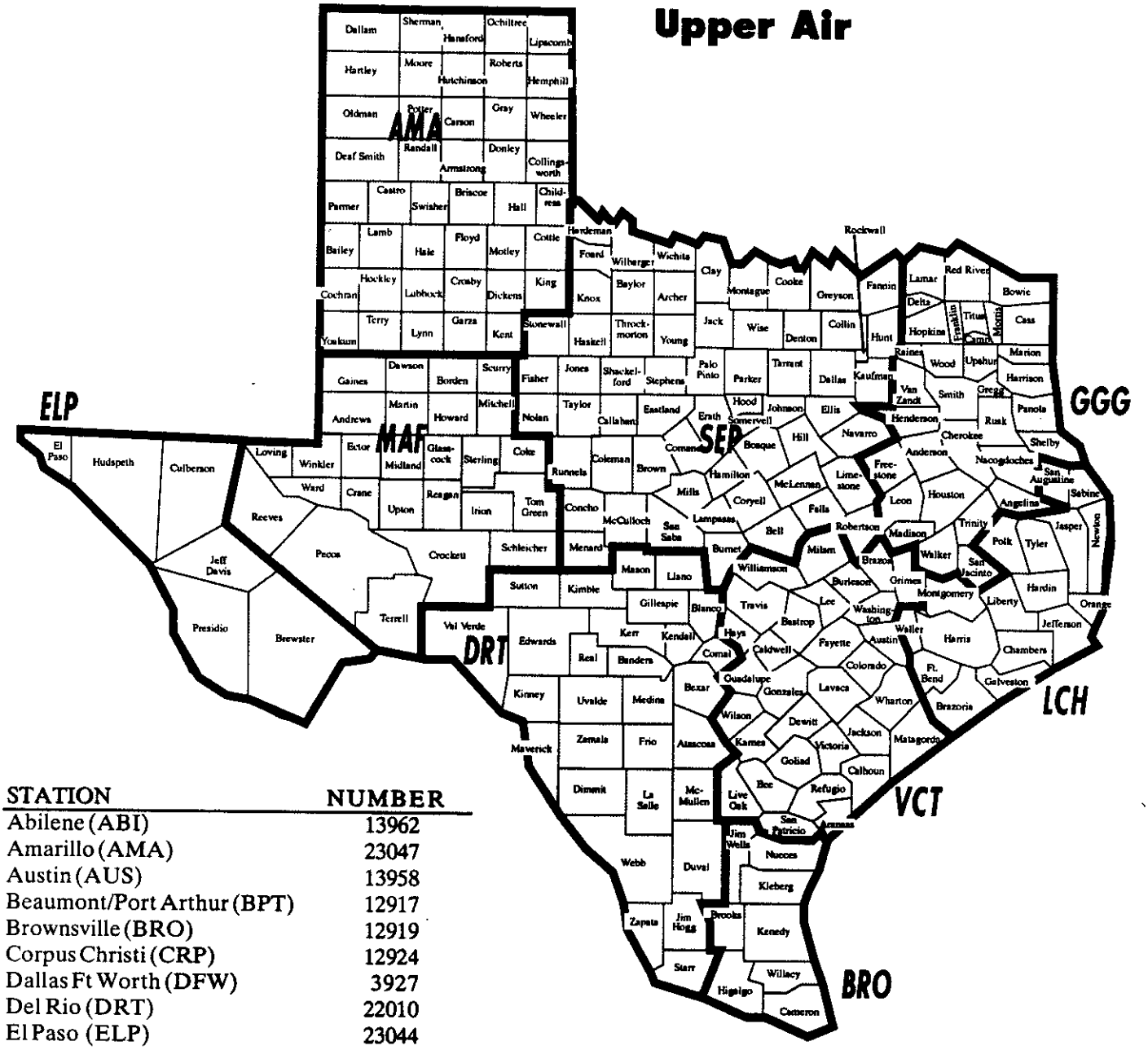
Short-term - Waco surface and Longview upper-air data for each year of the appropriate five-year period;

