The Senate Committee on Natural Resources

Interim Report to the 81st Legislature

Interim Charges 2, 3, 4 and 9

March 2009

SENATE COMMITTEE ON NATURAL RESOURCES

February 9, 2009

The Honorable David Dewhurst
Lieutenant Governor of Texas
Members of the Texas Senate
Texas State Capitol
Austin, Texas 78701

Dear Governor Dewhurst and Fellow Members:

The Senate Committee on Natural Resources of the Eightieth Legislature hereby submits its interim report including findings and recommendations for consideration by the Eighty-first Legislature.

Respectfully Submitted,

Senator Kip Averitt, Chair

Senator Craig Estes, Vice-Chair

Senator Glenn Hegar

Senator Kim Brimer

Senator Juan "Chuy" Hinojosa

Senator Robert Deuell

Senator Mike Jackson

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ABBREVIATIONS AND ACRONYMS

ACE	Advanced Clean Energy
BACT	Best Available Control Technology
BEG	Bureau of Economic Geology
BPA	Beaumont-Port Arthur
CPA	Comptroller of Public Accounts
DFW	Dallas-Fort Worth
EAC	Early Action Compact
EAS	Emissions Assessment Section (of TCEQ)
EI	emissions inventory
EPA	Environmental Protection Agency
ERIG	Emissions Reduction Incentive Grants
FY	fiscal year
GHG	greenhouse gas
HAP	hazardous air pollutants
HARC	Houston Advanced Research Center
HGB	Houston-Galveston-Brazoria
I/M	(vehicle) Inspection and Maintenance
LIRAP	Low Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program
LAER	Lowest Achievable Emission Rate
NAAQS	National Ambient Air Quality Standards
NCTCOG	North Central Texas Council of Governments
NO_x	nitrogen oxide
NTRD	New Technology Research and Development
OBD	on-board diagnostics
ppm	parts per million
PUC	Public Utility Commission
RCC	Railroad Commission of Texas

INTERIM CHARGE # 2

Review Texas' current air emissions inventory and evaluate the need for additional data to enhance or improve the inventory. Review current federal, state, and local incentive programs related to emissions reductions and recommend improvements.

BACKGROUND

AIR EMISSIONS INVENTORY

As part of national and state efforts to protect human health and the environment, federal and state laws require companies permitted for air emissions to prepare and submit an annual emissions inventory (EI) detailing the actual annual emissions of the air pollutants released at permitted sites. The EI is used to plan pollution control programs, promote compliance with laws and regulations, conduct permit reviews, develop airshed modeling and rulemaking activities, supply required data to the United States Environmental Protection Agency (EPA) for tracking progress of air quality standards, and develop control strategies for the State Implementation Plan (SIP).

The Texas Commission on Environmental Quality (TCEQ) is authorized to request EIs and supporting documentation. The Emissions Assessment Section (EAS) of TCEQ's Chief Engineer's Office oversees reporting requirements.

Section 101.10, Texas Administrative Code (TAC), provides the conditions that require submission of EIs and/or related data to TCEQ on forms or other media approved by

TCEQ. The EI process is a self-reporting process and permit holders are responsible for determining whether Section 101.10, TAC, applies to the permitted site. The conditions include:

- an account which meets the definition of a major facility/stationary source or any account in an ozone nonattainment area emitting a minimum of ten tons per year (tpy) volatile organic compounds (VOC), 25 tpy nitrogen oxides (NOx), or 100 tpy or more of any other contaminant subject to national ambient air quality standards (NAAQS);
- any account that emits or has the potential to emit 100 tpy or more of any contaminant;
- any account that emits or has the potential to emit 10 tons of any single hazardous air pollutants or 25 tons of aggregate hazardous air pollutants; and
- any minor industrial source, area source, non-road mobile source, or mobile source of emissions subject to special inventories.

Section 101.10, TAC also establishes that special inventories may be requested by TCEQ of any person owning or operating a source of air emissions as necessary to develop an inventory of emissions. Section 101.10, TAC, also provides instructions for calculations, certifying statements, reporting requirements, and enforcement. A copy of Section 101.10, TAC, and maps of nonattainment and special inventory areas can be found in Appendix A.

Reported emissions for EIs include criteria and precursor pollutants: nitrogen oxide (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), VOCs, lead, particulate matter (PM) no larger than 10 microns in diameter (PM_{10}), and PM no larger than 2.5 microns in diameter ($PM_{2.5}$). Other emissions reported in EIs are hazardous air pollutants (HAPs) identified in the Federal Clean Air Act, such as mercury, hydrogen fluoride, and hydrochloric acid. Any other regulated air contaminants subject to rules, regulations, permits, orders of TCEQ, or court orders may be included in EIs as well.

The EAS annually collects statewide data on emissions of air pollutants and stores the data in the State of Texas Air Reporting System (STARS). The STARS database stores the self-reported actual emissions for each facility, rather than the allowable permitted emissions level for the facility. The TCEQ cross checks the reported actual emissions to ensure that the emissions do not exceed permitted levels. The reported EI data is used to assess the appropriate Air Emissions Fee or the Air Inspection Fee.

To ensure that our state's goals are met, emissions inventory information must be stored in a standardized manner that accurately represents a site's processes. To develop an accurate emissions inventory, each emission source at the site must be identified. Using tools such as plot plans, site maps, and comprehensive process flow diagrams, all equipment and operations that may produce air emissions must be included. Examples of air emissions that must be reported include combustion sources, storage tanks, loading operations, piping component fugitive areas, wastewater collection and treatment systems, process areas, evaporative losses, and plant roads.[1] Company information,

geographic information, physical description of sources, and operational activity information are also included in the EI.

EMISSION TYPES

Various types of emissions are reported to TCEQ in EIs and some emissions are determined by TCEQ. These emissions include point sources, area sources, on-road mobile sources, non-road mobile sources, and biogenic sources. Point sources of air emissions include industrial and nonindustrial stationary equipment or processes considered significant sources of air pollution emissions. Point sources include industrial and commercial boilers, electric-utility boilers, turbine engines, wood and pulp processers, paper mills, chemical processing operations, petroleum storage tanks, etc. Facilities report point source emissions to TCEQ and the data are stored in the Point Source Database, available for use by TCEQ staff, EPA, state and federal legislators, air pollution researchers, public interest groups, and the general public.[2]

Area sources of air emissions include lawnmowers, residential painting, gas stations, dry cleaners, agriculture (e.g. feedlots, crop burning), waste management (e.g. landfills), and miscellaneous sources such as forest fires, wind erosion, and unpaved roads. Area source emissions are generally calculated and reported in EIs on a county-wide basis by category rather than by individual source, depending on the type of data available for each category.

On-road mobile sources include cars and trucks, categorized into eight classes, and are estimated using a model called MOBILE, developed by EPA. The MOBILE formula calculates an emissions factor for mobile sources using a set of complex mathematical equations. After an emissions factor is generated for each vehicle class, the factor is then used in conjunction with vehicle miles traveled (VMT) estimates, developed by the Texas Highway Performance Monitoring System data set for that selected area. The combination determines the contribution of emissions from mobile sources in a city, county, or state, and VMT data is maintained by the Texas Department of Transportation. Emissions from mobile sources in Texas, which are estimated on a county-wide basis, constitute the largest single source category of air pollution.[3]

Non-road mobile sources of air emissions include internal combustion engines not associated with highway vehicles, including construction equipment, trains, planes, boats, recreational vehicles, and lawn and garden equipment. A variety of emissions calculation methodologies are used to determine non-road mobile source emissions data from such different types of equipment.

Biogenic sources of air emissions are based on estimates of vegetation type and quantity and they account for 30 percent of all the VOCs emitted in urban areas in the eastern half of Texas. Biogenic VOC emissions are estimated using a computer model that takes into account the species of trees present, the density of their foliage, the temperature and solar radiation on the day in question, and the distribution of vegetation throughout the modeling domain. Parameters must be measured accurately if the biogenics inventory is

to be correct. Most plants emit some VOCs, but the largest emitters are oaks, pines, sweet gums, eucalypti, and poplars.[4]

TEXAS AIR EMISSIONS REPOSITORY

The TCEQ uses the Texas Air Emissions Repository (TexAER) -- a web-based computer system -- to archive, access, and secure area, non-road mobile, on-road mobile, and biogenic emissions data. The TexAER, formerly referred to as the State Implementation Plan Emissions Data Management System, allows users to upload, manage, query, and report on inventory data submitted to or generated by TCEQ.

The TexAER allows for the consolidation of emissions data and provides a web interface to an emissions comparison tool which allows for side-by-side display of up to five sets of emissions data arranged in a hierarchy by location, source classification code (SCC), or SCC class. The TexAER also provides a web interface to an audit/merge or inventory builder tool and maintains an audit trail that can be used to recreate earlier saved versions of an inventory.[5] The TexAER infrastructure could potentially be used to support implementation of additional functionality enhancements, including creating libraries of control strategy and growth factor data applied to existing subinventories. Such enhancements could be used to generate projected emissions and allow the general public to access high quality inventory data.[6]

OZONE STANDARDS AND NONATTAINMENT AREAS

Three regions of Texas have been designated as nonattainment areas due to excessive ground-level ozone: the Dallas-Fort Worth region (DFW), the Houston-Galveston-Brazoria region (HGB), and the Beaumont-Port Arthur region (BPA). Three additional areas (Austin/San Marcos, San Antonio, and Northeast Texas or Tyler/Longview) entered into Early Action Compacts (EAC) with EPA. The EACs are agreements between TCEQ and EPA to voluntarily achieve the eight-hour ozone standard. See Appendix B for charts of the DFW and HGB eight-hour ozone area NOx emissions from on-road, non-road, and point sources.

Revisions to the ozone NAAQS made by the federal government changed the eight-hour ozone standard from 0.08 parts per million (ppm) to the new eight-hour standard of 0.075 ppm (effective May 27, 2008). Monitored areas that exceed the current ozone standard of 0.08 ppm include the HGB and DFW areas. Monitored areas that exceed the ozone standard of 0.075 ppm include HGB, DFW, DFW-Hood County, DFW-Hunt County, Tyler-Longview-Marshall, Beaumont-Port Arthur, San Antonio, Austin, and El Paso. Due to the revision of the standards, the number of areas with design values over the standard increased from two to seven.[7] Charts of areas and counties monitoring over the old and new standards can be found in Appendix C.

The HGB SIP update issued in 2008 indicates significant improvements in the ozone design levels with estimated population increases from 1991 to 2007. Appendix D includes the 2009 Future Base Modeling Inventory for on-road, non-road and point

source emissions for the DFW and HGB eight-hour ozone areas and a graph of the HGB SIP update.

TEXAS EMISSIONS REDUCTION PLAN (TERP)

The Texas Emissions Reduction Plan (TERP), established by Senate Bill (S.B.) 5, 77th Legislature, 2001, is a comprehensive set of incentive programs aimed at improving air quality in Texas by reducing NOx emissions from on-road and non-road high-emitting internal combustion engines. The following documents can be found in Appendix E:

- a list of fees used to fund TERP
- TERP appropriations for fiscal year (FY) 2008 and FY 2009
- a map indicating TERP eligible counties and designated highways and roadways
- charts of TERP grants by area and by emission source from 2001 to 2007
- TERP grants awarded or pending by area and emissions source

The TERP has achieved significant NOx reductions and funded numerous projects. S.B. 12, 80th Legislature, 2007, extended TERP through 2013 to ensure that the program is able to continue achieving reductions with different deadlines and the new standards. The extension of TERP should provide SIP credit or assistance in demonstrating future attainment in the DFW and HGB areas by focusing efforts on projects that achieve immediate reductions in emissions.

In December of 2008, the Air Quality Division of TCEQ published the TERP Biennial Report to the Texas Legislature. A copy of the executive summary for that report is provided in Appendix F.

GRANT PROGRAMS UTILIZING TERP FUNDS

The New Technology Research and Development Program (NTRD) is a part of TERP that provides -- through the issue of state-funded grants -- financial incentives to encourage and support research, development, and commercialization of technologies that reduce pollution in Texas. Senate Bill 5, 77th Legislature, 2001, created NTRD, originally named the Texas Council on Environmental Technology, which was administered by The University of Texas until 2003. The TCEQ managed NTRD from 2003 to 2005 and through 2005 NTRD funded 71 projects with grants totaling approximately $20 million.[8] In 2006, the Texas Environmental Research Consortium (TERC) began to administer the NTRD program under a contract with TCEQ. This contract requires TERC to provide grants for the development of emissions-reducing technologies that may be used for projects eligible for awards under Chapter 386, Health and Safety Code. The primary objective of the NTRD program is to research the development of commercially available technologies that will support projects that may be funded under the TERP Emissions Reduction Incentive Grants (ERIG) program. The NTRD is also meant to streamline and expedite the process whereby TCEQ and EPA give recognition of and credit for new, innovative, and creative technological advancement.

The TCEQ is also required to issue specific requests for proposals or notice regarding program opportunities for technology projects to be funded under NTRD. The NTRD grants must be directed toward a balanced mix of certain technologies. See Appendix G for a chart of NTRD appropriations and projects for advanced technologies, existing and new engines, exhaust treatment technology, engine or vehicle modifications, fuels and additives, and other studies.

In order to offset the incremental costs associated with reducing emissions, TCEQ's ERIG program provides grants to eligible projects in nonattainment areas and EAC counties. Any person or entity who operates or plans to operate on-road heavy-duty vehicles, non-road equipment, or stationary engines primarily in one or more of the nonattainment areas or other eligible counties of the state, is potentially eligible for a grant. Infrastructure projects in eligible counties may also qualify for funding. The types of projects eligible for funding for the purchase or lease of new, lower emissions equipment and retrofits include on-road heavy-duty vehicles (8,500 lbs. or more), non-road equipment (25 hp or greater), marine vessels, locomotives, stationary equipment, refueling infrastructure (for qualifying fuel), on-site electrification and idle reduction infrastructure, and rail relocation and improvement. Funding decisions may be based on the likelihood that the emissions reductions will be proven and accepted. An applicant needs to show that the project is viable and can be expected to achieve significant reductions in NOx emissions. Data on ERIG grants awarded or pending by emissions source and area for 2008-2009 can be found in Appendix H.

The Rebate Grants Program is a streamlined grant application process that includes contracting, reimbursement, and reporting for on-road, heavy-duty vehicles and non-road equipment in the eligible counties in nonattainment areas. Rebate grants are based on preapproved maximum rebate grant amounts for eligible on-road and non-road replacement and repower projects.

The Third-Party Grants Program (TPGP) awards third-party pass-through grants to assist with the implementation of TERP projects in eligible areas. Current and pending TPGP grants include propane vehicle and equipment projects for the Railroad Commission of Texas (RRC), natural gas vehicle and equipment projects for the Texas General Land Office (GLO), and regional projects for the North Central Texas Council of Governments (NCTCOG) and the Houston-Galveston Area Council.

The Small Business Grants Program (SBGP) awards grants to businesses that own and operate one or two vehicles or pieces of equipment (one of which must be diesel-powered and a pre-1994 model) or pieces of non-road equipment with uncontrolled emissions. To provide a simplified application process, the SBGP grants are awarded as part of the Rebate Grants Program.

The Clean School Bus Program issues grants to reduce emissions of diesel exhaust from school buses throughout the state. Eligible projects may include emissions-reducing add-on equipment and other projects. In FY 2008, a total of $4.8 million was approved for grants to 51 school districts.[9]

LOW INCOME VEHICLE REPAIR ASSISTANCE, RETROFIT, AND ACCELERATED VEHICLE RETIREMENT PROGRAM (LIRAP)

The Low Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP), also known as the AirCheckTexas Drive a Clean Machine Program, may be administered in counties that have a vehicle Inspection and Maintenance (I/M) program. The LIRAP provides qualified vehicle owners with up to $600 toward repair of a vehicle or up to $3,500 toward a replacement vehicle. In order to qualify for LIRAP funds, the owner of the vehicle must have an annual income that is equal to or less than 300 percent of the federal poverty level. Recipients must provide proof of a valid inspection sticker for a car registered in an eligible county. Revenues and appropriations for LIRAP for FY 2002 through FY 2009 can be found in Appendix I.

Originally created by House Bill (H.B.) 2134, 77th Legislature, 2001, LIRAP was amended by H.B. 1611, 79th Legislature, Regular Session, 2005, and by S.B. 12, 80th Legislature, 2007. Prior to S.B. 12, LIRAP had been underutilized due to a lack of marketing and public awareness, limitations created by the income eligibility standards, and the amount of money provided for replacement. Because the program was underutilized, the 78th Legislature reduced appropriations from $13.75 million in 2003 to $10.49 million in 2005 to $5.5 million in 2007.

Senate Bill 12 makes the following changes to LIRAP that were implemented December 12, 2007:

- expands net income eligibility from 200 percent of the federal poverty rate to 300 percent of the federal poverty rate
- increases financial assistance from $1,000 to up to $3,500 for replacing a polluting vehicle
- establishes replacement vehicle requirements
- limits administrative costs to no more than 10 percent of the funds provided for program administrators
- allows eligible owners of gasoline powered vehicles 10 model years or older to be eligible for retirement
- requires the retired vehicle to be dismantled and the engine and emissions control components to be destroyed
- requires that residual scrap metal be provided to a recycler at no cost, except the cost of transportation to the recycler

The LIRAP is currently operating in 16 counties located in the HGB and DFW nonattainment areas, and the Austin EAC area. Dallas, Tarrant, Collin, Denton, and Harris counties began participation in the program in December of 2002. Galveston, Brazoria, Fort Bend, Montgomery, Johnson, Ellis, Rockwall, Kaufman, and Johnson counties began participation in May of 2003. The Austin EAC, which includes Travis and Williamson Counties, began participating in September of 2005. Charts with statistics regarding inspection and maintenance test numbers by area and the totals for retirements and replacements by area can be found in Appendix J.

ENERGY EFFICIENCY AND THE STATE ENERGY CONSERVATION OFFICE

Article 3, Energy Efficiency, S.B. 12, 80th Legislature, 2007, among other things, authorizes the State Energy Conservation Office (SECO) to adopt energy codes based on recommendations from the Energy Systems Laboratory (ESL). Senate Bill 12 also requires the Texas Building and Procurement Commission (TBPC) to develop and update a list of equipment and appliances that meet the energy efficiency standards and assist state agencies in selecting products under that section as appropriate.

HOUSE BILL 3732

House Bill (H.B.) 3732, 80th Legislature, 2007, relating to the implementation of advanced clean energy projects and other environmentally protective projects, was enacted in response to environmental concerns expressed about the build-out of new coal-fired power plants, concerns about price of electricity, and a critical need to be prepared for future demand for electricity in Texas. This bill creates regulatory and financial incentives for Advanced Clean Energy (ACE) Projects, which are defined to be limited to a class of technology that can meet the air emissions profile that the federal government has targeted for the year 2020. Feedstocks covered by the bill include coal, biomass, petroleum coke, solid waste, and fuel cells using hydrogen derived from such fuels. Incentives included in H.B. 3732 are:

- a time-certain permitting process that ensures that a decision will be made on an ACE project's air permit within 12 to 21 months, but still maintains the public's right to notice and a contested case hearing;

- improvements to the existing system for reducing property taxes (and tax rollbacks for public entities), including a pre-approved list of qualifying technologies (e.g. clean coal technology, including carbon dioxide capture equipment);
- an exemption from gross receipts tax for the sale of electricity generated by ACE Projects;
- severance tax exemptions for enhanced oil recovery projects using captured CO_2; and
- authorization for local property tax abatements for ACE Projects under the Texas Economic Development Act.

House Bill 3732 also created the statutory authorization for an ACE Grant and Loan Program funded through sources that include redirected gross receipts tax revenue and, if a subsequent constitutional amendment is passed, proceeds from the sale of general obligation bonds. The appropriation authorization for SECO to create and access this account was not passed during the 80th Legislative Session; therefore, this program has not yet been funded.

House Bill 3732 provides two additional protections for pending and future projects:

- clarifies that new technologies will not be discouraged through the best available control technology (BACT) or Lowest Achievable Emission Rate (LAER) requirement by clarifying that projects do not have to prove that the proposed technology has been previously demonstrated on a commercial scale

- clarifies that emission reductions achieved by advanced clean energy projects qualifying for incentives under this may not be considered achievable in a BACT or LAER review unless there is an independent basis for doing so[10]

INTERIM EFFORTS/ISSUE STATUS

AIR EMISSIONS INVENTORY

The Senate Committee on Natural Resources (Committee) heard testimony regarding Interim Charge #2 at four hearings during the interim. Agendas can be found in Appendix K.

On July 8, 2008, the Committee heard testimony regarding counties that currently exceed the revised ozone standard of 0.075 ppm. Witnesses reported that EPA requires cities with populations of 50,000 or more to have monitors and that the new ozone standard will require monitoring of 9 to 11 additional cities in the state and could affect 45 counties.[11]

Committee members were told that installation of a new monitor costs approximately $105,000, and a monitor's yearly operational cost are approximately $50,000.[12] The TCEQ's regional staff operate the monitors on a fulltime basis if the monitors are located sufficiently close to regional facilities. Operation of more remote monitors is contracted out at a cost of approximately $30,000 to $40,000 annually. Funding for new monitors is provided by TCEQ or the federal government if the monitors meet EPA qualifications.