Long-term - Waco STAR data for each year of the appropriate five-year period



Attachment C

11/9/92



STATION	NUMBER
Abilene (ABI)	13962
Amarillo (AMA)	23047
Austin (AUS)	13958
Beaumont/Port Arthur (BPT)	12917
Brownsville (BRO)	12919
Corpus Christi (CRP)	12924
Dallas Ft Worth (DFW)	3927
Del Rio (DRT)	22010
El Paso (ELP)	23044
Houston Intercontinental (IAH)	12960
Lake Charles (LCH)	3937
Longview (GGG)	3951
Lubbock (LBB)	23042
Midland (MAF)	23023
San Angelo (SJT)	23034
San Antonio (SAN)	12921
Shreveport (SHV)	13957
Stephenville (SEP)	13901
Victoria (VCT)	12912
Waco (ACT)	13959
Wichita Falls (SPS)	13966

Listing of Meteorological Stations By County

County	Surface	Upper Air	Star	TACB Region
Anderson	Waco	Longview	Waco	12
Andrews	Midland	Midland	Midland	6
Angelina	Shreveport	Longview	Shreveport	10
Aransas	Corpus Christi	Victoria	Corpus Christi	5
Archer	Wichita Falls	Stephenville	Wichita Falls	1
Armstrong	Amarillo	Amarillo	Amarillo	2
Atascosa	San Antonio	Del Rio	San Antonio	9
Austin	Austin	Victoria	Austin	7
Bailey	Lubbock	Amarillo	Lubbock	2
Bandera	San Antonio	Del Rio	San Antonio	9
Bastrop	Austin	Victoria	Austin	3
Baylor	Wichita Falls	Stephenville	Wichita Falls	1
Bee	Corpus Christi	Victoria	Corpus Christi	5
Bell	Waco	Stephenville	Waco	3
Bexar	San Antonio	Del Rio	San Antonio	9
Blanco	Austin	Del Rio	Austin	3
Borden	Midland	Midland	Midland	6
Bosque	Waco	Stephenville	Waco	3
Bowie	Shreveport	Longview	Shreveport	12
Brazoria	Houston Int'l	Lake Charles	Houston Int'l	7
Brazos	Austin	Victoria	Austin	3
Brewster	El Paso	El Paso	El Paso	11
Briscoe	Amarillo	Amarillo	Amarillo	2
Brooks	Brownsville	Brownsville	Brownsville	5
Brown	San Angelo	Stephenville	San Angelo	1
Burleson	Austin	Victoria	Austin	3
Burnet	San Angelo	Stephenville	San Angelo	3
Caldwell	Austin	Victoria	Austin	3
Calhoun	Victoria	Victoria	Victoria	5
Callahan	Abilene	Stephenville	Abilene	1
Cameron	Brownsville	Brownsville	Brownsville	4
Camp	Shreveport	Longview	Shreveport	12
Carson	Amarillo	Amarillo	Amarillo	2
Cass	Shreveport	Longview	Shreveport	12
Castro	Amarillo	Amarillo	Amarillo	2
Chambers	Houston Int'l	Lake Charles	Houston Int'l	7
Cherokee	Shreveport	Longview	Shreveport	12
Childress	Amarillo	Amarillo	Amarillo	1
Clay	Wichita Falls	Stephenville	Wichita Falls	1
Cochran	Lubbock	Amarillo	Lubbock	2
Coke	San Angelo	Midland	San Angelo	1

County	Surface	Upper Air	Star	TACB Region
Coleman	San Angelo	Stephenville	San Angelo	1
Collin	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Collingsworth	Amarillo	Amarillo	Amarillo	2
Colorado	Victoria	Victoria	Victoria	7
Comal	San Antonio	Del Rio	San Antonio	9
Comanche	San Angelo	Stephenville	San Angelo	1
Concho	San Angelo	Stephenville	San Angelo	1
Cooke	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Coryell	Waco	Stephenville	Waco	3
Cottle	Lubbock	Amarillo	Lubbock	1
Crane	Midland	Midland	Midland	6
Crockett	Midland	Midland	Midland	6
Crosby	Lubbock	Amarillo	Lubbock	2
Culberson	El Paso	El Paso	El Paso	11
Dallam	Amarillo	Amarillo	Amarillo	2
Dallas	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Dawson	Midland	Midland	Midland	6
Deaf Smith	Amarillo	Amarillo	Amarillo	2
Delta	Shreveport	Longview	Shreveport	12
Denton	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
De Witt	Victoria	Victoria	Victoria	5
Dickens	Lubbock	Amarillo	Lubbock	2
Dimmit	San Antonio	Del Rio	San Antonio	9
Donley	Amarillo	Amarillo	Amarillo	2
Duval	San Antonio	Del Rio	San Antonio	5
Eastland	Abilene	Stephenville	Abilene	1
Ector	Midland	Midland	Midland	6
Edwards	San Antonio	Del Rio	San Antonio	9
Ellis	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
El Paso	El Paso	El Paso	El Paso	11
Erath	Abilene	Stephenville	Abilene	8
Falls	Waco	Stephenville	Waco	3
Fannin	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Fayette	Austin	Victoria	Austin	3
Fisher	Abilene	Stephenville	Abilene	1
Floyd	Lubbock	Amarillo	Lubbock	2
Foard	Wichita Falls	Stephenville	Wichita Falls	1
Fort Bend	Houston Int'l	Lake Charles	Houston Int'l	7
Franklin	Shreveport	Longview	Shreveport	12
Freestone	Waco	Longview	Waco	3
Frio	San Antonio	Del Rio	San Antonio	9
Gaines	Midland	Midland	Midland	6
Galveston	Houston Int'l	Lake Charles	Houston Int'l	7

County	Surface	Upper Air	Star	TACB Region
Garza	Lubbock	Amarillo	Lubbock	2
Gillespie	San Angelo	Del Rio	San Angelo	9
Glasscock	Midland	Midland	Midland	6
Goliad	Victoria	Victoria	Victoria	5
Gonzales	San Antonio	Victoria	San Antonio	9
Gray	Amarillo	Amarillo	Amarillo	2
Grayson	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Gregg	Shreveport	Longview	Shreveport	12
Grimes	Houston Int'l	Victoria	Houston Int'l	3
Guadalupe	San Antonio	Victoria	San Antonio	9
Hale	Lubbock	Amarillo	Lubbock	2
Hall	Amarillo	Amarillo	Amarillo	2
Hamilton	San Angelo	Stephenville	San Angelo	3
Hansford	Amarillo	Amarillo	Amarillo	2
Hardeman	Wichita Falls	Stephenville	Wichita Falls	1
Hardin	Beaumont	Lake Charles	Beaumont	10
Harris	Houston Int'l	Lake Charles	Houston Int'l	7
Harrison	Shreveport	Longview	Shreveport	12
Hartley	Amarillo	Amarillo	Amarillo	2
Haskell	Abilene	Stephenville	Abilene	1
Hays	Austin	Victoria	Austin	3
Hemphill	Amarillo	Amarillo	Amarillo	2
Henderson	Waco	Longview	Waco	12
Hidalgo	Brownsville	Brownsville	Brownsville	4
Hill	Waco	Stephenville	Waco	3
Hockley	Lubbock	Amarillo	Lubbock	2
Hood	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Hopkins	Shreveport	Longview	Shreveport	12
Houston	Waco	Longview	Waco	10
Howard	Midland	Midland	Midland	6
Hudspeth	El Paso	El Paso	El Paso	11
Hunt	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Hutchinson	Amarillo	Amarillo	Amarillo	2
Irion	San Angelo	Midland	San Angelo	6
Jack	Abilene	Stephenville	Abilene	1
Jackson	Victoria	Victoria	Victoria	5
Jasper	Shreveport	Lake Charles	Shreveport	10
Jeff Davis	El Paso	El Paso	El Paso	11
Jefferson	Beaumont	Lake Charles	Beaumont	10
Jim Hogg	San Antonio	Del Rio	San Antonio	4
Jim Wells	Corpus Christi	Brownsville	Corpus Christi	5
Johnson	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Jones	Abilene	Stephenville	Abilene	1