Continuous data from the monitors can be hosted online. Current continuous air monitoring stations can be accessed through the TCEQ website at:

http://www.tceq.state.tx.us/cgi-bin/compliance/monops/select_curlev.pl.

(See Appendix L for locations of monitoring stations across the state.)

TIMELINE FOR ATTAINMENT DEMONSTRATION

Witnesses representing TCEQ testified before the Committee regarding TCEQ's efforts to notify state and county officials of the revised NAAQS. They stated that EPA requires the state to meet the timelines of both existing and new proposed SIPs. Attainment demonstration of SIPs is due to EPA by 2013 and actual attainment dates range from 2013 to 2030, depending upon classification under the new standard.[13]

NEW FEDERAL ENGINE STANDARDS

In testimony regarding the latest federal rules related to emission standards for locomotive and marine compression engines and limitations on idling of these engines, the Committee was told that EPA anticipates a 90 percent reduction in PM and an 80 percent decrease in NOx from engines by 2030 with the implementation of the new federal engine standards.[14]

COLLABORATIVE APPROACH TO AIR QUALITY

On April 15, 2008, the Committee and the Senate Committee on Business and Commerce met jointly to discuss overlapping charges and hear testimony from regulatory agencies about how the agencies communicate and interface when dealing with energy-related

issues. At that hearing, witnesses representing the Public Utility Commission (PUC), RRC, and TCEQ testified that there is value in communication between PUC staff, RRC, and TCEQ. The agencies must work together to balance the needs and future energy demands of a rapidly growing population, satisfying environmental regulations, and addressing the cost and availability of resources. The committees were told that there is currently little or no collaboration between TCEQ, RRC, and PUC, but that opportunities for cooperative work between the agencies are being pursued.[15] The committees also heard testimony stating that all options for meeting future energy needs must remain on the table and that the most cost effective way to address energy needs is through energy conservation. It is crucial for the various agencies to work together and offer environmental protections for the state. According to testimony, while there may not be a regulatory requirement to communicate with peer agencies, legislative direction is welcome and it makes sense for the agencies to work together.[16]

GOVERNOR'S ENERGY REPORT

In July of 2008, the Governor's Competitiveness Council issued the *Council's Report to the Governor* with the *2008 Texas State Energy Plan*. This document includes recommendations regarding wholesale market, transmission and distribution, energy efficiency and demand-response, retail market, workforce, and governance for implementing the plan. The governance recommendation is to create a council of member agencies or designate an official tasked with coordinating energy functions.[17] This report can be accessed online at

http://governor.state.tx.us/files/gcc/2008_Texas_State_Energy_Plan.pdf.

COMPTROLLER'S ENERGY REPORT

In May of 2008, the Texas Comptroller of Public Accounts (CPA) issued *The Energy Report, 2008*. As a part of the conclusion this report states that "Texas is in a position to lead on national energy policy, due to its unique experience in conventional energy technology, its vibrant research community, and its vast reserves of energy resources."[18] This report can be accessed online at www.window.state.tx.us/specialrpt/energy/.

GREENHOUSE GASES

In testimony before the Committee at the July 8, 2008, hearing in The Woodlands, Texas, members were told that although Texas is making significant contributions to greenhouse gas (GHG) emission levels, the state has no specific plans or initiatives in place to address climate change issues or their consequences. Commissioner Larry Soward, TCEQ, testified that in 1991 the Legislature granted TCEQ the statutory authority to "control air contaminants as necessary to protect against adverse effects related to climate changes, including global warming."[19] A significant number of other states are intensifying their efforts to address global climate change issues through the implementation of strategies or promulgation of laws or regulations. In addition to regional groups, 39 states, not including Texas, have signed on to The Climate Registry, which is intended to standardize how carbon dioxide emissions are reported, in anticipation of federal and state regulations. Members were told that "if Texas is to ever deliberate on and adopt its own prudent course of action to address climate change issues, [the state] can only do so with meaningful and reliable data as to [the state's] greenhouse gas emissions."[20] Commissioner Soward also stated that as the nation's leading emitter of

greenhouse gases, Texas' reasonable and logical approach is to step up, take a leadership role, and begin to seriously and meaningfully address GHG emissions.[21]

The Consolidated Appropriations Act of 2008, directed EPA to develop a draft mandatory reporting rule for GHG by the end of September of 2008. The draft rule has not yet been released but is due to be completed by June of 2009. This rule is expected to require mandatory reporting of GHG as emissions "above appropriate thresholds in all sectors of the economy," with thresholds and frequency of reporting to be determined by EPA.[22]

The Governor's Competitiveness Council's report includes the recommendation to "bring Texas' perspective to federal policy on carbon." The report states that "Texas needs to participate in the national carbon discussion to educate Washington on the economic value of Texas' energy production to the nation and prevent Texas from being punished for providing the energy and petrochemical products that the rest of the nation consumes."[23]

The Climate Registry (Registry) is a nonprofit organization founded by participating states, provinces, and tribes for voluntary reporting of GHG emissions in North America. The Registry's mission is to standardize and centralize GHG data into a North American GHG registry, which is intended to support voluntary and mandatory reporting programs. The Registry sets best practice standards for voluntary GHG emissions calculation, reporting, and verification. Registry board members, who provide direction for the

Registry, represent 39 U.S. states as well as several Mexican states, Canadian provinces, and tribal councils. A map of states and other North American areas participating in the Registry can be found in Appendix M.

AIR QUALITY INCENTIVE PROGRAMS

Senate Bill 12 provided significant improvements to LIRAP. Based on the new structure of the program established by S.B. 12, for FY 2008 and FY 2009, $45 million was appropriated for LIRAP.

Eligible replacement vehicles are up to 98 percent less polluting than the replaced vehicles and the LIRAP Drive a Clean Machine program accelerates the turnover rate of those older, more polluting vehicles.

The Houston-Galveston Area Council, which administers LIRAP for the HGB area, discontinued issuing LIRAP vouchers on July 10, 2008, as available funds were exhausted, but continued to accept applications and placed applicants on a waiting list. The NCTCOG, which administers LIRAP for the DFW area, discontinued accepting applications on May 30, 2008, as available funds were exhausted. The NCTCOG resumed taking applications on August 13, 2008, using funds previously set aside for repairs. Williamson and Travis counties had sufficient funds to continue accepting applications through the fiscal year.

The LIRAP expenditures, distributions, and vehicle repairs and replacements for FY 2002 through FY 2009 and vehicle and dealer statistics for FY 2008 and fourth quarter statistics for June 1, 2008 to August 31, 2008, can be found in Appendix N.

ADOPTION OF RULES BY THE STATE ENERGY CONSERVATION OFFICE

To date, SECO has adopted rules, effective February 4, 2008, defining terms and stating that SECO will publish notice in the *Texas Register* and the SECO website informing interested persons that they may provide written comments to SECO on the new editions of the Codes. The rules also state that comments are encouraged from any interested persons, including commercial and residential builders; architects and engineers; municipal, county, and other local government authorities; and environmental groups. Comments were accepted for 30 days after publication of the notice and forwarded to ESL for consideration in developing their written recommendations.[24] A copy of Subchapter E (Texas Building Energy Performance Standards), Chapter 19 (State Energy Conservation Office), Part 1 (Comptroller of Public Accounts), Title 34 (Public Finance), Texas Administration Code, can be found in Appendix O.

CONCLUSIONS

The increase in the number of regions to be monitored by TCEQ due to the NAAQS revisions and change in the ozone standard will require more data, more people to review the data, and more people to use the data to develop more SIPs.

Incentives must be maintained for industry and all emitting entities, including vehicles such as cars and trucks and equipment. These incentives need to be fine tuned in certain

areas to ensure that emissions reductions are achieved as soon as possible to work toward the previous ozone standard of 0.08 ppm, and eventually toward the new ozone standard of 0.075 ppm.

Recommendations included in the *Governor's Competitiveness Council 2008 Texas State Energy Plan*, the *CPA Energy Report, 2008*, and in testimony before the Committee emphasize the need for cross communication of agencies, noting that the major energy regulatory, permitting, research and assistance programs are dispersed throughout at least seven state agencies: PUC, TCEQ, RRC, CPA, GLO, the Electric Reliability Council of Texas, the Texas Department of Agriculture, and the Texas Department of Housing and Community Affairs. The report states that "the split of jurisdiction causes confusion for business and industry, and makes it more difficult to carry out a cohesive energy policy."[25]

RECOMMENDATIONS

- Provide TCEQ with the authority and resources to collect and review more data collected in order to develop additional SIPs under the new ozone standard.
- Continue to offer and fine tune incentives for emissions reductions from mobile sources.
- Provide TCEQ with the authority and funding to build a web-based automated database listing all actual permitted emissions.
- Develop creditable statewide NOx emissions reductions credits from energy efficiency and renewable energy.

- Develop creditable statewide NOx emissions credits from wind and other renewables.
- Fully fund TERP and LIRAP and consider certain adjustments to improve administration and efficiency of the programs.
- Continue to promote public awareness through the partners of the Drive a Clean Machine program.
- Fulfill the intent of the grant and loan provisions in H.B. 3732 and expressly authorize the creation of the ACE project account.
- Increase SECO's grant authorization to up to $300 million per biennium and maintain the bonding-based loan authorization up to $500 million.
- Adopt provisions regarding how and when applications should be reviewed and granted under the ACE project grant and loan program and integrate RRC, PUC, and TCEQ into the review process.
- Expand the time-certain permitting provisions in H.B. 3732 to apply to TCEQ-issued water quality permits under Chapter 26 of the Water Code.
- Create a sales tax exemption for carbon capture and storage equipment not currently exempt under existing tax exemptions.
- Extend and refine Chapters 312 and 313 of the Tax Code to ensure that the benefits of those programs can be fully realized by ACE projects.
- Extend the severance tax exemption for carbon capture and storage to 10 years and eliminate the tie to federal regulations of carbon.
- Require cross-communication and collaboration between state agencies with distinct jurisdiction, but related missions.

INTERIM CHARGE #3

Study and assess the use of advanced control technologies for the reduction of point source pollution emissions, including, but not limited to:

- Identifying state-of-the-art pollution control technologies;
- Identifying facilities which could benefit from state-of-the-art control technologies;
- Identifying mechanisms for implementing state-of-the-art controls in Texas;
- Reviewing the ability of the Texas Commission on Environmental Quality (TCEQ) to regulate the use of pollution control technologies, including possible legislative options to grant, improve, or mandate TCEQ actions to implement state-of-the-art control technologies; and
- Investigating the use of different approaches or methods in regulating emissions based on geographical/regional locations around the state.

BACKGROUND

The Federal Clean Air Act requires that certain facilities employ Best Available Control Technology (BACT) to control emissions. All major sources of emissions are generally required to use BACT. Best available control technology is defined as the "maximum degree of reduction in the discharge of air pollutants (emissions) achievable through the currently available methods, systems, and techniques while taking economic, energy,

environmental, and other costs into consideration."[26] There are various air pollution control technologies and urban planning strategies available to reduce air pollution.

INTERIM EFFORTS/ISSUE STATUS

NEW CONTROL TECHNOLOGIES

Several witnesses provided testimony regarding new control technologies at the Senate Committee on Natural Resources (Committee) hearing July 8, 2008, in The Woodlands, Texas. See Appendix K for hearing agendas.

The TCEQ reported on the use of remote sensing infrared cameras, including the HAWK helicopter/camera system and the GasFind IR handheld camera. According to TCEQ, the cameras help in determining whether there are significant volatile organic compound (VOC) emissions that were previously unknown or unaccounted for from unconventional sources, providing more accuracy for TCEQ's emissions inventory (EI). The cameras are also used in helping TCEQ identify individual sources of emissions in areas with elevated air concentrations or pollutants.

Remote sensing projects called Find It and Fix It were conducted by TCEQ with HAWK flyovers in 2005 and 2007 over the Houston Ship Channel, the Texas City area, and the Beaumont area. The Dallas/Fort Worth area was added in 2007. These remote sensing projects discovered barge leaks, emissions from loading operations, floating roof tank landings, and oil field storage tanks. Review of submitted EI data showed landing loss emissions increased the reported total point source VOC inventory by 7,984 tons per year

(tpy), which is more than a 59 percent increase in the Houston Ship Channel area, not including Baytown. Reported oil and gas flash emissions increased statewide area source EI by 700,000 tpy of VOC.[27]

The TCEQ reported to the Committee on the use of the handheld GasFind IR cameras to conduct screening observations of gas pipelines; truck loading and unloading operations; barge loading and unloading, cleaning and pressure relief valves; vapor recovery units; and storage tanks with fixed and internal floating roofs. The handheld cameras are also used to detect emissions from oil and gas facilities, refinery towers, incinerators, and flares.

The TCEQ was the first regulatory agency to conduct field studies using the differential absorption light detection and ranging (DIAL) project. The DIAL is an advanced remote sensing system from the United Kingdom which measures air pollution concentrations using infrared cameras and ultraviolet lasers. A five-week study measured emissions from storage tanks, flares, wastewater operations, and coker units and compared the measurements with traditional Environmental Protection Agency (EPA) emissions estimation techniques. The DIAL crude oil tanks measurements were 5 to 10 times greater than calculated emissions using EPA emission factor programs.[28]

Other TCEQ emissions inventory improvements include an upstream oil and gas storage tank project which measured emissions from tank batteries; developed an emission factor that includes working, breathing, and flash losses; and increased statewide area source EI

by more than 700,000 tons per year of VOC. Hourly inventories collected hourly emissions rates from 1,200 sources located throughout East Texas and the data was used for improved ozone modeling. A VOC EI improvement Stakeholder Group was formed and discussed issues related to reconciling EI and ambient monitoring data and conducted surveys of flares and cooling towers.[29]

Also heard in testimony before the Committee on July 8, 2008, was a report from the Houston Advanced Research Center (HARC) stating that Houston may be the most monitored city in the world with over 40 ground-level monitors for ozone and numerous other monitors. Ground level monitors do not indicate the size of pollution plumes or how often plumes are missed because the wind carries the plume to either side or above the monitors. On the other hand, Solar Occulation Flux (SOF) technology uses the sun as its light source to a mobile detector mounted in a van. The process quantifies emissions with wind speed and a material balance around the SOF Box. See Appendix P for further explanation and illustrations of how the SOF Box operates and quantifies emissions. According to HARC, the use of SOF would keep the regulatory agencies from having to spend millions of dollars revising emissions factors. Because the measurement techniques such as DIAL and SOF provide critical information that is not provided by ground level point monitors, it may be useful in some cases to conduct DIAL studies rather than, or in conjunction with, SOF studies.

The Committee heard testimony on July 8, 2008, regarding other advanced technologies, including geothermal power, Zero-emission Energy Recycling Oxidation System

(ZEROS), and photovoltaic energy generating systems. Copies of all written testimony regarding these technologies and other issues can be obtained from the Committee office.

The Committee heard testimony on July 8, 2008, regarding a commercial-scale, coal-fired, baseload power facility that, unlike any operation anywhere, would capture up to 90 percent of its potential carbon dioxide (CO_2) emissions and deliver it for use in enhanced oil recovery operations and geologic storage.[30]

REVISED OZONE STANDARD

With revisions to the ozone National Ambient Air Quality Standards (NAAQS) (See Appendix C), state recommendations on boundaries and designations are due to EPA on March 12, 2009. The EPA is scheduled to make final designations and classifications on March 12, 2010. Attainment demonstration of State Implementation Plans (SIPs) are due to EPA approximately 2013, with attainment dates, depending on severity of problem, scheduled for 2013 to 2030.

CONCLUSIONS

The ability of TCEQ to regulate the use of pollution control technologies will be challenged by the increased need for technology and manpower to monitor 22 counties, rather than eight under the previous ozone standard. State-of-the art control technologies may facilitate TCEQ's ability to properly and accurately monitor the additional counties, but the 81st Legislature may need to consider legislative options to grant, improve, or mandate TCEQ actions to implement state-of-the-art control technologies.

The 80th Texas Legislature approved approximately $150 million annually to continue emission reductions through TERP. In 2008, the first round of emission reduction incentive grants resulted in a total of 444 project applications from the HGB region, with a total funding request of approximately $55.4 million.[31] Currently, TERP funding is authorized through 2013. The HGB region's new 2019 attainment date under the 1997 ozone standard and the second attainment date (to be finalized in 2010) to address the new ozone standard make it difficult to model projected emission reductions associated with TERP beyond the current authorization. Extending TERP will ensure funding for the retrofit and replacement of heavy-duty vehicles in order to achieve necessary emissions reductions.[32]

RECOMMENDATIONS

- Promote bringing new technologies to the market in order to address the revised ozone standard and potential federal mandates regarding greenhouse gas (GHG) emissions.
- Ensure that the state is engaged in monitoring GHG developments at the federal level to ensure that the state's interests are protected.

INTERIM CHARGE #4

Assess the environmental impact of new electric generation sources and technologies. Collect and evaluate data related to use and conservation of water used in the production of energy. Examine the need to include electric generation facility water needs in regional water plans.

BACKGROUND

ENVIRONMENTAL IMPACT OF ELECTRIC GENERATION

Electric generation plants and technologies have varying environmental impact on the state's natural resources. Different types of electric generation, such as coal and nuclear power plants and solar, wind, and hydro energy require different amounts of land use for power production. Some of these fuel sources/production types allow for dual use of land, while others do not.

Most traditional types of electric generation have an impact on air quality, emitting solid particles and gases. Appendix Q contains charts that show possible emissions from different types of plants. These charts can be found in a report published in August 2007, by the National Energy Technology Laboratory, entitled *Cost and Performance Baseline from Fossil Energy Plants.* The complete report can be found online at:

http://www.netl.doe.gov/energy-analyses/pubs/Bituminous%20Baseline_Final%20Report.pdf.

WATER AND ENERGY PRODUCTION

Water and energy are the two most fundamental components of modern civilization. Due to rapidly growing populations, the demands for both resources are increasing faster than ever.

The term water/energy nexus describes the unique relationship between the use of water in the electric generation process and the use of electricity in the treatment and delivery of water. Water restrictions present challenges for generating energy, and energy factors, particularly rising prices, challenge efforts to deliver water supplies.[33]

The majority of water use in electricity generation is associated with the cooling of thermoelectric plants. The thermoelectric power sector uses approximately 195 billion gallons a day of fresh and saline water for cooling. The amount of water required to cool the plants impacts the available supply for all other uses. Although a considerable portion of water is eventually returned to the source after production, a certain amount evaporates and the return flow is discharged at a different temperature and with a different biological content than the original source. How a thermoelectric power plant uses water for cooling is determined by the particulars of a plant's design. See Appendix R for diagrams of different cooling systems.

The state's energy portfolio is becoming more diversified with the addition of renewable resources for power generation, most of which are less water intensive than traditional sources of generation. As renewable sources of energy account for a larger portion of our

state's energy portfolio, the state may realize additional water savings and other environmental benefits.

INTERIM EFFORTS/ISSUE STATUS

The Senate Committee on Natural Resources (Committee) met on September 30, 2008. Members heard testimony regarding steam-electric water demands included in the 2007 State Water Plan. The hearing agenda can be found in Appendix K. Due to the ever changing marketplace, the amount of water needed for electric generation identified in the State Water Plan at the time of the plan's adoption differed from that of industry reports in 2008. A comparison of the 2007 State Water Plan projections and current study projections (2010-2060) can be found in Appendix S. The Committee received testimony indicating that regional water plans were being amended to account for new electric generation projects and projections.

On August 31, 2008, the Bureau of Economic Geology (BEG), The University of Texas at Austin, published a report entitled *Water Demand Projections for Power Generation in Texas* (report). This report, prepared for TWDB, includes factors affecting Texas water usage for electricity and states that, "the electric generating industry in Texas is entering a period of change driven by high and uncertain natural gas prices; potential federal legislation that could economically drive CO_2 capture and sequestration from fossil fuel fired power plants; and public concern about environmental issues." The report cites specific factors, which are listed below, that need to be accounted for in understanding

the future interaction between the increasing demand for both electric power and water in Texas:

- Texas' projected future population and economic output.
- Texas' deregulated wholesale and retail power markets. The deregulated market has significant advantages, but it also means that the Public Utility Commission (PUC) has no ability to impact siting of power plants based on the state's view of regional projections of water availability. As a consequence, understanding the factors that will drive the site selection decisions of Texas' investor-owned utilities (IOUs) and independent power producers is critical to understand the regional patterns of future water demands for power generation.
- High and volatile natural gas prices may drive increases in the percentage of baseload power generation based on coal and uranium fuels. It is unclear whether unconventional gas resources, such as Barnett Shale, and liquefied natural gas (LNG) imports into the Gulf Coast will drive natural gas prices low such that natural gas fueled power plants may provide significant amounts of baseload in the future.
- There may be a necessity in the future to develop post combustion CO_2 capture on existing coal fired power plants. If post combustion capture has to be retrofitted to existing coal fired power plants, the efficiencies of such plants could decrease by up to 35 percent. The resultant increase in water consumption per net electricity output at the retrofitted plants with CO_2 capture can be more than 80 percent over the plant with no CO_2 capture. These and other potential impacts of

water usage of carbon capture technologies must be factored into future water demand projections for Texas.[34]

A summary of the report can be found in Appendix T. This summary includes current estimated water requirements of different electricity-generating feedstocks, including natural gas, subbituminous coal, lignite, nuclear, and others. The complete BEG report can be found on the TWDB website at:

http://www.twdb.state.tx.us/wrpi/data/socio/est/Final_pwr.pdf.