County	Surface	Upper Air	Star	TACB Region
Karnes	San Antonio	Victoria	San Antonio	9
Kaufman	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Kendall	San Antonio	Del Rio	San Antonio	9
Kenedy	Brownsville	Brownsville	Brownsville	5
Kent	Lubbock	Amarillo	Lubbock	1
Kerr	San Antonio	Del Rio	San Antonio	9
Kimble	San Angelo	Del Rio	San Angelo	9
King	Lubbock	Amarillo	Lubbock	2
Kinney	San Antonio	Del Rio	San Antonio	9
Kleberg	Corpus Christi	Brownsville	Corpus Christi	5
Knox	Wichita Falls	Stephenville	Wichita Falls	1
Lamar	Shreveport	Longview	Shreveport	12
Lamb	Lubbock	Amarillo	Lubbock	2
Lampasas	San Angelo	Stephenville	San Angelo	3
La Salle	San Antonio	Del Rio	San Antonio	9
Lavaca	Victoria	Victoria	Victoria	5
Lee	Austin	Victoria	Austin	3
Leon	Waco	Longview	Waco	3
Liberty	Houston Int'l	Lake Charles	Houston Int'l	7
Limestone	Waco	Stephenville	Waco	3
Lipscomb	Amarillo	Amarillo	Amarillo	2
Live Oak	Corpus Christi	Victoria	Corpus Christi	5
Llano	San Angelo	Del Rio	San Angelo	3
Loving	Midland	Midland	Midland	6
Lubbock	Lubbock	Amarillo	Lubbock	2
Lynn	Lubbock	Amarillo	Lubbock	2
Madison	Waco	Longview	Waco	3
Marion	Shreveport	Longview	Shreveport	12
Martin	Midland	Midland	Midland	6
Mason	San Angelo	Del Rio	San Angelo	9
Matagorda	Victoria	Victoria	Victoria	7
Maverick	San Antonio	Del Rio	San Antonio	9
McCulloch	San Angelo	Stephenville	San Angelo	1
McLennan	Waco	Stephenville	Waco	3
McMullen	San Antonio	Del Rio	San Antonio	5
Medina	San Antonio	Del Rio	San Antonio	9
Menard	San Angelo	Stephenville	San Angelo	1
Midland	Midland	Midland	Midland	6
Milam	Austin	Victoria	Austin	3
Mills	San Angelo	Stephenville	San Angelo	3
Mitchell	Midland	Midland	Midland	1
Montague	Wichita Falls	Stephenville	Wichita Falls	1
Montgomery	Houston Int'l	Lake Charles	Houston Int'l	7

County	Surface	Upper Air	Star	TACB Region
Moore	Amarillo	Amarillo	Amarillo	2
Morris	Shreveport	Longview	Shreveport	12
Motley	Lubbock	Amarillo	Lubbock	2
Nacogdoches	Shreveport	Longview	Shreveport	10
Navarro	Waco	Stephenville	Waco	8
Newton	Shreveport	Lake Charles	Shreveport	10
Nolan	Abilene	Stephenville	Abilene	1
Nueces	Corpus Christi	Brownsville	Corpus Christi	5
Ochiltree	Amarillo	Amarillo	Amarillo	2
Oldham	Amarillo	Amarillo	Amarillo	2
Orange	Beaumont	Lake Charles	Beaumont	10
Palo Pinto	Abilene	Stephenville	Abilene	8
Panola	Shreveport	Longview	Shreveport	12
Parker	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Parmer	Amarillo	Amarillo	Amarillo	2
Pecos	Midland	Midland	Midland	6
Polk	Shreveport	Lake Charles	Shreveport	10
Potter	Amarillo	Amarillo	Amarillo	2
Presidio	El Paso	El Paso	El Paso	11
Raines	Dallas Ft Worth	Longview	Dallas Ft Worth	12
Randall	Amarillo	Amarillo	Amarillo	2
Reagan	Midland	Midland	Midland	6
Real	San Antonio	Del Rio	San Antonio	9
Red River	Shreveport	Longview	Shreveport	12
Reeves	Midland	Midland	Midland	6
Refugio	Corpus Christi	Victoria	Corpus Christi	5
Roberts	Amarillo	Amarillo	Amarillo	2
Robertson	Waco	Stephenville	Waco	3
Rockwall	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Runnels	San Angelo	Stephenville	San Angelo	1
Rusk	Shreveport	Longview	Shreveport	12
Sabine	Shreveport	Lake Charles	Shreveport	10
San Augustine	Shreveport	Lake Charles	Shreveport	10
San Jacinto	Houston Int'l	Longview	Houston Int'l	10
San Patricio	Corpus Christi	Victoria	Corpus Christi	5
San Saba	San Angelo	Stephenville	San Angelo	3
Schleicher	San Angelo	Midland	San Angelo	6
Scurry	Midland	Midland	Midland	1
Shackleford	Abilene	Stephenville	Abilene	1
Shelby	Shreveport	Longview	Shreveport	10
Sherman	Amarillo	Amarillo	Amarillo	2
Smith	Shreveport	Longview	Shreveport	12
Somervell	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8

County	Surface	Upper Air	Star	TACB Region
Starr	San Antonio	Del Rio	San Antonio	4
Stephens	Abilene	Stephenville	Abilene	1
Sterling	San Angelo	Midland	San Angelo	6
Stonewall	Abilene	Stephenville	Abilene	1
Sutton	San Angelo	Del Rio	San Angelo	6
Swisher	Amarillo	Amarillo	Amarillo	2
Tarrant	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Taylor	Abilene	Stephenville	Abilene	1
Terrell	Midland	Midland	Midland	6
Terry	Lubbock	Amarillo	Lubbock	2
Throckmorton	Abilene	Stephenville	Abilene	1
Titus	Shreveport	Longview	Shreveport	12
Tom Green	San Angelo	Midland	San Angelo	6
Travis	Austin	Victoria	Austin	3
Trinity	Waco	Longview	Waco	10
Tyler	Shreveport	Lake Charles	Shreveport	10
Upshur	Shreveport	Longview	Shreveport	12
Upton	Midland	Midland	Midland	6
Uvalde	San Antonio	Del Rio	San Antonio	9
Val Verde	San Antonio	Del Rio	San Antonio	9
Van Zandt	Dallas Ft Worth	Longview	Dallas Ft Worth	12
Victoria	Victoria	Victoria	Victoria	5
Walker	Houston Int'l	Longview	Houston Int'l	10
Waller	Houston Int'l	Lake Charles	Houston Int'l	7
Ward	Midland	Midland	Midland	6
Washington	Austin	Victoria	Austin	3
Webb	San Antonio	Del Rio	San Antonio	4
Wharton	Victoria	Victoria	Victoria	7
Wheeler	Amarillo	Amarillo	Amarillo	2
Wichita	Wichita Falls	Stephenville	Wichita Falls	1
Wilbarger	Wichita Falls	Stephenville	Wichita Falls	1
Willacy	Brownsville	Brownsville	Brownsville	4
Williamson	Austin	Victoria	Austin	3
Wilson	San Antonio	Victoria	San Antonio	9
Winkler	Midland	Midland	Midland	6
Wise	Dallas Ft Worth	Stephenville	Dallas Ft Worth	8
Wood	Shreveport	Longview	Shreveport	12
Yoakum	Lubbock	Amarillo	Lubbock	2
Young	Abilene	Stephenville	Abilene	1
Zapata	San Antonio	Del Rio	San Antonio	4
Zavala	San Antonio	Del Rio	San Antonio	9