Testimony provided to the Committee by the University of Texas Department of Environmental and Water Resources Engineering included information about trends that could intensify the relationship between energy and water. These trends include a shift toward more energy intensive water supplies, such as desalination projects, brackish water treatment, and long-haul pipelines. Stricter water treatment and disinfecting standards will also require additional energy. Simultaneously, trends in the energy sector are moving toward water intensive energy supplies, including the use of unconventional fuels, such as biofuels, and the development of innovative passenger vehicles, such as electric vehicles.[35] While the development of these products provides some environmental benefits, the water use associated with each could be significant.

CONCLUSIONS

The state's water supplies are already strained due to heat waves, droughts, silting reservoirs, and low reservoirs across the state. Because of the significant investment in the State Water Plan, it is essential that the role of future electric generation be accounted

for in the plan. The state cannot build new water purification systems without driving up the demand for energy and cannot build new power plants without acknowledging that these plants will require freshwater supplies. State and national policies must integrate water and energy solutions, and innovative technologies, so that we are able to provide for one resource without draining the other.

The State of Texas continues to grow rapidly, both economically and demographically, and we must address the future demand for water supplies and reliable electric generation. Cross communication and cooperation between all relevant agencies and entities involved in water planning and power generation are crucial to accomplishing this goal.

RECOMMENDATIONS

- Promote research and development for energy sources that employ components that conserve water and energy.
- Promote the development of more efficient power plant cooling techniques.
- Promote the use of reclaimed or saline water for power plant cooling.
- Ensure that there is adequate water supply in the State Water Plan for new energy projects.
- Plan for adequate water supply, energy production, and improved air quality in concert by developing integrated energy/water policymaking.
- Recognize and increase public awareness about the mutual benefits of water and energy conservation.

INTERIM CHARGE #9

Study and assess issues concerning mercury and arsenic emissions, including but not limited to:

- identifying the sources of mercury and arsenic pollution in air and water;
- investigating the status of drinking water, reservoir, river, estuary, and fish and wildlife mercury and arsenic monitoring programs in Texas;
- investigating the implementation by the Texas Commission on Environmental Quality (TCEQ) of the Federal Clean Air Mercury Rule (CAMR) on power plants in Texas;
- studying the potential costs and benefits of including all coal/lignite burning sources in Texas, not just power plants, into the state's CAMR program; and
- determining the legislative and regulatory mechanisms and advisability of including all coal/lignite burning sources into the state's CAMR program.

BACKGROUND

The Clean Air Interstate Rule (CAIR) was designed by the Environmental Protection Agency (EPA) to help nonattainment areas in downwind states achieve compliance with the national ambient air quality standards (NAAQS) for ozone and particulate matter of less than or equal to 2.5 microns ($PM_{2.5}$) through reductions in NOx and sulfur dioxide (SO_2) emissions from new and existing electric generating utilities. The CAIR is intended to achieve the largest reduction in air pollution in more than a decade by

reducing air pollution that moves across state boundaries. The CAIR will permanently cap emissions of SO_2 and NOx in the eastern United States. According to EPA, when fully implemented, CAIR will reduce SO_2 emissions in 28 eastern states and the District of Columbia by over 70 percent and NOx emissions by over 60 percent from 2003 levels.[36]

The federal CAIR rule was finalized on May 12, 2005. The Texas CAIR state implementation plan (SIP) was submitted to EPA in August of 2006. On June 4, 2008, TCEQ proposed changes to the Texas CAIR SIP based on Senate Bill (S.B.) 1672 from the 80th Legislative Session.

Senate Bill 1672 requires TCEQ to adjust the baseline for purposes of NOx allowance allocations for all affected electric generating units beginning January 1, 2018, rather than January 1, 2016, to accommodate EPA timing requirements. The bill also requires TCEQ, in adopting the rules, to incorporate any modification to the federal rules that result from a request for rehearing regarding those rules that is filed with EPA, a petition for review of those rules that is filed with a court, or a final rulemaking action of EPA.

The Clean Air Mercury Rule (CAMR) was designed by the EPA to permanently cap and reduce mercury emissions from new and existing coal-fired power plants throughout the United States. The CAMR is the first rule to federally mandate requirements that coal-fired electric utilities reduce their emissions of mercury.[37] The CAMR establishes standards of performance limiting mercury emissions from new and existing coal-fired

power plants and creates a market-based cap-and-trade program that will reduce nationwide utility emissions of mercury in two phases.[38] The federal CAMR rule was finalized on May 18, 2005, and requires states to develop state plans to achieve the mercury emission reductions required by CAMR and allows states to choose what measures to adopt to achieve the necessary reductions.[39] The TCEQ approved rulemaking to implement the CAMR trading program for mercury in July 2006. Together, CAIR and CAMR create a multi-pollutant strategy to reduce emissions throughout the United States.[40]

INTERIM EFFORTS/ISSUE STATUS

On July 11, 2008, the United States District of Columbia (D.C.) Circuit Court of Appeals vacated EPA's CAIR program, stating that EPA had overstepped its authority by instituting the rule.[41] On December 23, 2008, the federal appeals court reinstated CAIR while EPA develops a new clean air program.[42] On February 8, 2008, the United States D.C. Circuit Court of Appeals also vacated the EPA's CAMR program. The EPA is reviewing the Court's decisions and evaluating the impact.

CONCLUSION

The Senate Committee on Natural Resources has no recommended action on this issue at this time because the Texas SIPs are currently not affected.

[1] 2007 Emissions Inventory Guidelines, Texas Commission on Environmental Quality, Air Quality Division, January 2008.
[2] Sources of Air Pollution, Texas Commission on Environmental Quality, www.tceq.state.tx.us.
[3] Id.
[4] Id.
[5] Streamlining the State Emissions Inventory Data Management and Development Processes: Texas Air Emissions Repository (TexAER), Eastern Research Group, Inc., Texas Co mmission on Environmental Quality.
[6] Id.
[7] Texas Commission on Environmental Quality, Testimony before the joint hearing of the Senate Committee on Business and Commerce and the Senate Committee on Natural Resources, April 15, 2008.
[8] Texas Environmental Research Consortium, Annual Report 2008
[9] Texas Commission on Environmental Quality, Texas Emissions Reduction Plan, Air Quality Division, Testimony before the Senate Committee on Natural Resources, September 30, 2008.
[10] Mike Nasi, Clean Coal Technology Foundation of Texas, "Texas Incentives for 'Advanced Clean Energy Projects' and the Use and Storage of Carbon Dioxide," Testimony before the Senate Committee on Natural Resources, September 30, 2008.
[11] Keith Sheedy, technical advisor, Chief Engineer's Office, TCEQ, Testimony before the Senate Committee on Natural Resources, July 8, 2008.
[12] Id.
[13] Id.
[14] EPA's New Program to Control Pollution from Locomotives and Marine Diesels, Don Kopinski, Office of Transportation and Air Quality, March 19, 2008.
[15] Commissioner Elizabeth Jones, Railroad Commission of Texas (RRC), Testimony before the Senate Committee on Natural Resources and the Senate Committee on Business and Commerce, April 15, 2008.
[16] Id.
[17] Governor's Competitiveness Council, Recommendation 36, 2008 Texas State Energy Plan
[18] The Energy Report 2008, Texas Comptroller of Public Accounts Susan Combs, May, 2008.
[19] Commissioner Larry R. Soward, TCEQ Commissioner, Testimony before the Senate Committee on Natural Resources, July 8, 2008.
[20] Id.
[21] Id.
[22] Emissions of Greenhouse Gases Report, Energy Information Administration; Official Energy Statistics from the United States Government
[23] Report of the Governor's Competitiveness Council, June 2008.
[24] Governor's Competitiveness Council, 2008 Texas State Energy Plan, "Implementing the Energy Plan," June, 2008.
[25] Id.
[26] BusinessDictionary.com
[27] Keith Sheedy, Technical Advisor, Chief Engineer's Office, Texas Commission on Environmental Quality, Testimony before the Senate Committee on Natural Resources, July 8, 2008.
[28] Id.
[29] Use of Monitoring and Emissions Inventory Data, David Schanbacher and Susana Hildebrand, Texas Commission on Environmental Quality, presentation to the Senate Committee on Natural Resources, April 4, 2008.
[30] Dr. Gregory P. Kunkel, Tenaska, Inc., Testimony before the Senate Committee on Natural Resources, July 8, 2008.
[31] The Greater Houston Partnership, Testimony before the Senate Committee on Natural Resources, September 30, 2008.
[32] Id.
[33] Catch - 22: Water vs. Energy, Michael Webber, Ph.D., Technology & Policy Center for Lifelong Engineering Education, Scientific American; Earth 3.0.

[34] Water Demand Projections for Power Generation in Texas, Bureau of Economic Geology, The University of Texas at Austin, August 31, 2008.
[35] The Nexus of Energy and Water, Michael Webber, Ph.D., Testimony before the joint hearing of the Senate Committee on Business and Commerce and the Senate Committee on Natural Resources, April 15, 2008.
[36] United States Environmental Protection Agency, Clean Air Interstate Rule, http://www.epa.gov/interstateairquality/, accessed January 7, 2009.
[37] United States Environmental Protection Agency, Clean Air Mercury Rule, http://www.epa.gov/oar/mercuryrule/basic.htm, accessed January 7, 2009.
[38] Id.
[39] Id.
[40] United States Environmental Protection Agency, Clean Air Interstate Rule, http://www.epa.gov/interstateairquality/, accessed January 7, 2009.
[41] "Court reinstates clean air rule during EPA fix," Jesse J. Holland, *Associated Press*, December 23, 2008.
[42] Id.

Appendix A

30 TAC §101.10. Emissions Inventory Requirements

(a) **Applicability.** The owner or operator of an account or source in the State of Texas or on waters that extend 25 miles from the shoreline meeting one or more of the following conditions shall submit emissions inventories and/or related data as required in subsection (b) of this section to the commission on forms or other media approved by the commission:

(1) an account which meets the definition of a major facility/stationary source, as defined in §116.12 of this title (relating to Nonattainment Review Definitions), or any account in an ozone nonattainment area emitting a minimum of ten tons per year (tpy) volatile organic compounds (VOC), 25 tpy nitrogen oxides (NO_x), or 100 tpy or more of any other contaminant subject to national ambient air quality standards (NAAQS);

(2) any account that emits or has the potential to emit 100 tpy or more of any contaminant;

(3) any account which emits or has the potential to emit 10 tons of any single or 25 tons of aggregate hazardous air pollutants as defined in FCAA, §112(a)(1); and

(4) any minor industrial source, area source, non-road mobile source, or mobile source of emissions subject to special inventories under subsection (b)(3) of this section. For purposes of this section, the term "area source" means a group of similar activities that, taken collectively, produce a significant amount of air pollution.

(b) **Types of inventories.**

(1) Initial emissions inventory. Accounts, as identified in subsection (a)(1), (2), or (3) of this section, shall submit an initial emissions inventory (IEI) for any criteria pollutant or hazardous air pollutant (HAP) that has not been identified in a previous inventory. The IEI shall consist of actual emissions of VOC, NO_x, carbon monoxide (CO), sulfur dioxide (SO_2), lead (Pb), particulate matter of less than 10 microns in diameter (PM_{10}), any other contaminant subject to NAAQS, emissions of all HAPs identified in FCAA §112(b), or any other contaminant requested by the commission from individual emission units within an account. For purposes of this section, the term "actual emission" is the actual rate of emissions of a pollutant from an emissions unit as it enters the atmosphere. The reporting year will be the calendar year or seasonal period as designated by the commission.

Reported emission activities must include annual routine emissions; excess emissions occurring during maintenance activities, including startups and shutdowns; and emissions resulting from upset conditions. For the ozone nonattainment areas, the inventory shall also include

typical weekday emissions that occur during the summer months. For CO nonattainment areas, the inventory shall also include typical weekday emissions that occur during the winter months. Emission calculations must follow methodologies as identified in subsection (c) of this section.

(2) Statewide annual emissions inventory update (AEIU). Accounts meeting the applicability requirements during an inventory reporting period as identified in subsection (a)(1), (2), or (3) of this section shall submit an AEIU which consists of actual emissions as identified in subsection (b)(1) of this section if any of the following criteria are met. If none of the following criteria are met, a letter certifying such shall be submitted instead:

(A) any change in operating conditions, including start-ups, permanent shut-downs of individual units, or process changes at the account, that results in at least a 5.0% or 5 tpy, whichever is greater, increase or reduction in total annual emissions of VOC, NO_x, CO, SO_2, Pb, or PM_{10} from the most recently submitted emissions data of the account; or

(B) a cessation of all production processes and termination of operations at the account.

(3) Special inventories. Upon request by the executive director or a designated representative of the commission, any person owning or operating a source of air emissions which is or could be affected by any rule or regulation of the commission shall file emissions-related data with the commission as necessary to develop an inventory of emissions. Owners or operators submitting the requested data may make special procedural arrangements with the Industrial Emissions Assessment Section to submit data separate from routine emission inventory submissions or other arrangements as necessary to support claims of confidentiality.

(c) **Calculations.** Actual measurement with continuous emissions monitoring systems (CEMS) is the preferred method of calculating emissions from a source. If CEMS data is not available, other means for determining actual emissions may be utilized in accordance with detailed instructions of the commission. Sample calculations representative of the processes in the account must be submitted with the inventory.

(d) **Certifying statement.** A certifying statement, required by the FCAA, §182(a)(3)(B), is to be signed by the owner(s) or operator(s) and shall accompany each emissions inventory to attest that the information contained in the inventory is true and accurate to the best knowledge of the certifying official.

(e) **Reporting requirements.** The IEI or subsequent AEIUs shall contain emissions data from the previous calendar year and shall be due on March 31 of each year or as

directed by the commission. Owners or operators submitting emissions data may make special procedural arrangements with the Industrial Emissions Assessment Section to submit data separate from routine emission inventory submissions or other arrangements as necessary to support claims of confidentiality. Emissions-related data submitted under a special inventory request made under subsection (b)(3) of this section are due as detailed in the letter of request.

(f) **Enforcement.** Failure to submit emissions inventory data as required in this section shall result in formal enforcement action under the TCAA, §382.082 and §382.088. In addition, the TCAA, §361.2225, provides for criminal penalties for failure to comply with this section.

December 23, 1999

Eight-Hour Ozone Nonattainment Areas

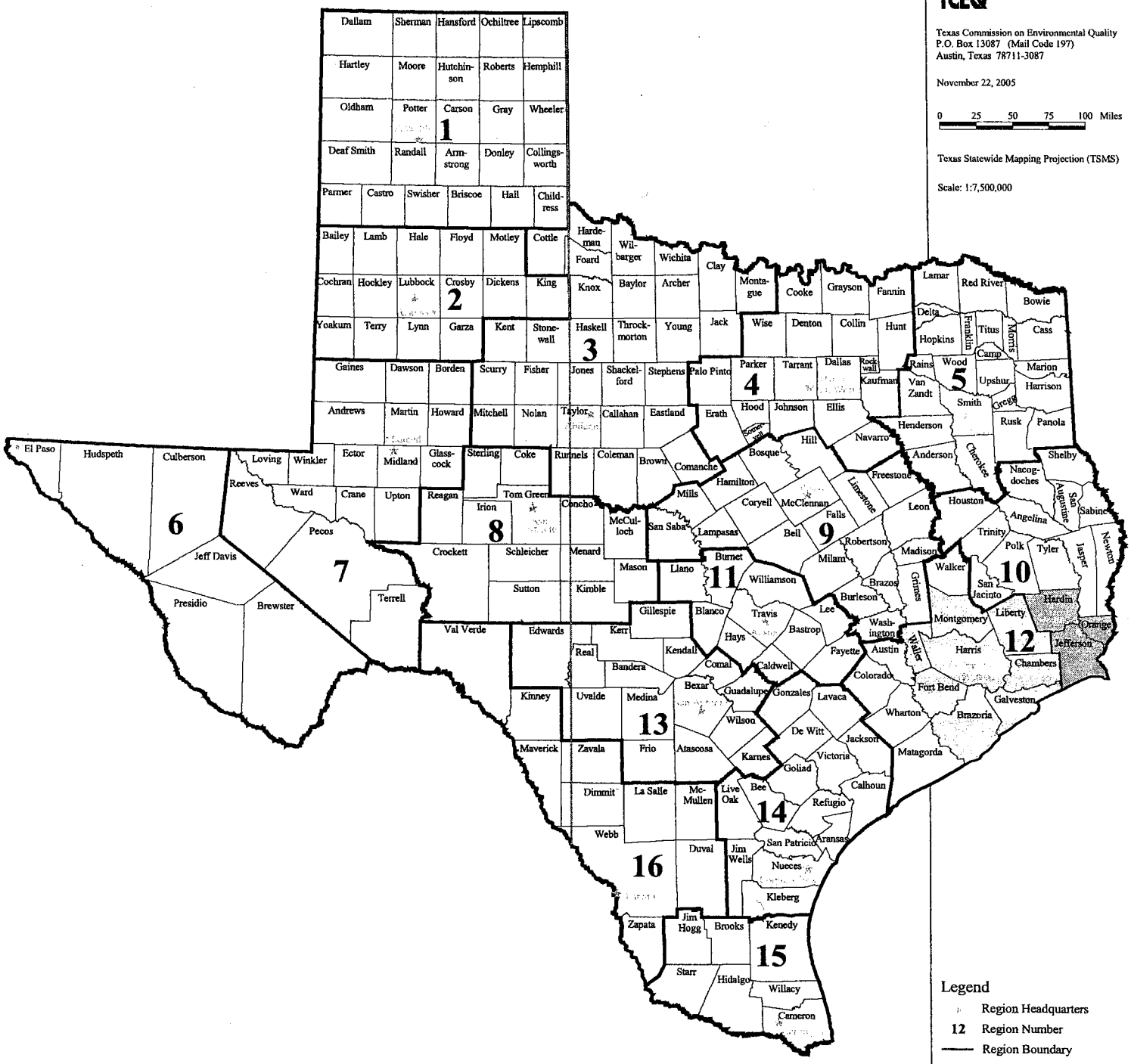


Table 1-2. Eight-hour ozone nonattainment areas

Summary of Reporting Requirements (tpy) for 30 TAC Section 101.10										
County	VOC		NO_x		Other		Individual HAP		Aggregated HAP	
	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential
Brazoria, Chambers, Fort Bend Galveston, Harris, Liberty, Montgomery, Waller MODERATE / OZONE	10	100	25	100	100	100	10	10	25	25
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant MODERATE / OZONE	10	100	25	100	100	100	10	10	25	25
Hardin, Jefferson, Orange MARGINAL / OZONE	10	100	25	100	100	100	10	10	25	25
All Other Counties	100	100	100	100	100	100	10	10	25	25

Note: If an account's emissions meet or exceed the tons per year (tpy) thresholds listed in this table, an emissions inventory questionnaire must be submitted to the TCEQ. This table is provided as a guidance and is not the actual rule. If a discrepancy exists between the table and rule 30 TAC Section 101.10 and 30 TAC Section 116.12 (Major Source Definition), then the rule will take precedence.

Protecting Texas by Reducing and Preventing Pollution

TCEQ

Texas Commission on Environmental Quality
P.O. Box 13087 (Mail Code 197)
Austin, Texas 78711-3087

November 22, 2005

0 25 50 75 100 Miles

Texas Statewide Mapping Projection (TSMS)

Scale: 1:7,500,000

Legend

- Region Headquarters
- 12 Region Number
- Region Boundary
- County Boundary
- Central Meridian

Source: The county boundaries and region headquarters are U S Census Bureau 1992 Tiger/Line data (1:100,000). The near non-attainment data is from the TCEQ Office of Policy and Regulator Development.

M McDonough CRF 051117148

Special Inventory Areas

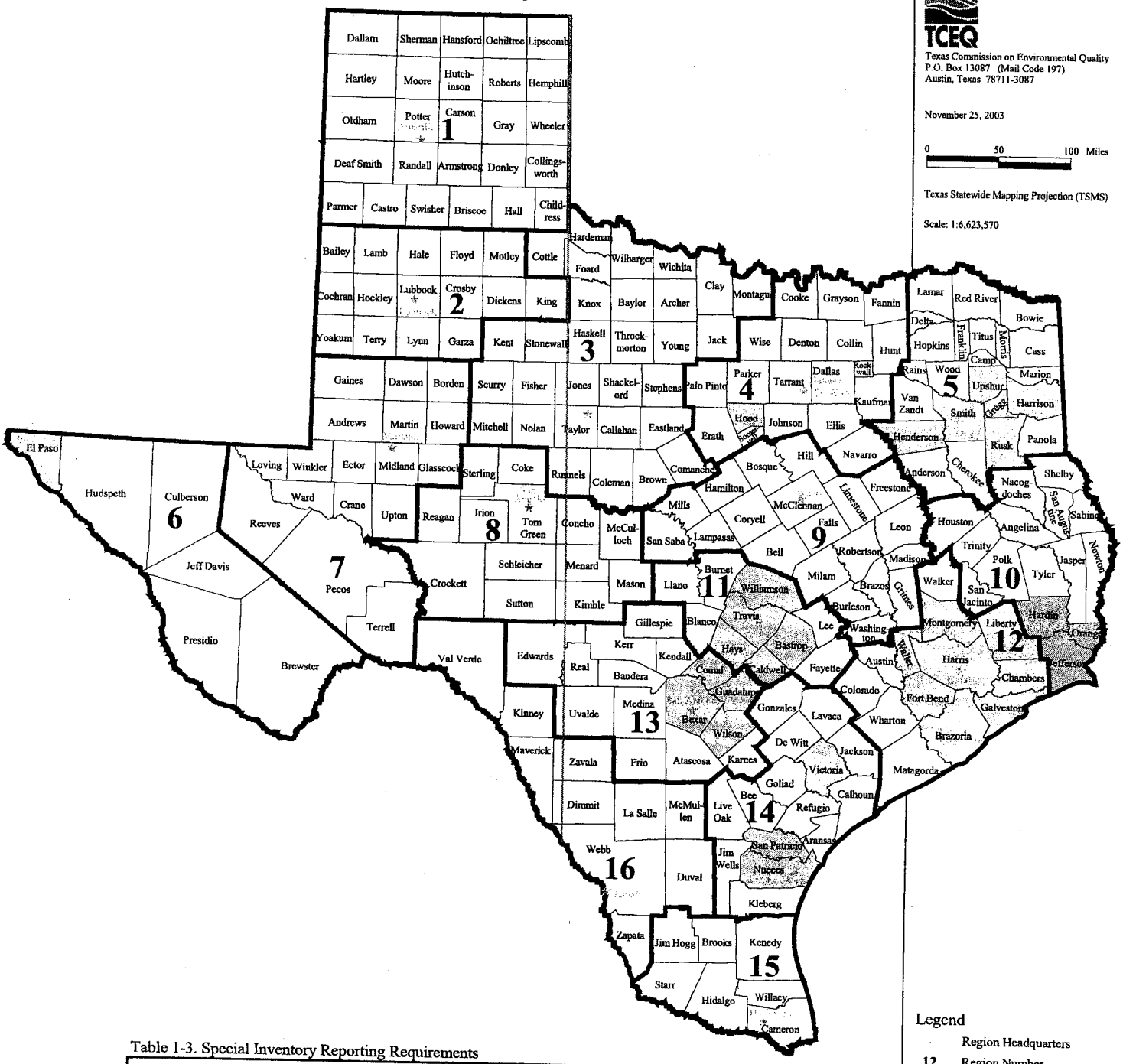


Table 1-3. Special Inventory Reporting Requirements

Summary of Reporting Requirements (tpy) for 30 TAC Section 101.10

County	VOC		NO_x		Other		Individual HAP		Aggregated HAP	
	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential
Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller SPECIAL INVENTORY REPORTING THRESHOLDS	10	25	25	25	100	100	10	10	25	25
El Paso SPECIAL INVENTORY REPORTING THRESHOLDS	10	50	25	100	100	100	10	10	25	25
Collin, Dallas, Denton, Tarrant SPECIAL INVENTORY REPORTING THRESHOLDS	10	50	25	50	100	100	10	10	25	25
Hardin, Jefferson, Orange SPECIAL INVENTORY REPORTING THRESHOLDS	10	50	25	50	100	100	10	10	25	25
Near Nonattainment and Affected Counties (See Listing Below) SPECIAL INVENTORY REPORTING THRESHOLDS	10	100	25	100	100	100	10	10	25	25

Note: This table is provided as a guidance and is not the actual rule. If a discrepancy exists between the table and rule 30 TAC Section 101.10 and 30 TAC Section 116.12 (Major Source Definition), then the rule will take precedence.

Near Nonattainment and Affected Counties: Bastrop, Bexar, Caldwell, Comal, Gregg, Guadalupe, Harrison, Hays, Henderson, Hood, Nueces, Rusk, San Patricio, Smith, Travis, Upshur, Victoria, Williamson, Wilson

Protecting Texas by Reducing and Preventing Pollution

TCEQ

Texas Commission on Environmental Quality
P.O. Box 13087 (Mail Code 197)
Austin, Texas 78711-3087

November 25, 2003

0 50 100 Miles

Texas Statewide Mapping Projection (TSMS)

Scale: 1:6,623,570

Legend

- Region Headquarters
- 12 Region Number
- County Boundary
- Central Meridian

Source: The county and region boundaries are U S Census Bureau 1992 Tiger/Line data (1:100,000). The Region Headquarters are U.S. Census Bureau 1998 data (1:100,000). The nonattainment and near nonattainment data is from the TCEQ Office of Policy and Regulatory Development.

N

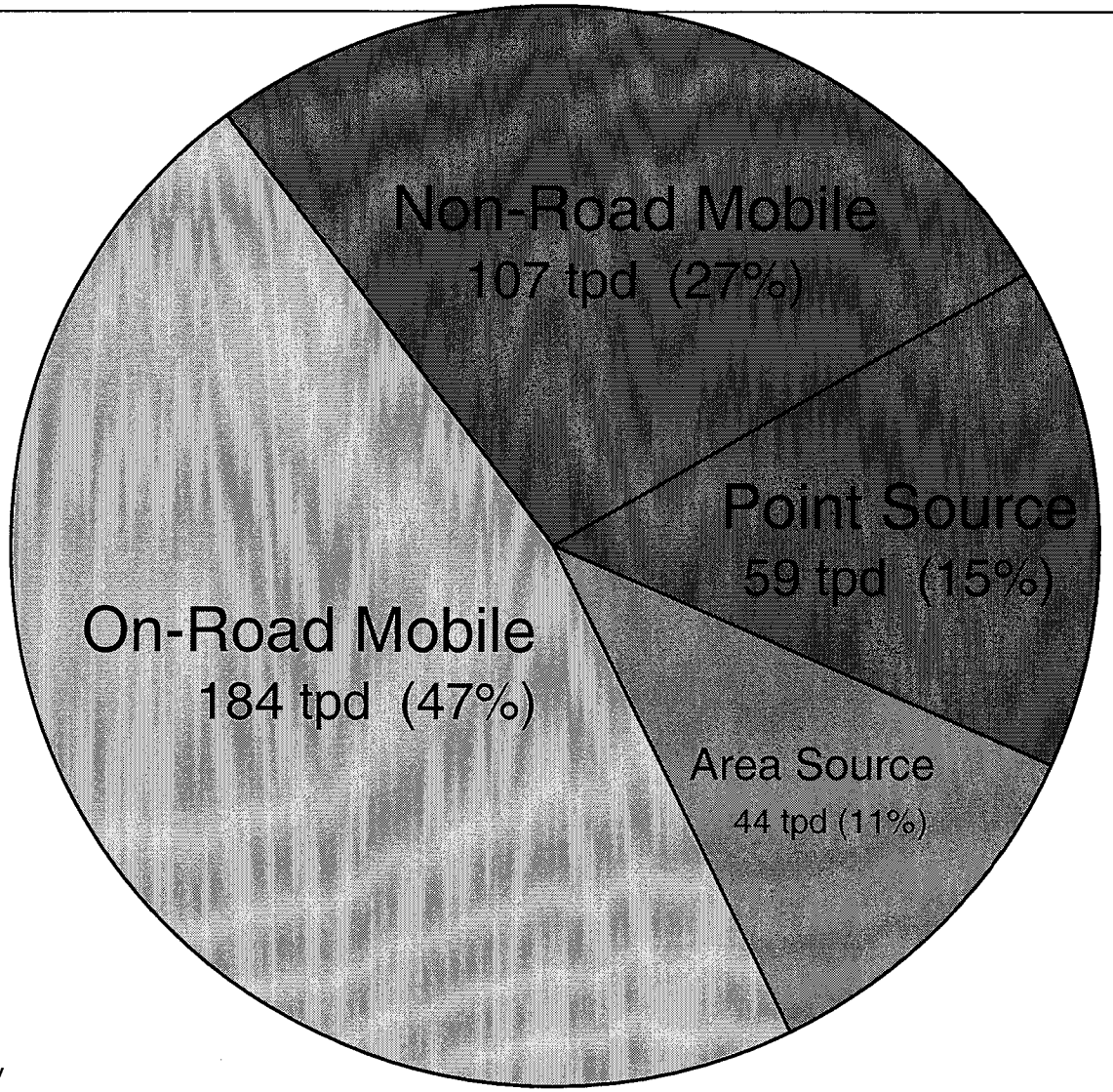
This map was generated by the Information Resources Division of the Texas Commission on Environmental Quality. No claims are made to the accuracy or completeness of the data or to its suitability for a particular use. For information concerning the map, contact the Information Resources Division at (512) 239-0800.

Michael McDonough - CRF 051117147

Appendix B

2009 Future Base Modeling Inventory

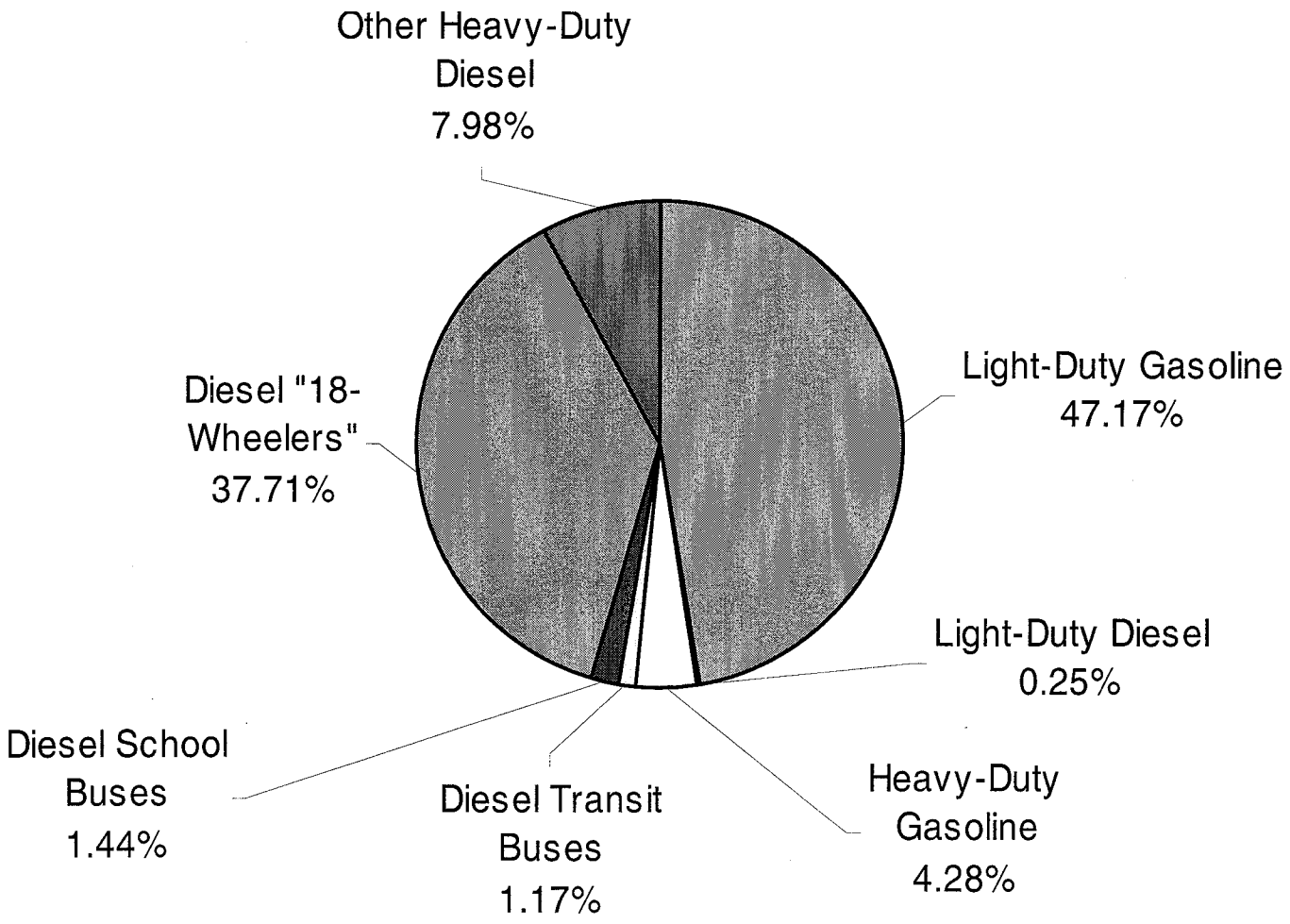
9-County Dallas/Fort Worth NO_X



Source: a2 Modeling Inventory
TCEQ Contact: Pete Breitenbach
Updated: 11/24/2008

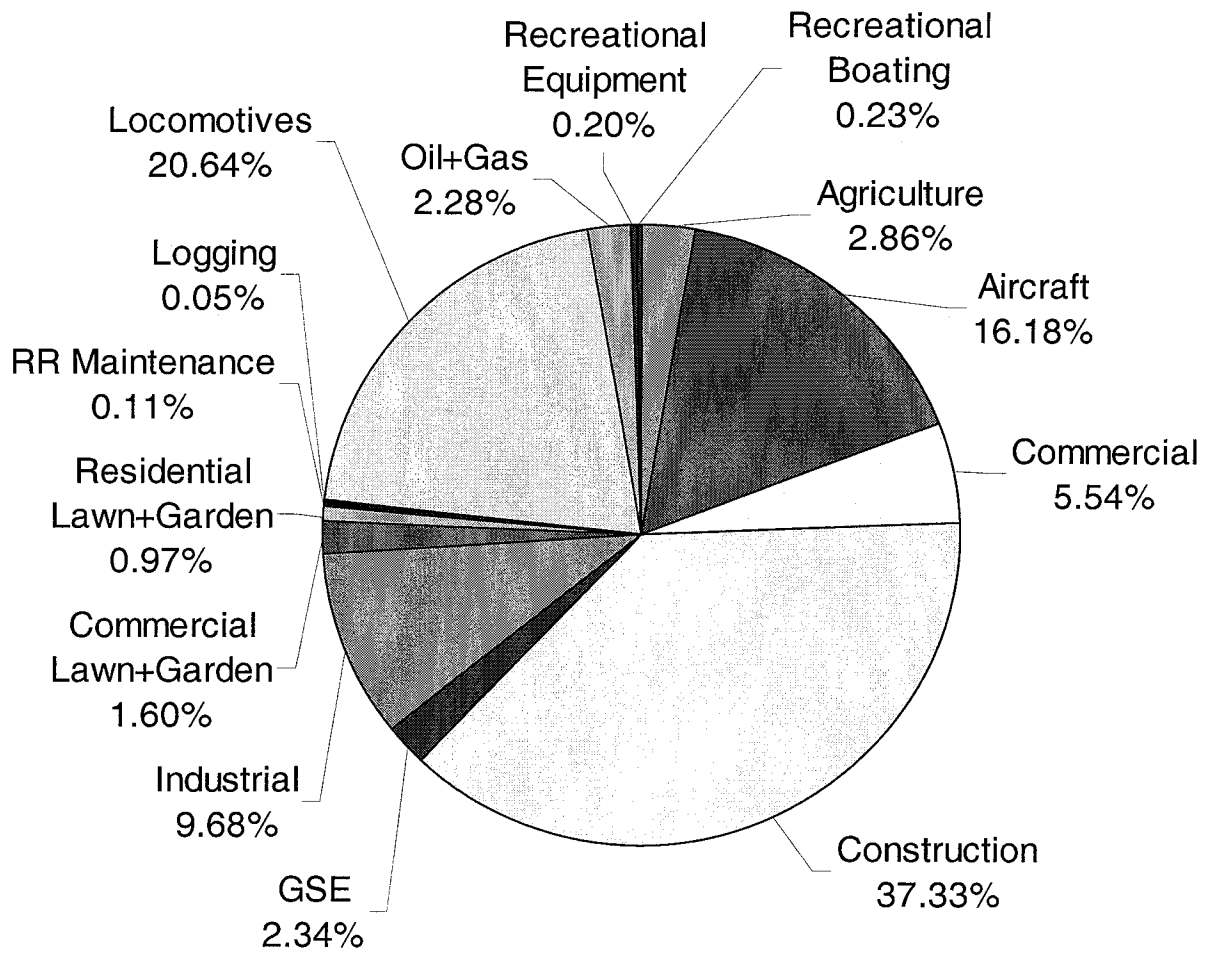
2009 Future Base Modeling Inventory

On-Road



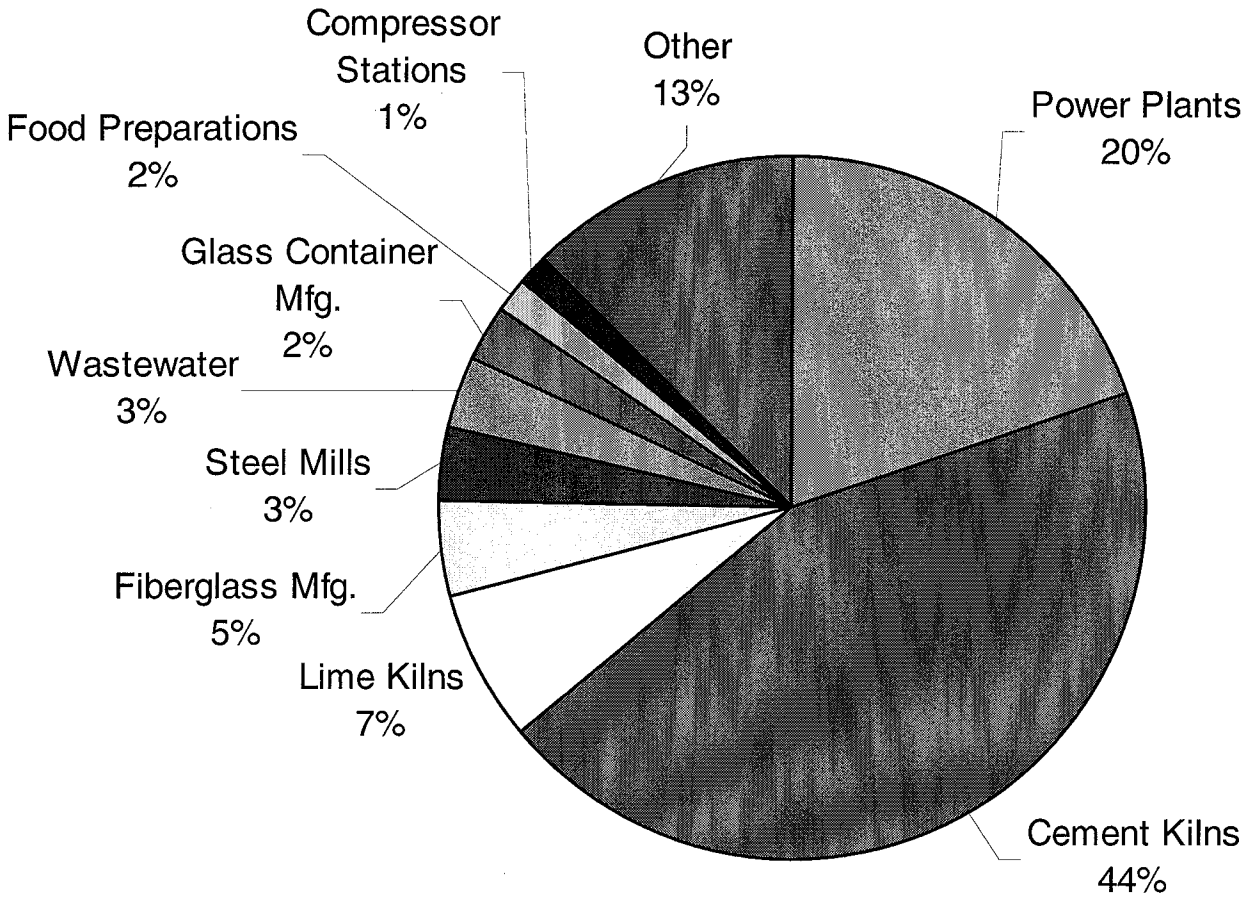
Source: TCEQ Modeling Inventory
TCEQ Contact: Chris Kite
Updated: 11/24/2008