Reporting Requirements

The Air Quality Analysis submitted to the TACB in support of a state or PSD permit application becomes an addendum to the permit application. The application will be reviewed by the Permits Program staff. When the permit application is complete and there are no unresolved issues which could affect the modeling and/or the results, the Air Quality Analysis may be forwarded to the TACB Modeling staff for an audit. The analysis elements include, but are not limited to, the following:

1. **Certification Letter:** The applicant must supply a cover letter (signed by the person responsible for performing the air quality analyses) certifying that modeling procedures strictly adhere to the most recent written and/or verbal guidance from the TACB Modeling staff.

2. **Project Overview:** Include a brief discussion of the plant process or processes and the types and locations of the emissions under consideration.

3. **Plot Plan:** Include a copy of the plot plan which meets the guidelines of the Permits Program. The plot plan must include a clearly marked scale, all property lines and fence lines (highlighted), a true-north arrow, UTM coordinates along vertical and horizontal dimensions (do not use plant or other coordinates), reference UTM coordinates and locations of <u>all</u> emission points, including fugitive sources, listed in Item No. 4. The labels and coordinates given for the emission points on this map must correlate with the information in the tables required in Items No. 4 and 5. Buildings/obstructions on-property or off-property which would affect building downwash must be shown (highlighted). Building dimensions including height must be given. Depending on the scope of the project, several plot plans may be needed.

4. **Source Inventory - On-Property:** This is a Table 1(a) listing <u>all</u> emissions points being modeled with the same emission point numbers shown on the plot plan. The data contained in this table must exactly match the corresponding data used to develop the Permits Program Maximum Allowable Emission Rate (MAER) Table. Existing emission points that are included in the modeling, but not part of the permit unit (i.e., previously permitted sources, grandfathered sources, and exempt sources modeled for their contributions to the background concentration), must also be listed on a Table 1(a) with their associated stack parameters.

5. **Table Correlating the Source Name and EPN on the Table 1(a) with the Source Number in the Modeling Output:** This is a table listing the names and EPNs from the submitted Table 1(a) with the corresponding source numbers used in the modeling data (the same EPN should be used in the Table 1(a) and the modeling input/output, if possible).

6. **Stack Parameter Justification:** The applicant must provide the basis for using the listed stack parameters (flow rates, temperatures, stack heights, velocities). This will include calculations if necessary for justification. The applicant must ensure that the modeled emission rates and stack parameters will produce the worst-case impacts (in certain cases lower production levels may result in higher predicted impact). At least 25%, 50%, 75%, and 100% production or load levels should be evaluated, if the facility may be operated at these reduced levels. Discussion supporting realistic worst-case operating conditions should be included in the applicant's Air Quality Analysis.

7. **Flares:** If applicable, all data and calculations used to develop the flare stack parameters must be submitted. Table 1(a) should specify stack parameters which reflect the physical characteristics of the unit [do not specify modeling parameters in the Table 1(a)]. The modeling submission should discuss the difference between the physical parameters and flare modeling parameters. Refer to the TACB Air Quality Modeling Guidelines Section 7.2 for assistance in calculating flare modeling parameters. The applicant's Air Quality Analysis must include sufficient information for Permits Program staff approval of the flare gross heat release and weighted (by volume) average molecular weight of the mixture being burned.

8. **Source Inventory - Off-Property:** For each pollutant evaluated, the applicant's Air Quality Analysis should include discussion of sources located in uncontrolled on-property areas and off-property. This discussion should include a table listing all sources included in the PSDB retrieval and other sources evaluated. The locations of sources evaluated should be shown on the area map requested in Item No. 9.