DFW 8-Hour Ozone Area NO_x
Non-Road Emissions



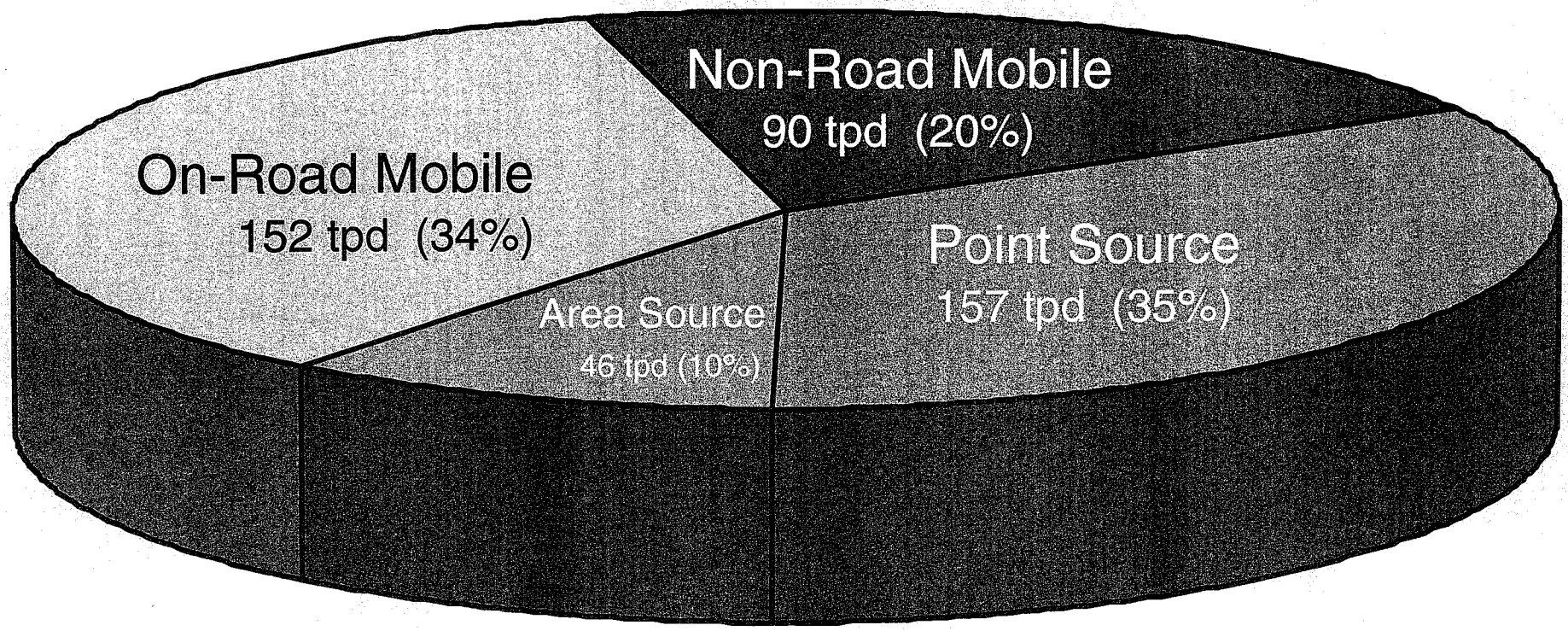
2009 Future Base Modeling Inventory

Point Source



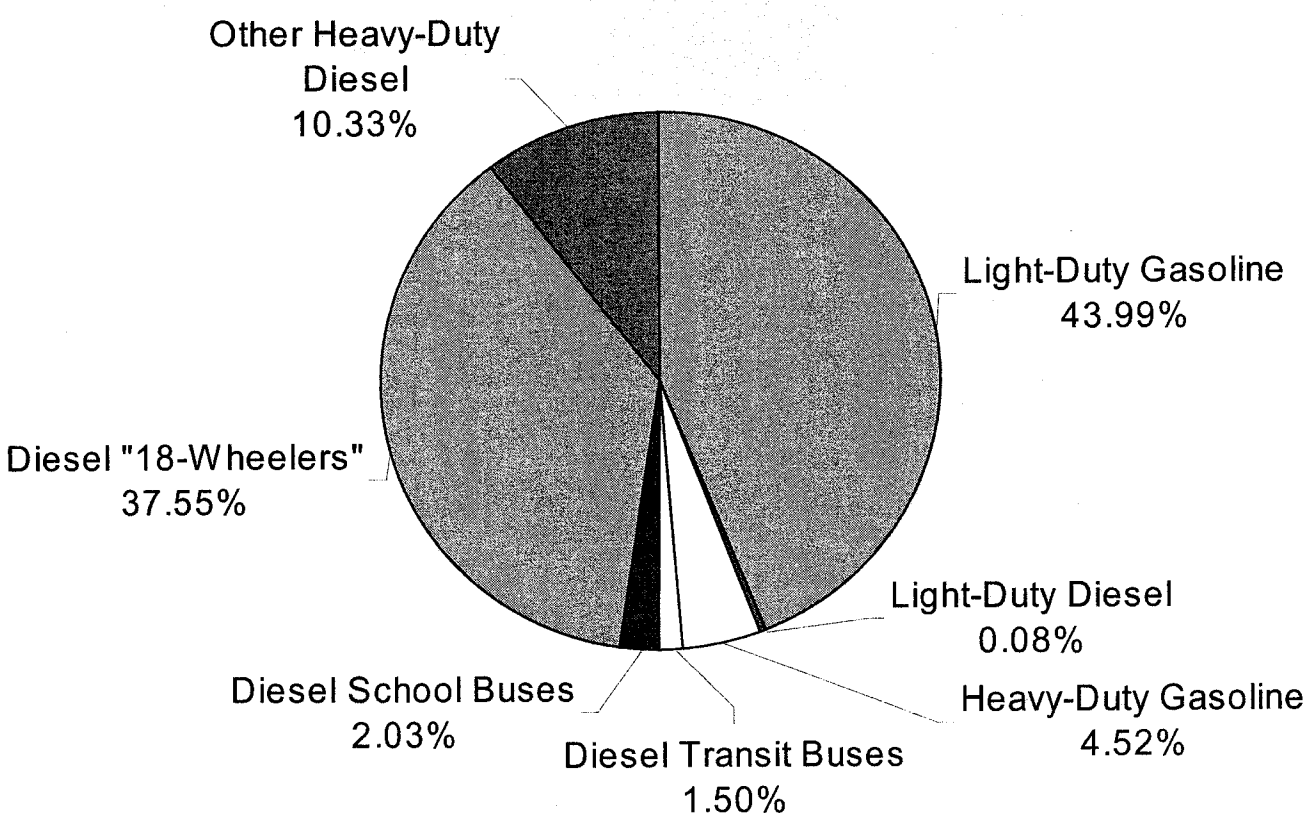
Source: TCEQ Modeling Inventory
TCEQ Contact: Ron Thomas
Updated: 11/24/2008

HGB 8-Hour Ozone Area NO_x (2009 future base modeling inventory)

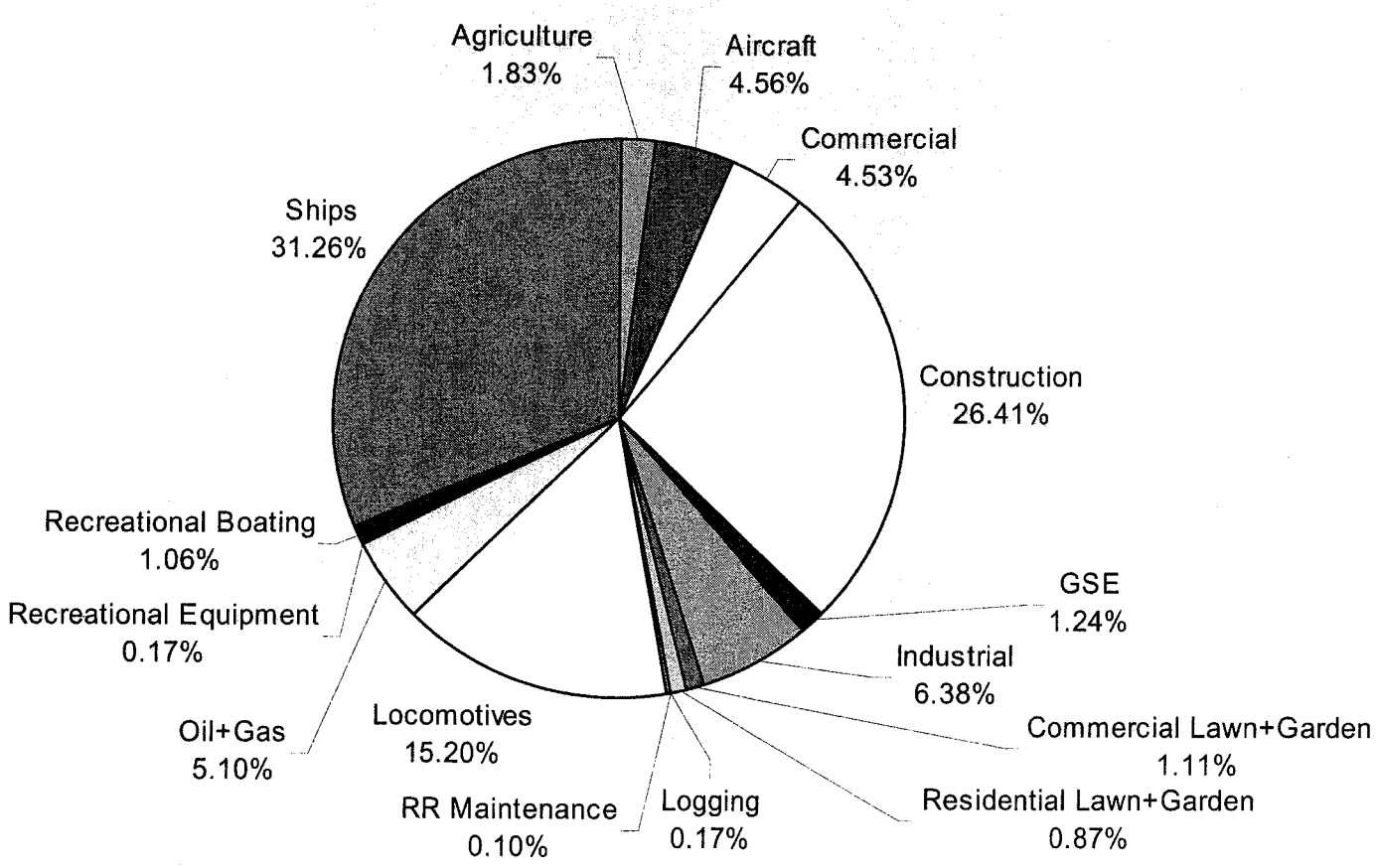


Source: TCEQ Emissions Inventory
TCEQ Contact: Dick Karp

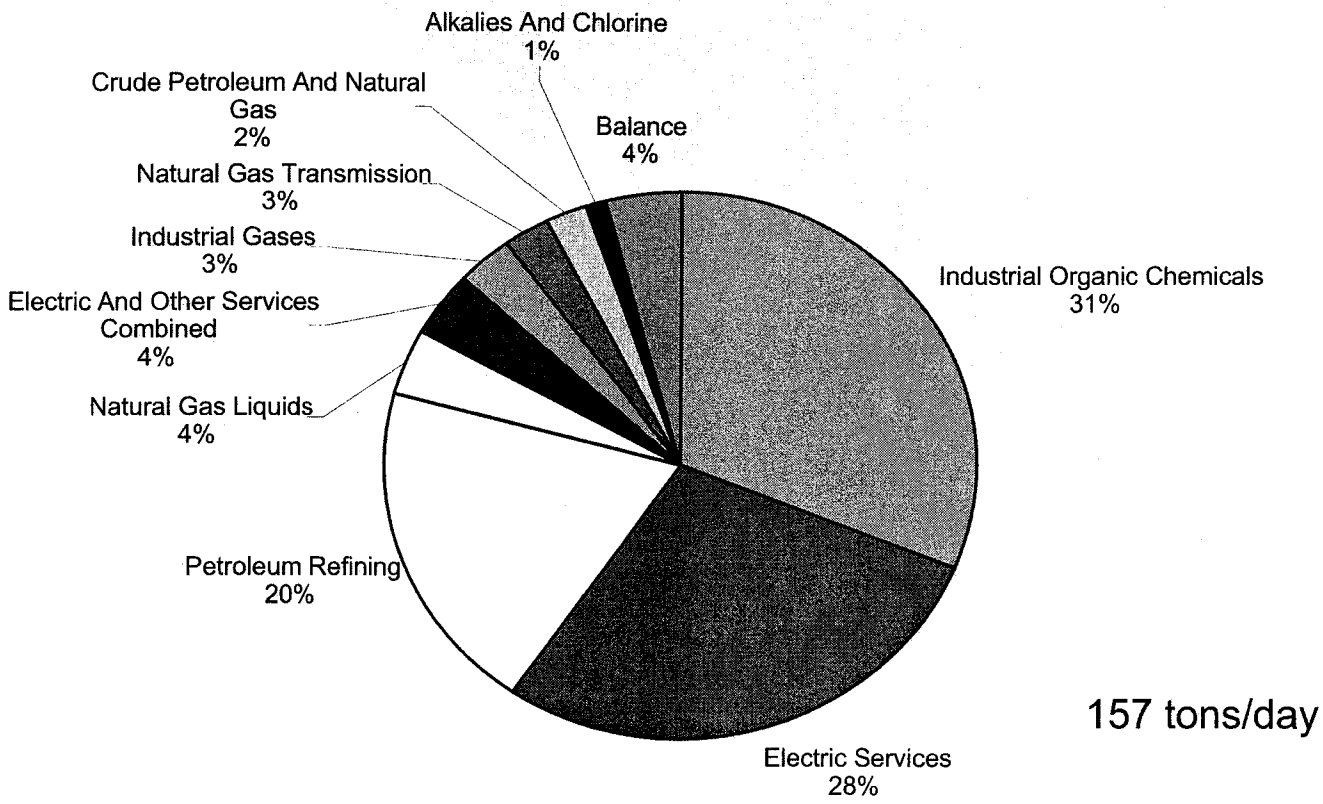
HGB 8-Hour Ozone Area NO_X
On-Road Emissions



HGB 8-Hour Ozone Area NO_X
Non-Road Emissions



HGB 8-Hour Ozone Area NO_X
Point Source Emissions



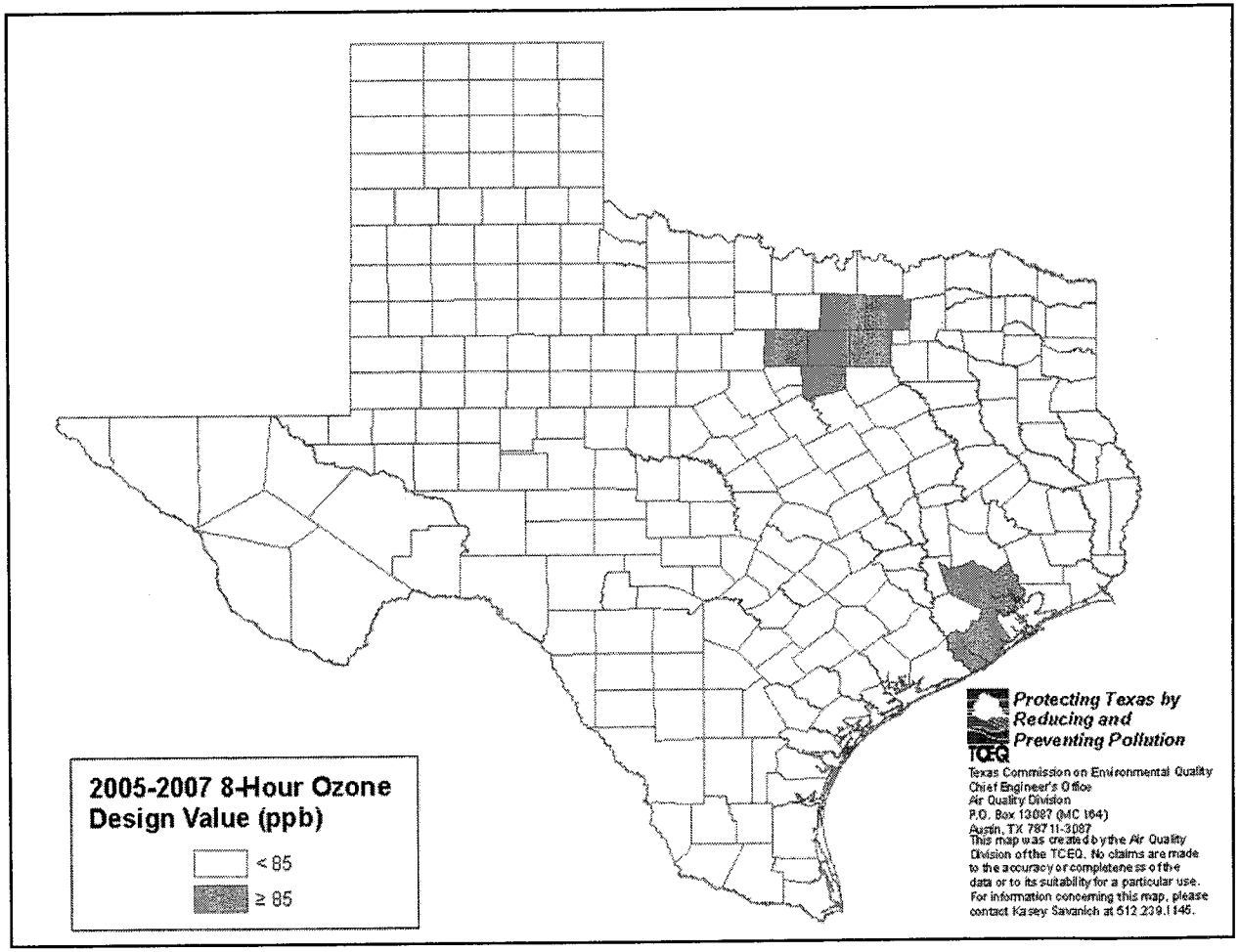
157 tons/day

Source: TCEQ Emissions Inventory
Contact: Marvin Jones

Appendix C

Counties Monitoring Over the Existing Ozone Standard of 0.08 ppm

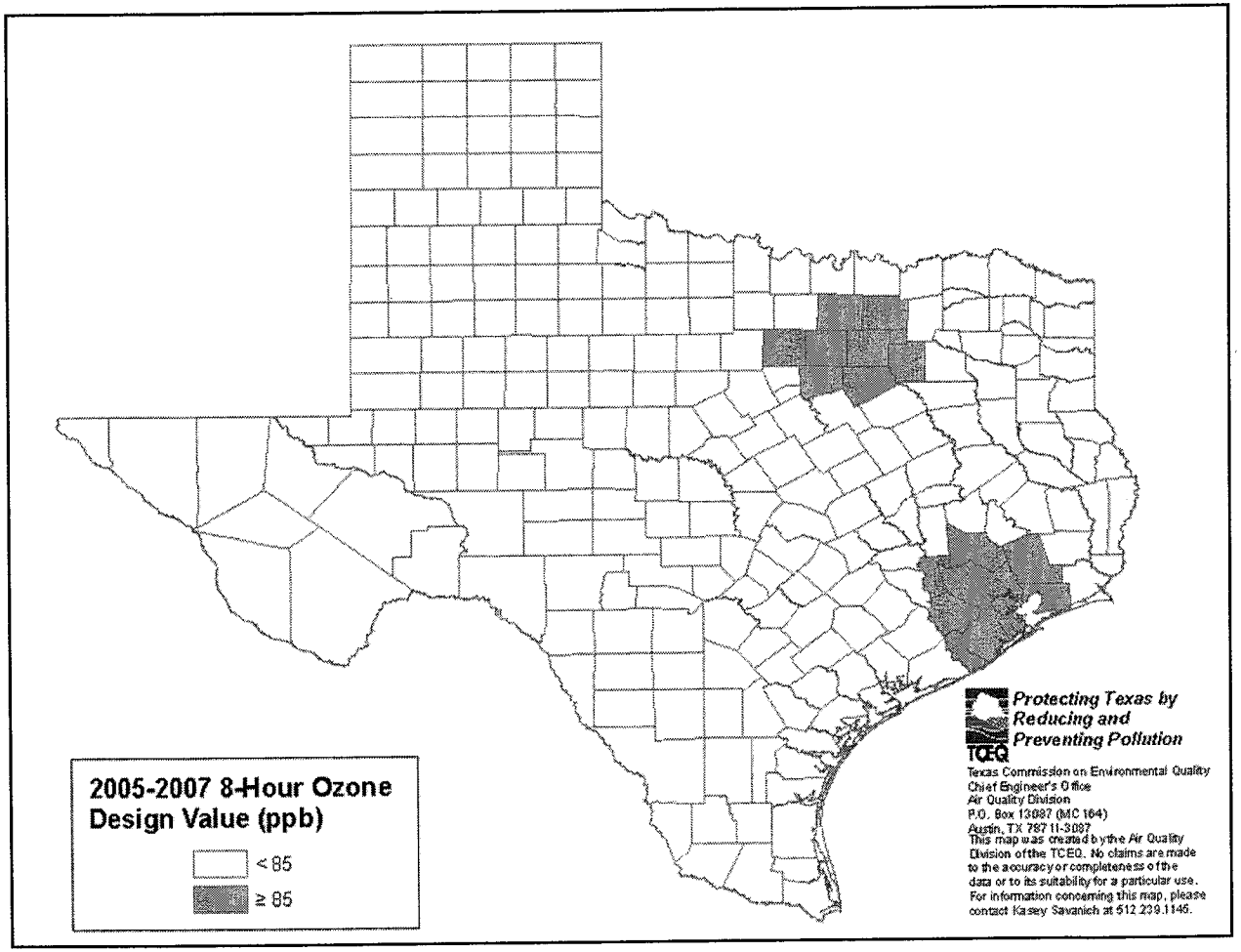
Region	County	2007 8-Hr Ozone DV (ppb)*
HGB	HARRIS	96
HGB	BRAZORIA	91
DFW	TARRANT	95
DFW	DENTON	94
DFW	PARKER	91
DFW	COLLIN	88
DFW	DALLAS	86
DFW	JOHNSON	85



*2007 design values based on average of 2005 to 2007 data. To exceed the old ozone standard the design value must be greater than or equal to 85 ppb.

Areas Monitoring Over the Existing Ozone Standard of 0.08 ppm

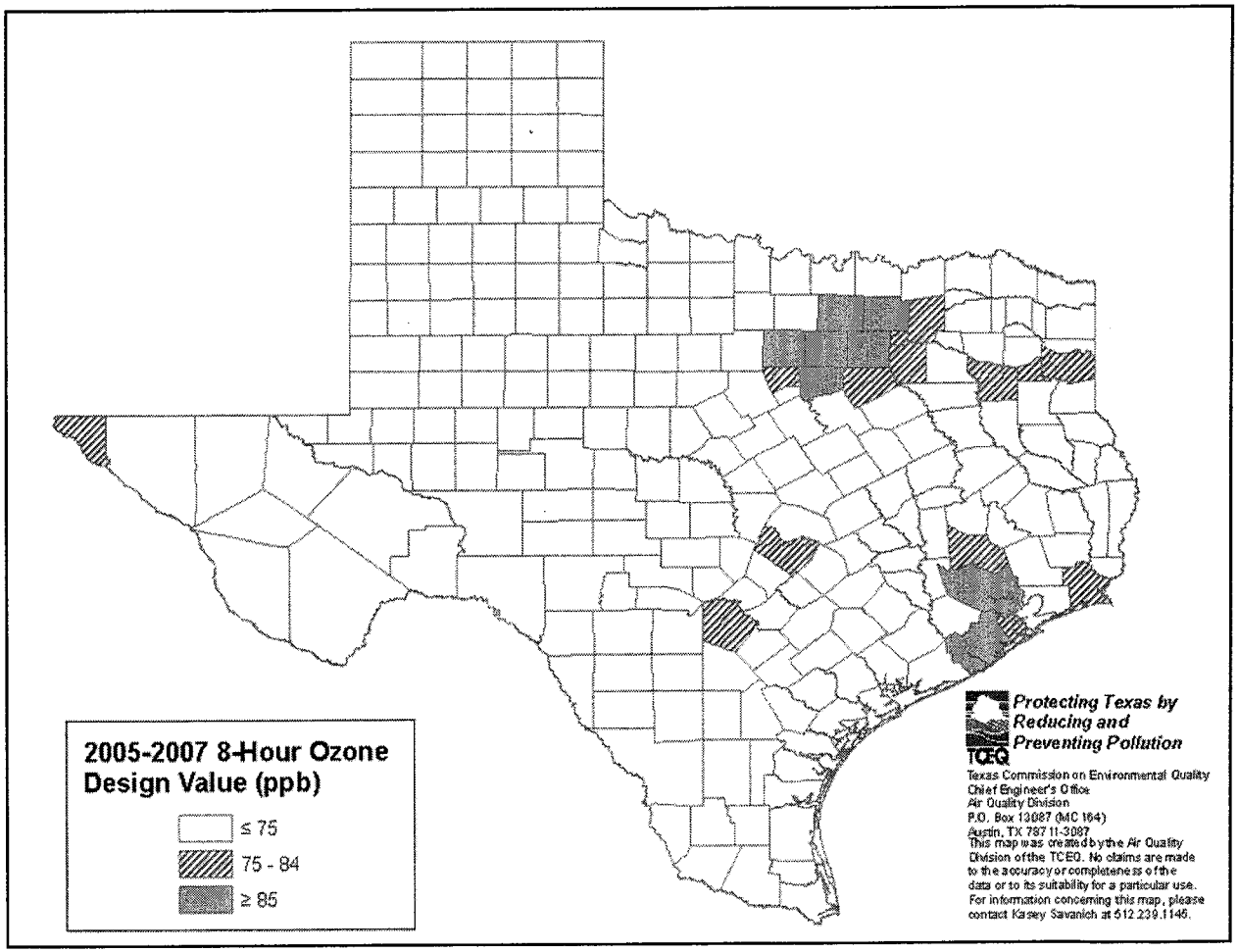
Region	2007 8-Hr Ozone DV (ppb)*
HGB	96
DFW	95



*2007 design values based on average of 2005 to 2007 data. To exceed the old ozone standard the design value must be greater than or equal to 85 ppb.

Counties Monitoring Over Revised Ozone Standard of 0.075 ppm

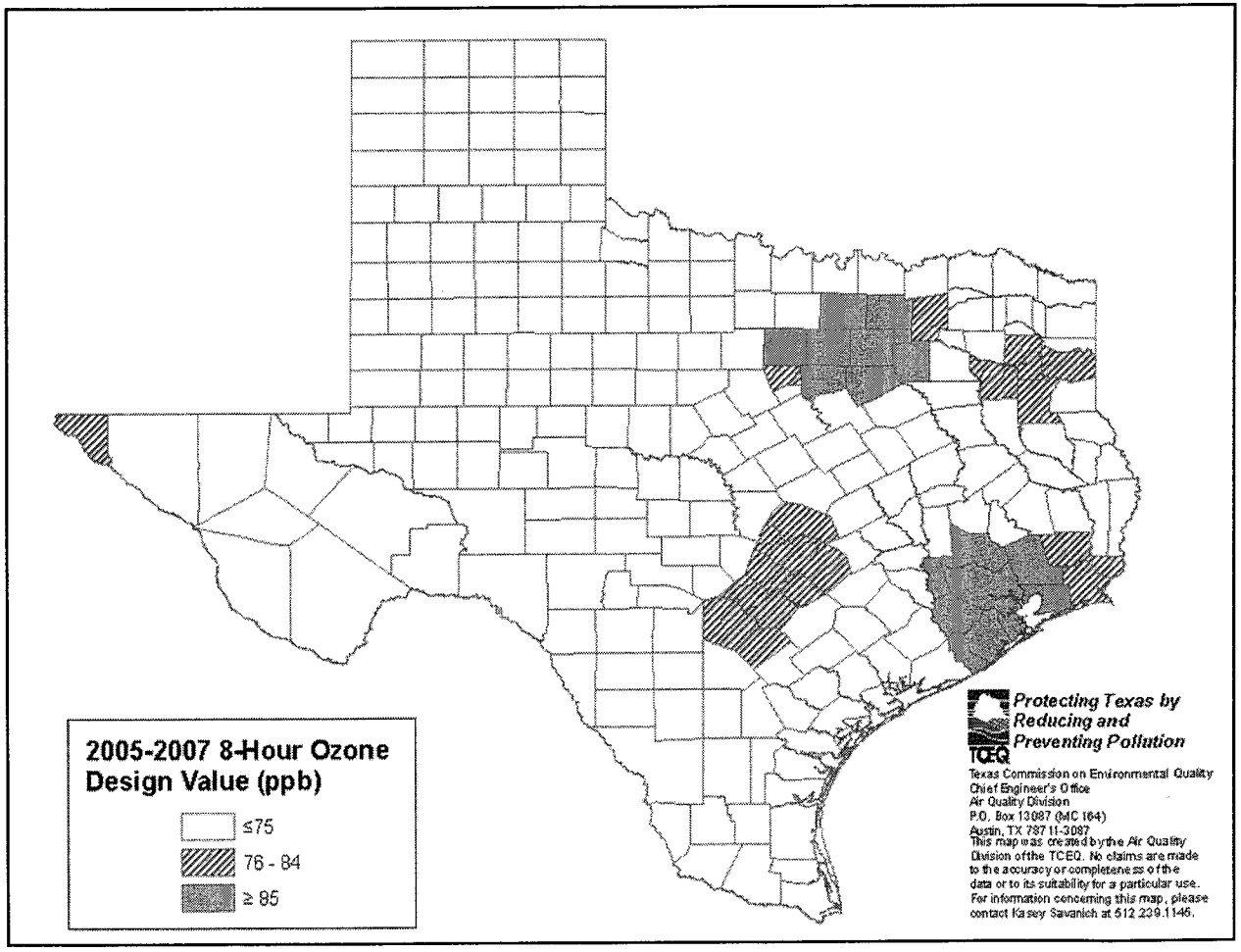
Region	County	2007 8-Hr Ozone DV (ppb)*
HGB	HARRIS	96
HGB	BRAZORIA	91
HGB	GALVESTON	84
HGB	MONTGOMERY	84
DFW	TARRANT	94
DFW	DENTON	94
DFW	PARKER	91
DFW	COLLIN	88
DFW	DALLAS	86
DFW	JOHNSON	85
DFW	HOOD	84
DFW	ROCKWALL	78
DFW	ELLIS	78
DFW	HUNT	76
DFW	KAUFMAN	76
TLM	GREGG	84
TLM	SMITH	80
TLM	HARRISON	77
BPA	JEFFERSON	83
SAN	BEXAR	82
AUS	TRAVIS	80
ELP	EL PASO	79



*2007 design values based on average of 2005 to 2007 data. To exceed the revised standard the design value must be greater than or equal to 76 ppb.

Areas Monitoring Over Revised Ozone Standard of 0.075 ppm

Region	2007 8-Hr Ozone DV (ppb)*
HGB	96
DFW	94
DFW (Hood County)	84
DFW (Hunt County)	76
TLM	84
BPA	83
SAN	82
AUS	80
ELP	79



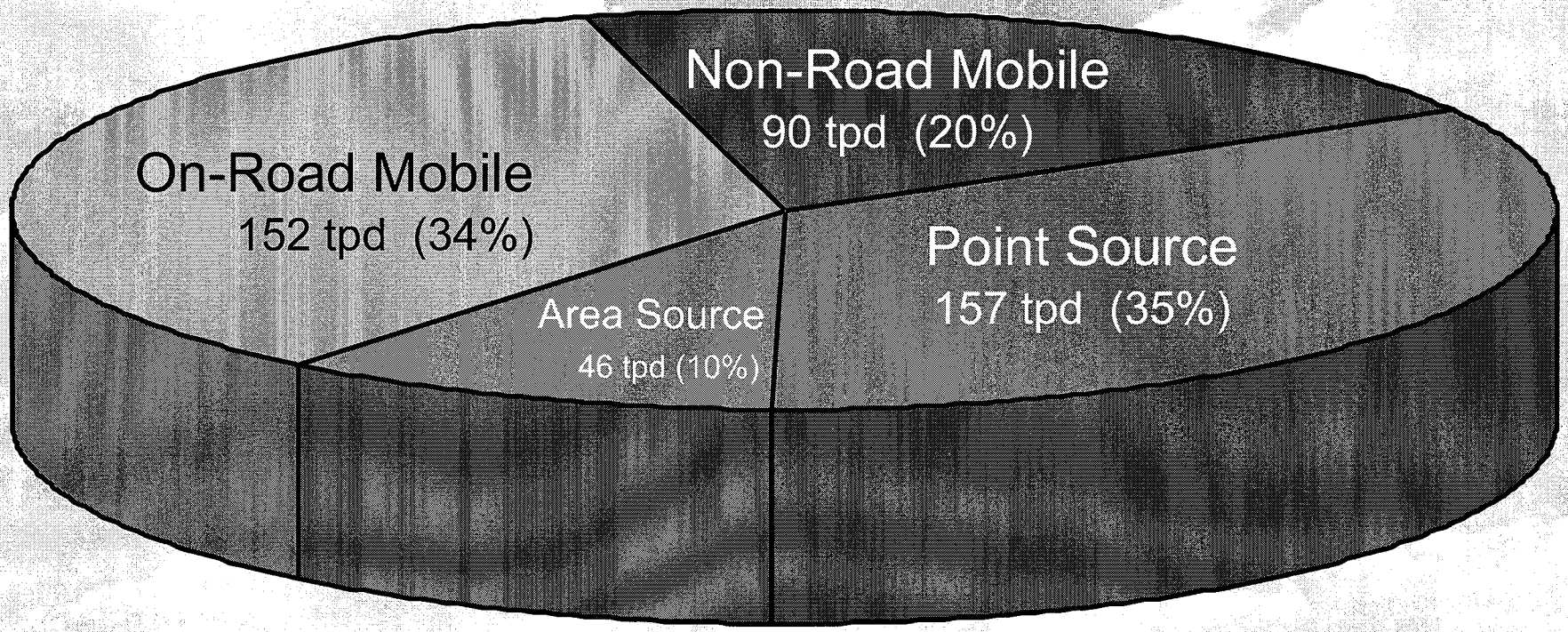
*2007 design values based on average of 2005 to 2007 data. To exceed the revised standard the design value must be greater than or equal to 76 ppb.

Conclusion – Areas Over the Standard

- At 0.08 ppm (Current Standard):
  - 2 areas have design values over the old standard.
    - HGB – Houston/Galveston/Brazoria
    - DFW – Dallas/Fort Worth
- At 0.075 ppm:
  - 5 additional areas have design values over the proposed standard.
    - TLM – Tyler/Longview/Marshall
    - BPA – Beaumont/Port Arthur
    - SAN – San Antonio
    - AUS - Austin
    - ELP – El Paso
- A total of 7 areas will monitor over a standard of 0.075 ppm

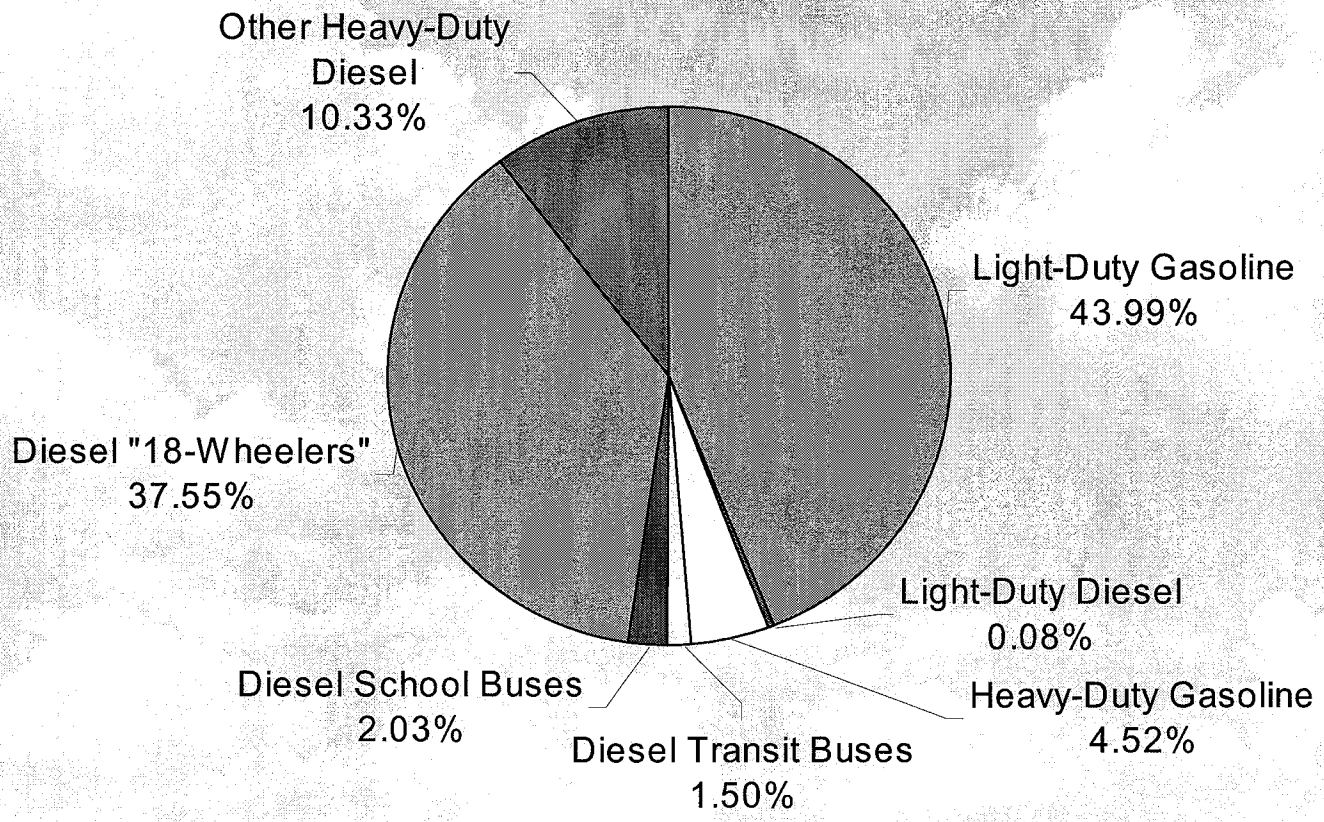
Appendix D

HGB 8-Hour Ozone Area NO_X (2009 future base modeling inventory)

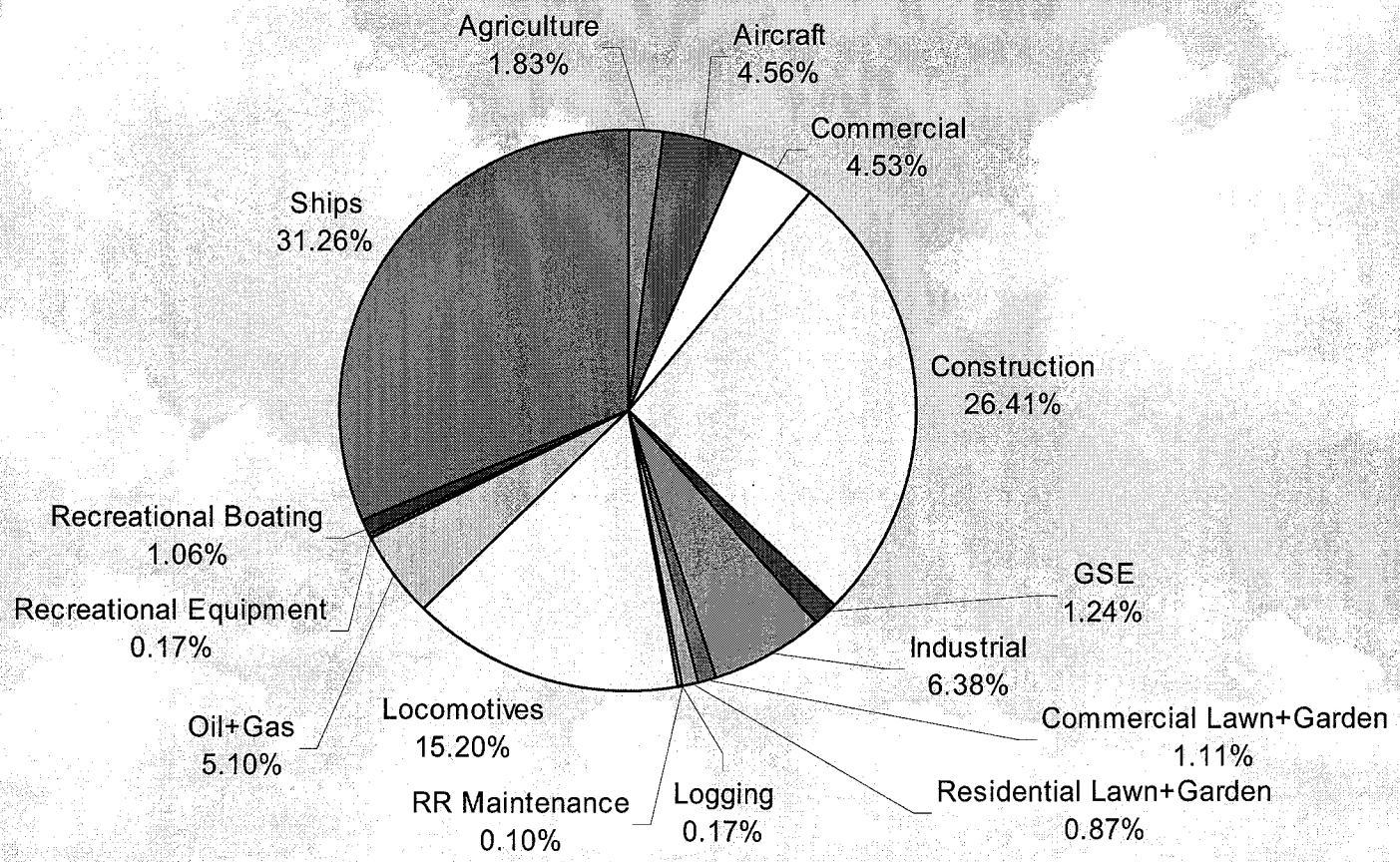


Source: TCEQ Emissions Inventory
TCEQ Contact: Dick Karp

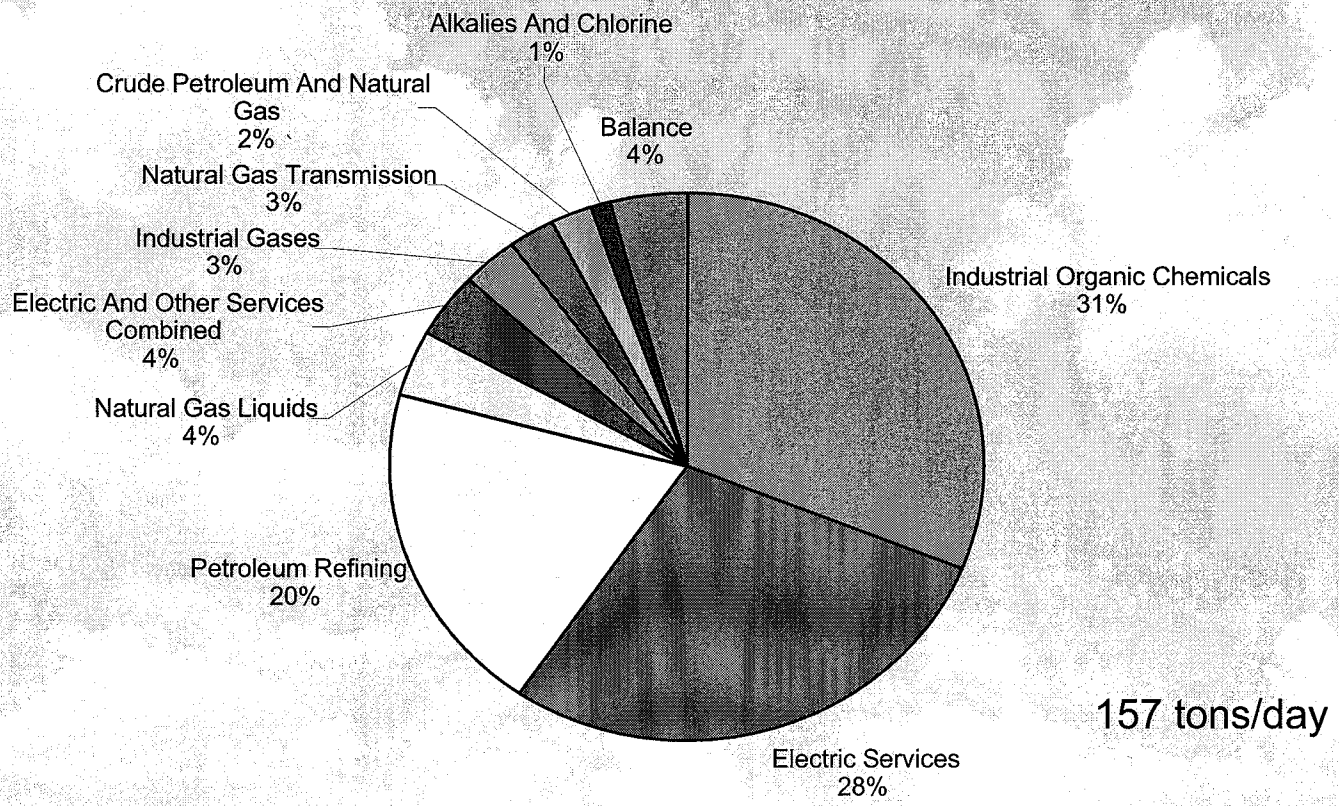
HGB 8-Hour Ozone Area NO_x
On-Road Emissions