9. **Area Map:** A current United States Geological Survey (USGS), 7.5-minute topographic map with Universal Transverse Mercator (UTM) coordinates and terrain elevations is required with property lines and fence lines marked. The portion of the map included in the air quality analysis should be full scale (no reduction or enlargement) covering the area within a 3,000-meter radius of the facility and showing locations of established residence(s), churches, schools, day care centers or similar facilities, dedicated public parks and other recreational areas, health care facilities and other sensitive areas (more than one map may be required).

10. **Models and Modeling Input Discussion:** This is a detailed discussion of the modeling methodology, models used, and the model input options (e.g., meteorological data and period of time used, rural or urban dispersion coefficients, regulatory default option, type of plume rise, etc.). If ratio techniques have been used for predicting the concentrations, the method must be discussed, and assumptions and sample calculations must be supplied. Justification for use of the various model input options must be provided. This discussion must also demonstrate the modeling was conducted in a manner consistent with proposed, enforceable permit provisions.

11. **Land Use Analysis:** An Auer Land Use Analysis should be submitted which clearly specifies land use which could be impacted by the facility operation. The selection of urban or rural dispersion coefficients should be based on the Auer Land Use Analysis and/or alternate methods. Alternate methods of determining dispersion coefficients must be explained in detail, with all calculations shown. An example land use analysis is available from the TACB Modeling staff. The associated discussion should identify the nearest area which could be developed for residential purposes.

12. **Building Wake Effects:** If manual methods are used, this discussion must include an explanation of how the dominant downwash structure was selected for each source. All calculations must be included along with sketches used to determine the downwash parameters.

If automated downwash programs are used, tables and automated plots must be submitted which clearly illustrate how the downwash parameters were selected for each source. Also, if the automated program has different input options (for combining structures, for definition of the area of influence, etc.), then the air quality analysis must include discussion supporting selection of such options. If manual calculations are needed in preparation of automated program input data, then these calculations should be provided.

13. **Receptors:** A discussion of receptor design considerations must be submitted. A diagram of the receptor grids with labels and nomenclature must be included. Information provided on the receptors must concur with applicable information provided on the plot plan(s) and area map(s) required in Items No. 3 and No. 9.

14. **Modeling Results:** This is a summary and discussion of the modeling results relative to all applicable standards or guidelines (federal and state). Tabulated results are preferred when several pollutants are addressed.

15. **Modeling Runs and Hard Copy Output:** The following information must be included for <u>each</u> pollutant:

a. One set of output tables showing the emission rates and stack parameters modeled;

b. Table of selected model options;

c. Maps showing the maximum predicted ground level concentration for each modeled receptor;

d. For analyses of pollutants with a TACB 1-hour effects screening level, maps showing the number of exceedances of the screening level for each modeled receptor; and

e. For analyses of pollutants with a TACB 1-hour screening level, maps showing the date and time of occurrence of the maxima at the modeled receptors.

Property lines and fence lines must be shown on each map described.

16. **Diskettes:** Diskettes must be submitted with the following files:

a. All input and output files for each dispersion model, including meteorological data. The ISCST2 options to generate an event file and plot files should be selected for each run. The ISCLT2 options to generate predicted concentrations for each individual source and plot files should also be selected;

b. All automated downwash program input and output files;

c. Files specifying coordinates for fence lines and property lines; and

d. All spreadsheet files used for comparison of predicted concentrations with standards or guidelines (this includes, but is not limited to, spreadsheet files used for ratio techniques).

17. **Form PI-1:** The most current version of the Form PI-1 should be included in the Air Quality Analysis.

18. **Permit Modeling Guidance Checklist:** This is the checklist provided to the applicant by the TACB Modeling staff confirming the details of discussions with the TACB Modeling and other staff. It must have been <u>completed and signed</u> by the TACB Modeling staff member following a meeting or telephone conversation with the applicant or the applicant's representative. The Air Quality Analysis should be received no later than six months after the date of the TACB Permit Modeling Guidance Checklist or six months after the date of the last addendum to this checklist.