HGB 8-Hour Ozone Area NO_x
Non-Road Emissions



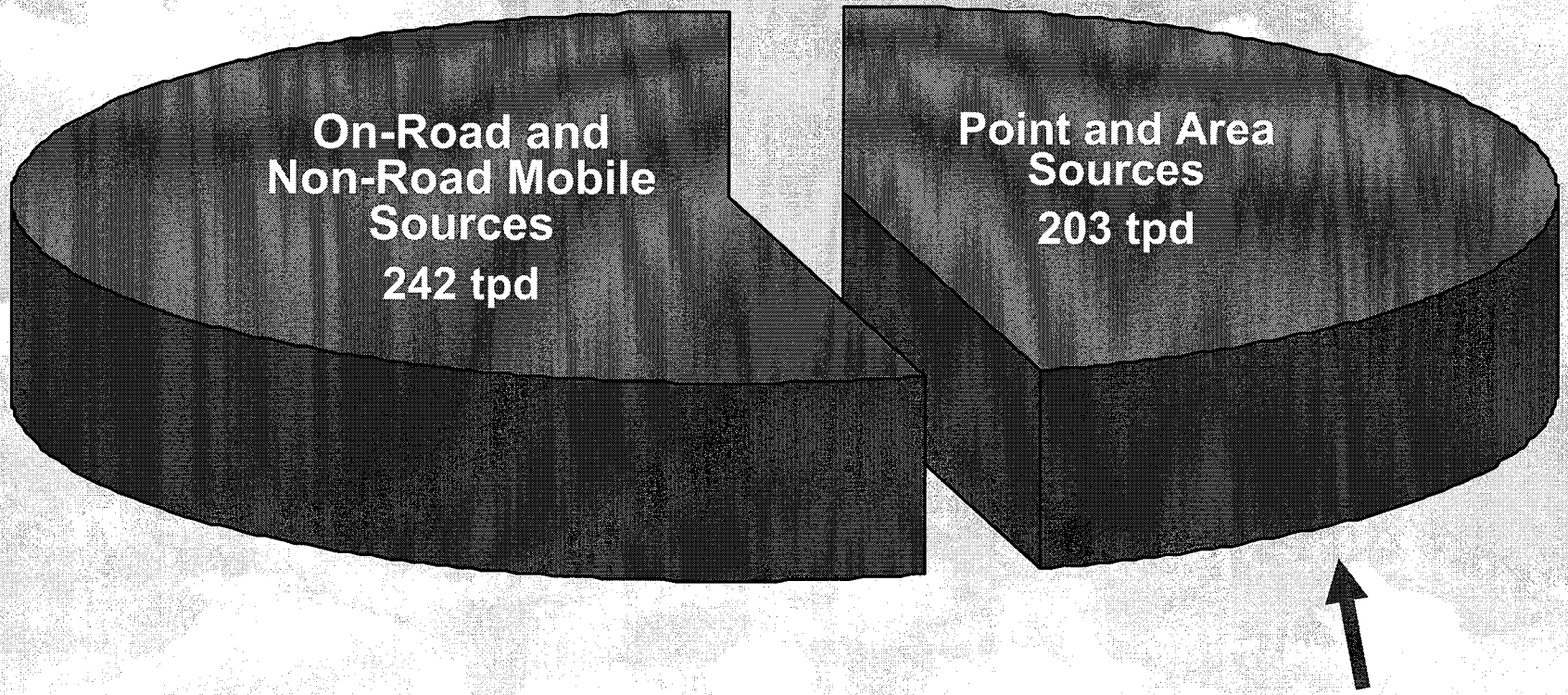
HGB 8-Hour Ozone Area NO_x
Point Source Emissions



157 tons/day

Source: TCEQ Emissions Inventory
Contact: Marvin Jones

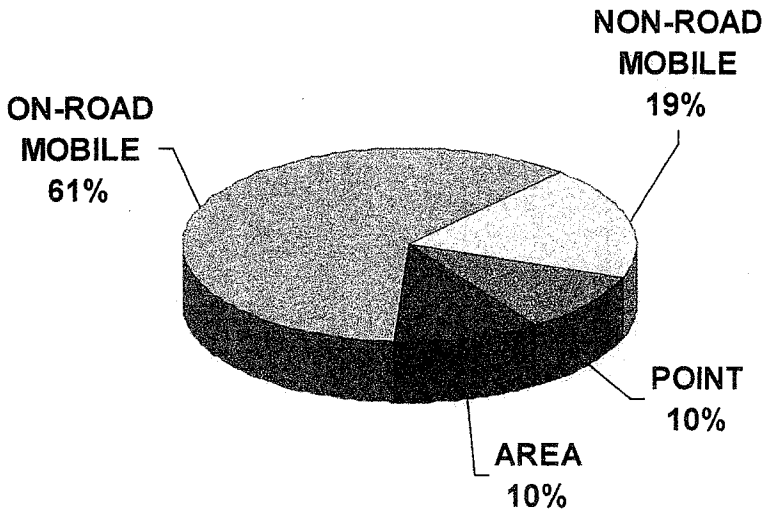
HGB 8-Hour Ozone Area NO_x (2009 future base modeling inventory)



NO_x Sources Directly Regulated by TCEQ: 46%

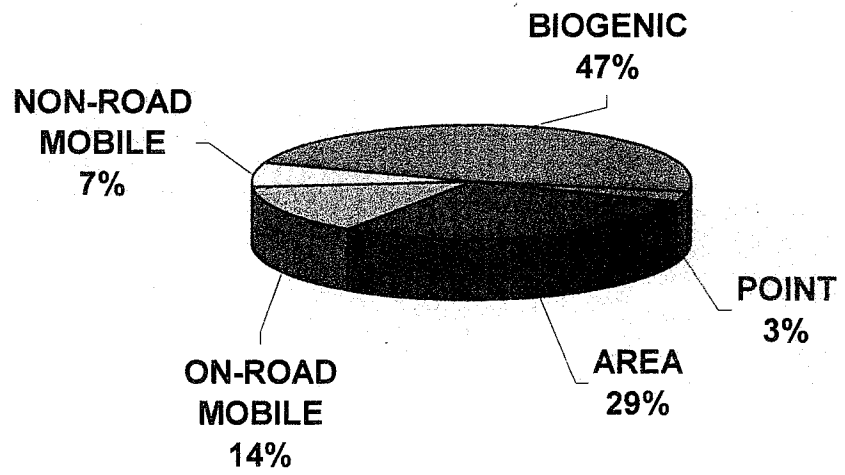
Dallas-Ft. Worth (DFW) 2005 EI

2005 DALLAS - FORT WORTH
NOx EMISSIONS INVENTORY



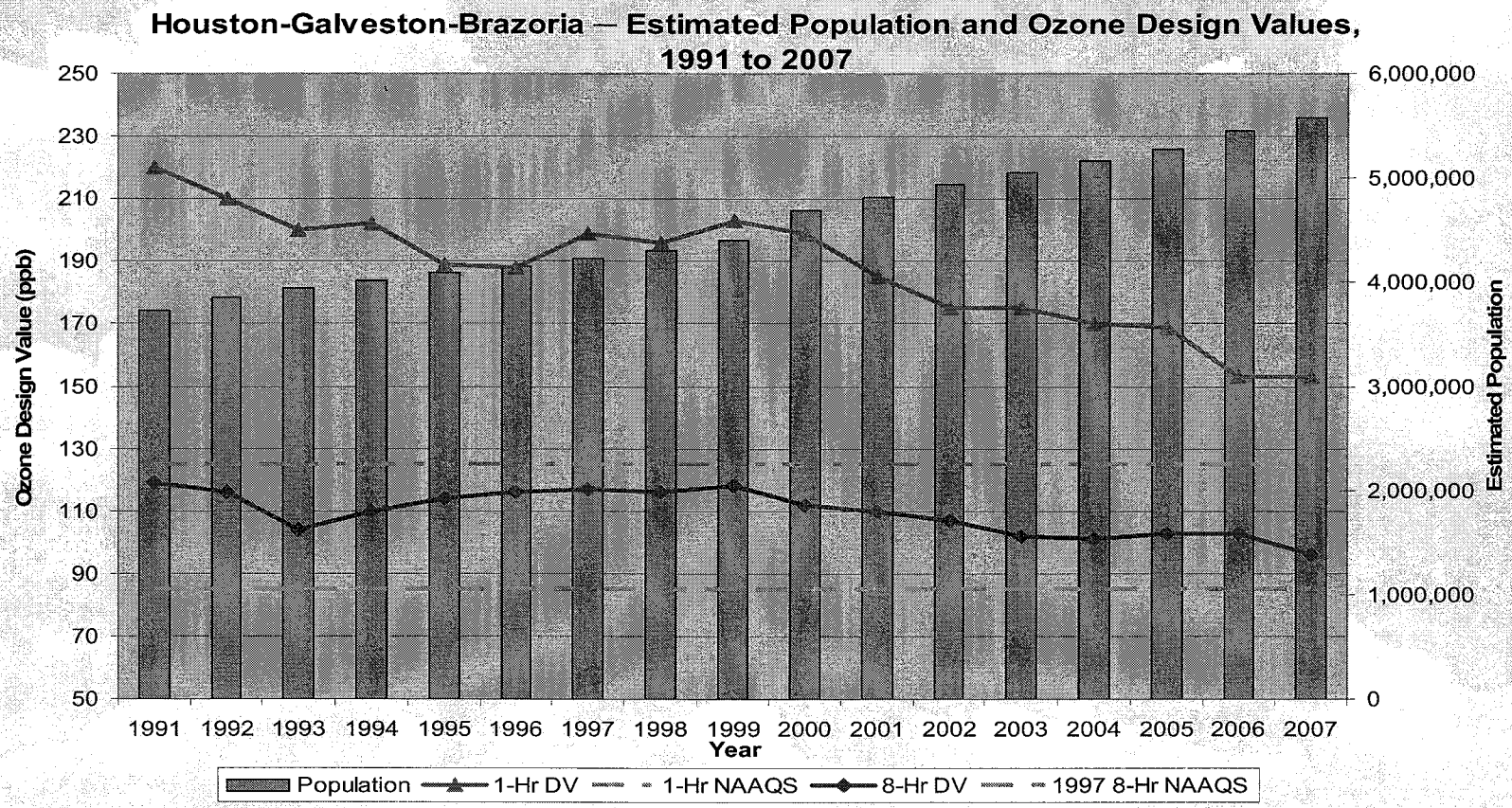
Total NO_X = 561 tpd

2005 DALLAS - FORT WORTH
VOC EMISSIONS INVENTORY



Total VOC = 942 tpd

Houston-Galveston-Brazoria SIP Update



*Source: Ozone -- EPA's AQS database.
1991-2007 Population --http://www.census.gov/popest/archives/1990s/MA-99-03b.txt and http://www.census.gov/popest/counties/CO-EST2007-01.html, May 9, 2008

Appendix E

TERP Fees

- Vehicle title transfer
- 2.5% or 1.0% fee on sale/lease of on-road diesel
- 10% commercial vehicle registration surcharge
- $10 commercial vehicle inspection surcharge
- 2% fee on sale/lease of off-road diesel

FY '07 Collections: $201.7 million* (actual)
FY '08 Collections: $196 million* (estimate)

*** Includes interest earned**

TERP Appropriations

PROGRAM	FY '08	FY '09
Emission Reduction Incentive Grants (ERIG)	$146,806,644	$150,337,599
New Technology Research & Development (NTRD)	$17,880,033	$18,310,078
TCEQ Administration	$2,234,917	$2,273,917
TOTAL	$166,921,594	$170,921,564

TERP Eligible Counties and Designated Highways and Roadways*

Austin Area:
Bastrop
Caldwell
Hays
Travis
Williamson

Beaumont-Port Arthur:
Hardin
Jefferson
Orange

Corpus Christi Area:
Nueces
San Patricio

Dallas-Fort Worth:
Collin
Dallas
Denton
Ellis
Henderson
Hood
Hunt
Johnson
Kaufman
Parker
Rockwall
Tarrant

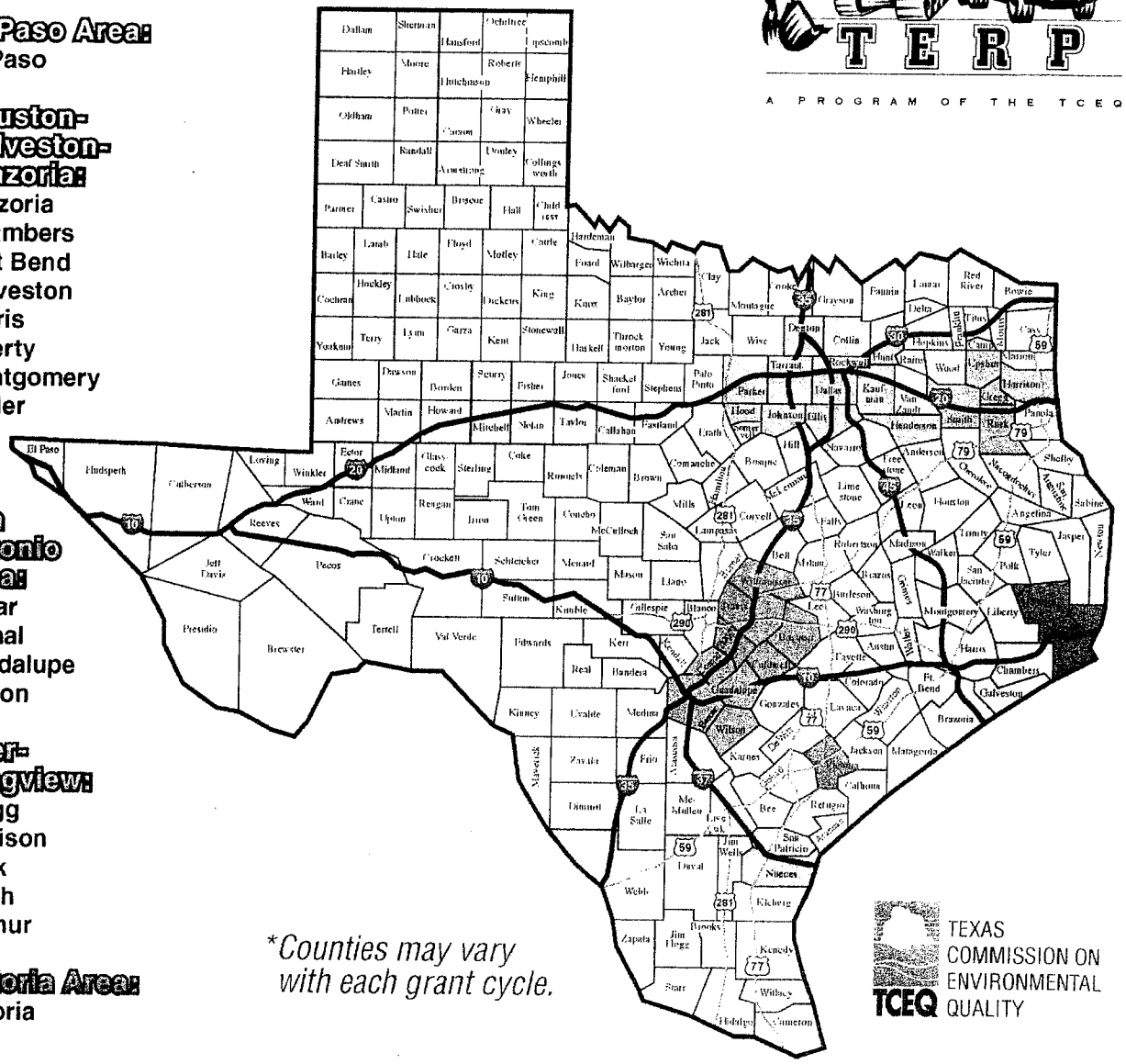
El Paso Area:
El Paso

Houston-Galveston-Brazoria:
Brazoria
Chambers
Fort Bend
Galveston
Harris
Liberty
Montgomery
Waller

San Antonio Area:
Bexar
Comal
Guadalupe
Wilson

Tyler-Longview:
Gregg
Harrison
Rusk
Smith
Upshur

Victoria Area:
Victoria



*Counties may vary with each grant cycle.

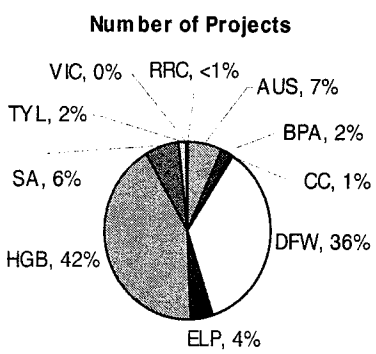
TERP
A PROGRAM OF THE TCEQ

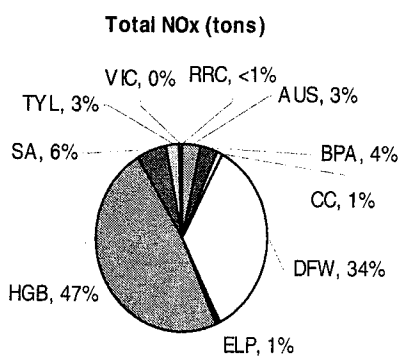
TCEQ TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

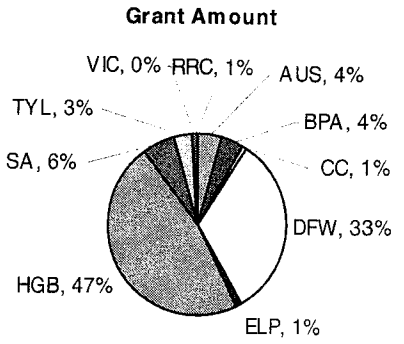
TERP Grants 2001-2007 by Area

AREA	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Austin	202	471	4,015.3796	$22,612,392.04	$5,631.45	2.4329
Beaumont/Port Arthur	59	202	4,392.2732	$18,822,955.93	$4,285.47	2.7107
Corpus Christi	22	85	1,095.2394	$5,344,830.55	$4,880.06	0.6887
Dallas/Fort Worth	1,090	2,656	42,651.0806	$163,929,732.24	$3,843.51	17.9614
El Paso	137	172	696.6289	$3,183,977.08	$4,570.55	0.4075
Houston/Galveston/ Brazoria	1,293	3,386	58,922.6667	$238,332,612.43	$4,044.84	26.9494
San Antonio	198	412	7,130.0546	$30,459,448.87	$4,271.98	3.0943
Tyler/Longview	51	121	3,075.0991	$16,089,107.89	$5,232.06	1.6960
Victoria	9	13	91.7853	$618,839.36	$6,742.25	0.0548
GLO*	1	1	666.6667	$5,000,000.00	$7,500.00	0.3810
	3,062	7,519	122,736.8741	$504,393,896.38	$4,109.55	56.3767

* Third-Party Grant to Texas General Land Office for Natural Gas Initiative Program, funding not yet reported as assigned to specific purchases.