19. **For PSD Permit Applications:** Additional information is required as specified in the <u>TACB/EPA Suggested Approach for PSD Protocols</u> available from the TACB Modeling staff.

Permit Modeling Guidance Checklist -CL

1. Applicant: _____

   Permit No.: _____

2. Consultant, if any: _____

3. Date of Contact with TACB Staff: _____
   By: Phone ☐ Meeting ☐ Written ☐ Other ☐

4. Names of Participants / Affiliation / Telephone #: _____

   _____

5. Name of TACB Staff Contacts

   A. Permits Program: _____

   B. Modeling: _____

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6. Type of Permit Review: State ☐ Federal ☐ PSD ☐ Nonattainment ☐ TWC ☐

   A. PSD applicability determined? _____

   B. Worst-case stack parameters approved for normal operating conditions? _____

   C. Worst-case emission rates approved for normal operating conditions? _____

   D. Upset condition modeling required? _____

   E. Disaster review modeling required? _____

7. Location: Nearest City: _____ County: _____ TACB Region: _____

8. Facility Type(s)/Process Description: _____

9. Shortest Distance to Property Line (feet): _____

   Plot plan available pursuant to TACB Staff Air Quality Modeling Guidelines Section 2.1? _____

10. Source Types: _____

    Information regarding the physical characteristics of the emission points definitive enough to provide modeling guidance? _____

    A Covered Stacks? Yes ☐ No ☐ B. Horizontal Exhausts? Yes ☐ No ☐ C Fugitive Sources? Yes ☐ No ☐
    D. Area Sources? Yes ☐ No ☐ E. Tanks? Yes ☐ No ☐ F. Roads? Yes ☐ No ☐
    G. Flares? Yes ☐ No ☐

    Note: All modeling techniques for non-point sources must be clearly documented with discussion supporting technique selection (that is, pseudo point source vs. volume source).

11. A. Pollutants Evaluated: _____

    B. Applicable State & Federal Standards or Effects Screening Levels: _____

12. Attainment Status by Pollutant: _____

13. Source Inventory:

    A. Are all on-property sources to be evaluated? _____

    B. Are off-property sources to be evaluated? _____

    C. Ratio Techniques proposed (stack parameters approved)? _____

14. Models Proposed:
    A. Flat / Simple Terrain? ____ B. Complex Terrain? ____ C. Disaster? ____ D. Other? ____

15. Meteorological Data: Short-term: _____

    Long-term: _____

16. Coefficients: Applicant should provide Auer land use analysis _____

17. Methodology Proposed to Evaluate Building Wake Effects: _____

18. Receptor Grid: The Applicant should follow the TACB staff Air Quality Modeling Guidelines Section 6.5, except as noted:

    Is an area map available pursuant to TACB staff Air Quality Modeling Guidelines, Section 2.1? _____

    Distances (feet) to nearest:

    A. Established residence(s) _____ B. Church(s) _____ C. School(s) _____

    Is School within 3,000 feet? Yes☐ No☐ D. Day care center(s) _____

    E. Health care facilities _____ F. Dedicated public park(s) or similar facilities _____

19. Miscellaneous:

    A Applicant should provide all information specified in Attachment D to the TACB staff Air Quality Modeling Guidelines; and

    B. Other? _____

    Note: This Checklist must be completed and submitted with the Applicant s Air Quality Analysis. Air Quality Analysis submitted pursuant to this checklist is subject to audit.

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20. TACB Modeling Staff Signature: _____

    Date: _____

DISTRIBUTION OF THE BOLL WEEVIL IN TEXAS

The dots upon this map indicate cotton production. Each dot represents 1,000 bales or an additional fractional part of 1,000 bales produced in the census year, 1919.

The line "AB" represents the western and northern limit of boll weevil injury for 1920, 1921 and 1922 as reported by correspondents. It is a well known fact that weevils occur to some extent farther northwest than the line indicates but they do not seem to do any appreciable damage.