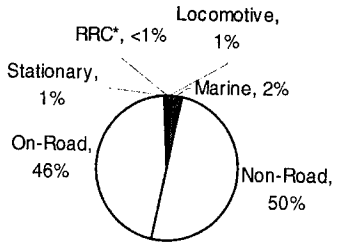


TERP Grants 2001-2007 by Emission Source

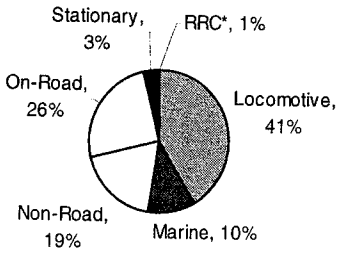
EMISSION SOURCE	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Locomotive	26	247	50,930.1534	$161,443,072.86	$3,169.89	15.3147
Marine	68	413	12,768.2844	$39,905,279.21	$3,125.34	6.7156
Non-Road	1,530	3,226	23,098.2177	$133,779,186.59	$5,791.75	14.9429
On-Road	1,412	3,596	31,513.5231	$153,743,645.99	$4,878.66	17.4787
Stationary	25	36	3,760.0288	$10,522,711.73	$2,798.57	1.5440
GLO*	1	1	666.6667	$5,000,000.00	$7,500.00	0.3810
	3,062	**7,519**	**122,736.8741**	**$504,393,896.38**	**$4,109.55**	**56.3767**

* Third-Party Grant to Texas General Land Office for Natural Gas Initiative Program, funding not yet reported as assigned to specific purchases.

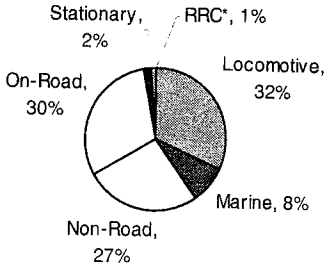
Number of Projects



Total NOx (tons)



Grant Amount

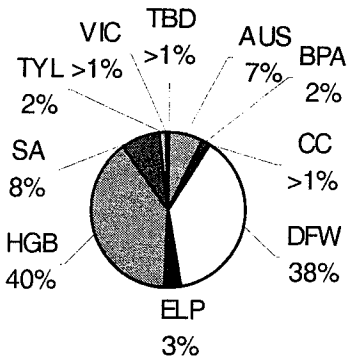


TERP Grants Awarded or Pending by Area

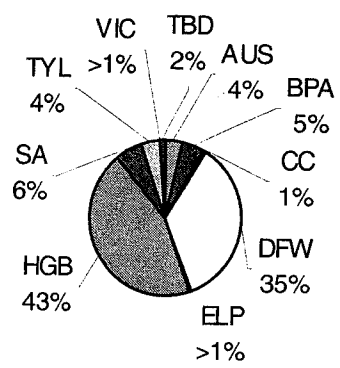
AREA	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Austin	337	696	5,508.7167	$36,035,390.59	$6,541.52	3.2897
Beaumont/Port Arthur	88	304	6,838.5489	$32,500,241.95	$4,752.51	3.5802
Corpus Christi	22	85	1,095.2394	$5,344,830.55	$4,880.06	0.6887
Dallas/Fort Worth	1,846	3,773	53,082.2177	$239,137,486.39	$4,505.04	23.2752
El Paso	137	172	696.6289	$3,183,977.08	$4,570.55	0.4075
Houston/Galveston/Brazoria	1,918	4,390	66,838.0994	$299,690,493.47	$4,483.83	31.4568
San Antonio	393	719	9,067.5510	$47,713,386.69	$5,261.99	4.2129
Tyler/Longview	90	228	5,329.0281	$30,470,480.59	$5,717.83	3.0852
Victoria	9	13	91.7853	$618,839.36	$6,742.25	0.0548
Unknown (TBD)*	4	4	2,423.4647	$18,175,985.00	$7,500.00	1.3849
	4,844	10,384	150,971.2801	$712,871,111.65	$4,721.90	71.4359

* Third-Party Grants to Railroad Commission of Texas for Propane Equipment Initiative Program, funding not yet reported as assigned to projects In specific areas.

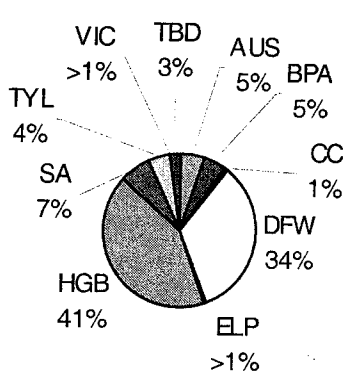
Number of Projects



Total NOx (tons)



Grant Amount

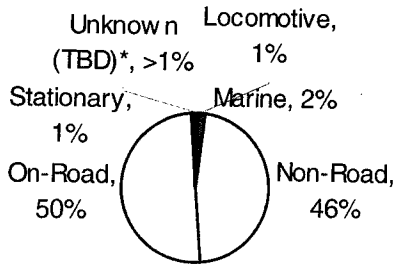


TERP Grants Awarded or Pending by Emission Source

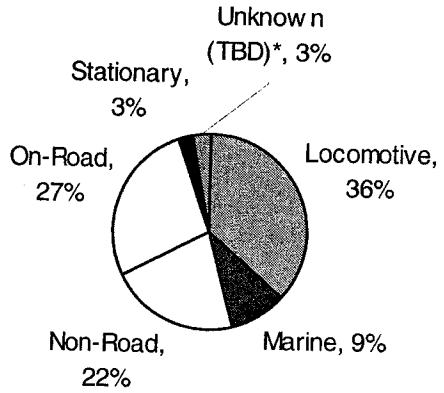
AREA	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Locomotive	32	271	54,857.2206	$176,187,326.00	$3,211.74	16.1456
Marine	81	473	14,167.954	$45,433,840.88	$3,206.80	7.4363
Non-Road	2,237	4,517	32,911.1891	$208,438,934.95	$6,333.38	20.9877
On-Road	2,455	5,069	40,694.2834	$238,107,797.13	$5,851.14	22.7185
Stationary	33	48	3,917.1683	$11,527,227.69	$2,942.75	1.6201
Unknown (TBD)*	6	6	4,423.4647	$33,175,985.00	$7,500.00	2.5277
	4,844	10,384	150,971.2801	$712,871,111.65	$4,721.90	71.4359

* Includes Third-Party Grants to North Central Texas Council of Governments, Houston Galveston Area Council and Railroad Commission of Texas for funding not yet reported as assigned to specific purchases.

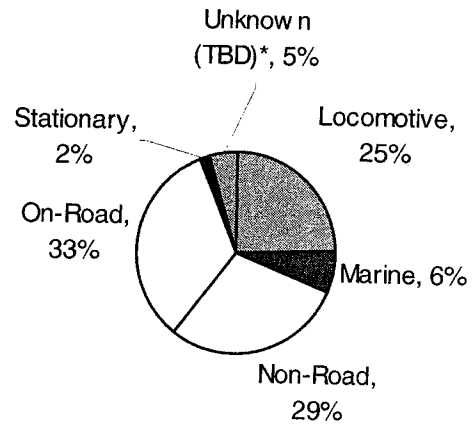
Number of Projects



Total NOx (tons)



Grant Amount



Appendix F

EXECUTIVE SUMMARY
Texas Emissions Reduction Plan

This fourth biennial report is provided by the Texas Commission on Environmental Quality in fulfillment of the requirements of Texas Health and Safety Code 386.057 and 386.116(d).

The Texas Emissions Reduction Plan (TERP) was established by the 77th Texas Legislature in 2001, through enactment of Senate Bill (SB) 5, to help improve and maintain good air quality in areas throughout the state.

Since the start of the program, there have been several legislative revisions. In 2003, House Bill (HB) 1365, 78th Texas Legislature, established a new revenue source of vehicle title fee increases under Texas Transportation Code 501.138(a–b) to replace the original $225 out-of-state vehicle registration fee, which was determined to be unconstitutional. In addition, under Texas Tax Code 151.0515 the existing surcharge on the sale, lease, or rental of new or used off-road equipment increased from one to two percent. A one percent surcharge was added for the sale, lease, or use of model 1997 and later heavy-duty diesel on-road vehicles under Tax Code 152.0215(a). The bill added a program for small business grants and increased the number of counties and the types of projects eligible for the Emissions Reduction Incentive Grants and Small Business Grants programs.

House Bill 37 set appropriation levels for various TERP programs. This bill, in conjunction with HB 43, defined roles of the TCEQ and the Texas Council on Environmental Technology (TCET) in administering the New Technology Research and Development (NTRD) Program.

In 2005, HB 2481, 79th Texas Legislature, established cost-effectiveness limits for locomotive and marine vessel grants. The bill also directed the TCEQ to implement a new Rebate Grants program under the TERP incentive programs. The TCEQ is to award rebate grants in order to streamline grant applications, contracting, reimbursement, and reporting for certain projects. The bill transferred the administration and implementation of the NTRD program from the TCEQ to the Texas Environmental Research Consortium (TERC), a nonprofit organization based in Houston. It also repealed the statutory provision requiring the TCEQ to include NTRD information in this biennial report.

House Bill 3469 authorized the TCEQ to create and implement a new Texas Clean School Bus Program to reduce emissions of diesel exhaust from school buses.

In 2007, SB 12, 80th Texas Legislature, amended the TERP program. It raised the maximum cost-effectiveness from $13,000 to $15,000 per ton of NO_x reduced. The bill allowed travel on highways and roadways designated by the commission to count towards the requirement that grant-funded on-road vehicles be operated at least 75 percent of the annual miles in the nonattainment areas and affected counties. In addition the bill added marine vessels to the list of vehicles and equipment for which an electrification or idle-reduction infrastructure project may be funded. The bill authorized the TCEQ to fund other state agencies to lease, purchase, or install idle-reduction infrastructure at rest areas and other public facilities located on major highway transportation routes in eligible nonattainment areas and affected counties.

House Bill 160 added a new category to the list of infrastructure projects that may be funded under the TERP. The new project category is to fund rail relocation and improvement projects at major rail intersections in the eligible counties to reduce locomotive engine idling.

Programs

Several government agencies are responsible for developing and implementing TERP-related programs. In addition to the TCEQ, these agencies include the Texas Comptroller of Public Accounts (CPA), the State Energy Conservation Office (SECO), the Public Utility Commission of Texas (PUC), and local governments. The Energy Systems Laboratory (ESL) at the Texas Engineering Experiment Station of the Texas A&M University system assists in energy-efficiency and renewable energy research, along with emissions-reduction calculations. A description of each program follows.

Emissions Reduction Incentive Grants Program. Authorized in Health and Safety Code 386.102, this program is managed by the TCEQ and provides grants to cover the incremental costs of projects in the State's 41 air quality nonattainment, near-nonattainment, and early-action-compact counties. Eligible projects include new purchases, replacements, repowers, retrofit technologies, infrastructure, qualifying fuels, and rail relocation and improvement.

Rebate Grants Program. Health and Safety Code 386.117 directs the TCEQ to award rebate grants in order to streamline grant applications, contracting, reimbursement, and reporting for on-road heavy-duty vehicles and non-road equipment in the eligible counties in the nonattainment areas. Projects are limited to replacements and repowers.

Third-Party Grants. The TCEQ may issue grants to third parties to use the funds for pass-through grants for projects consistent with the TERP Guidelines. The TCEQ has awarded three third-party grants to assist with the implementation of TERP projects in eligible areas: the Railroad Commission of Texas to fund propane vehicle and equipment projects; the North Central Texas Council of Governments to fund various TERP projects, including refuse-hauler projects; and the Texas General Land Office to fund natural gas vehicle and equipment projects.

Small Business Grants Program. Per Health and Safety Code 386.116, businesses that own and operate one or two vehicles or pieces of equipment—one of which must be diesel-powered and a pre–1994 model vehicle—or pieces of non-road equipment with "uncontrolled emissions" are considered small businesses. The TCEQ is to award grants to small businesses under a quick and simple process.

Texas Clean School Bus Program. This program, established under Health and Safety Code 390.002 and managed by the TCEQ per 386.052, is intended to reduce emissions of diesel exhaust from school buses throughout the state. Eligible projects may include emissions-reducing add-on equipment and other projects.

Heavy-Duty Motor Vehicle Purchase or Lease Incentive Program. This is a statewide program under Health and Safety Code 386.112 to reimburse a purchaser or lessee of an eligible new on-road heavy-duty vehicle for the incremental costs of purchasing or leasing the vehicle in lieu of a higher-emitting diesel powered vehicle. A heavy-duty vehicle is defined as a motor vehicle with a gross vehicle weight rating of 10,000 pounds or more. This program is managed by the TCEQ, but has not yet been implemented due to funding constraints.

Light-Duty Motor Vehicle Purchase or Lease Incentive Program. Per Health and Safety Code 386.152, this program is administered by the CPA and the TCEQ. The program provides financial incentives (rebates) for the purchase or lease of an eligible new car or light truck meeting certain U.S. Environmental Protection Agency (EPA) emission standards. This program has not yet been implemented due to funding constraints.

Energy-Efficiency Grants Program. The PUC has jurisdiction over this program, per Health and Safety Code 386.202. The PUC regulates energy-efficiency programs to meet demand-reduction goals in the 41 counties. The original TERP program included authorization for grant funding to be administered by the PUC. This authorization was removed by HB 1365. However, the PUC administers other energy-efficiency programs and reports the results of those programs to the TCEQ.

Texas Building Energy Performance Standards. Local governments have the responsibility to administer and enforce the standards found in the International Energy Conservation Code and the chapter on energy efficiency in the International Residential Code. The ESL is responsible for assessing the energy savings from adopted energy codes. The program is authorized by Health and Safety Code 388.003.

Energy-efficiency programs in certain political subdivisions. This program requires counties and political subdivisions in the affected areas to establish the goal of reducing energy consumption by 5 percent per year and to implement cost effective energy-efficiency measures. As required by Health and Safety Code 388.005 and 399.006, organizations report their progress each year to the SECO.

New Technology Research and Development. Authorized in Health and Safety Code Chapter 387, the primary objective of this program is to promote the development and commercialization of technologies that will support projects that can be funded under the TERP Emissions Reduction Incentive Grants program. In 2005, HB 2481 transferred the administration and implementation of the NTRD program from the TCEQ to the TERC. The program is funded via a contract with the TCEQ. In addition, HB 2481 repealed the statute requiring the TCEQ to report information on the NTRD program to the legislature.

Funding

The TERP revenue is allocated through appropriation by the legislature. The revenue allocation for the last four fiscal years is shown in the table below.

Allocation of TERP Revenue

Agency	2005	2006	2007	2008
Texas Commission on Environmental Quality[a]	$176,623,958	$128,520,574	$128,520,572	$166,921,594
Energy Systems Lab	$2,236,613	$952,019	$952,019	$952,019
Total allocation	**$178,860,571**	**$129,472,593**	**$129,472,591**	**$167,873,613**
Other fund obligations		$1,278,676	$681,326	$714,004
Unappropriated fund balance[b]	$15,530,490		$173,345,669	

[a]TCEQ allocation of TERP revenue per comptroller records for fiscal 2005. For fiscal 2006–08, per CPA and TCEQ records. The TCEQ allocation includes funds awarded under grant contract to the TERC to implement the NTRD program and funds allocated to the Texas Clean School Bus Program.
[b]This amount represents money remaining in the fund after all appropriations are made. The ending balance in 2005 is from unspent funds from prior years that were not encumbered at the close of fiscal 2005. The unappropriated fund balance for the 2006–07 biennium is from the 2007 Annual Financial Report.

Status and Results to Date

Emissions Reduction Incentive Grants Program. The TCEQ has established guidelines and technical supplements for administering the Emissions Reduction Incentive Grants (ERIG) Program. Additionally, for every round of funding, a Request for Applications (RFA) is released. Each RFA highlights TERP goals, areas, and projects eligible for funding, and application details. Cost-effectiveness measures and limits on emission reduction costs per ton are also included in the RFA.

Since the beginning of the program in 2001 through September 2008, the TCEQ has awarded grants to, or approved with contracts pending, 4,844 projects under all grant categories for $712,871,111. These projects are projected to reduce NO_x emissions by 150,971 tons, representing 71.4359 tons per day, at a cost per ton of $4,721.

Of the grants awarded or pending, 2,532 are funded under the ERIG Program for $575,921,947.18. The ERIG projects are projected to reduce NO_x emissions by 130,415.1370 tons, representing 60.0388 tons per day, at a cost per ton of $4,416.

Rebate Grants Program. The Rebate Grants Program has been in place since April 2006. This program uses default factors, including default usage levels, for calculating reductions in emissions. The application process was simplified and maximum rebate grant amounts are pre-determined, so that applicants know how much money they are eligible to receive before applying for the grant.

Of the grants awarded or approved pending contracts, the TCEQ has awarded or approved 1,205 rebate grants for $80,133,722.47. The rebate grant projects are projected to reduce NO_x emissions by 11,741.0207 tons, representing 6.7092 tons per day, at a cost per ton of $6,825.

Third-Party Grants. The TCEQ has awarded $56,815,442 in third-party grants to the Railroad Commission of Texas, the North Central Texas Council of Governments, the Texas General Land Office, and the Houston-Galveston Area Council. These grants are currently projected to reduce NO_x emissions by 8,815.1224 tons, representing 4.6879 tons per day, at a cost of $6,445.22.

Small Business Grants Program. Of the grants awarded or pending contracts, 691 grantees were identified as small businesses. These grants totaled $47,178,109.75, with projected reductions in NO_x emissions of 7,022.7421 tons, representing 4.1704 tons per day, at a cost per ton of $6,717. The TCEQ estimates that many more grant recipients met the definition of "small business," but did not apply under the rebate grant program.

Clean School Bus Grants Program. Over the 2008–09 biennium, the legislature appropriated $3.75 million per fiscal year for the Texas Clean School Bus Program, to install retrofit devices to reduce diesel exhaust emissions from school buses throughout the state. The TCEQ allocated an additional $2.1 million per fiscal year from the appropriations to the TERP Emissions Reduction Incentive Grants Program to supplement these funds in order to help address the significant interest in the program. These additional funds are targeted at school districts in the TERP eligible counties in the nonattainment, near-nonattainment, and early-action-compact areas.

In fiscal 2008, the TCEQ awarded $4.8 million to 51 school districts. As a result, approximately 2,600 school buses around the state will provide a healthier ride to both drivers and their K–12 student passengers. Significant interest remains in the program and the TCEQ expects to commit the fiscal 2009 funds very quickly.

Heavy-Duty Motor Vehicle Purchase or Lease Incentive Program. This program has not been implemented because of funding constraints. However, the program is authorized and could be implemented in the future.

Light-Duty Motor Vehicle Purchase or Lease Incentive Program. The program was suspended by the Comptroller in 2002 due to an inadequate fund balance from SB 5 revenue sources. Since fiscal 2003, the legislature has not appropriated funds to the program. This program is still authorized and could be implemented in the future.

Energy-Efficiency Grants Program. The PUC administers energy efficiency programs established in 1999 by SB 7, 76th Texas Legislature, and in 2001 by SB 5, 77th Texas Legislature. The funding for energy efficiency grants under SB 5 was discontinued in 2003. However, the PUC continues to report reductions in energy demand, peak loads, and associated emissions under the SB 7 provisions in Texas Utility Code 39.905. During 2007, utilities cumulatively exceeded their goals for savings in demand by 25 percent and saved nearly 371,459 megawatt-hours (MWh) of energy. The transmission and distributions utilities, which are responsible for implementing the energy-efficiency program, achieved 152 megawatts of demand savings during calendar year 2007. Based on the report from the ESL, the cumulative savings from the PUC's SB 5 and SB 7 energy efficiency programs through 2007 was 1,598,054 MWh/year. The ESL estimates that these electricity savings could represent up to 1,125 tons of NO_x emissions reductions.

Texas building energy performance standards. The ESL assesses energy savings in nonattainment and affected counties for energy-compliant new construction. The ESL reports an estimated cumulative electricity savings through 2007 for these programs of 1,440,885 MWh/year, for an estimated cumulative annual NO_x emissions reductions of 1,014 tons.

Energy-efficiency programs in certain political subdivisions. The SECO works with local governments to establish and implement goals to reduce electrical consumption by 5 percent, and the ESL assists those local governments and reports on the estimated energy savings and reductions in NO_x emissions. The number of Texas jurisdictions adopting the 5 percent goal for public facilities increased from 176 in 2002 to 280 in 2006. The ESL estimates that the cumulative energy savings from these changes could be as high as 353,701 MWh/year, for an estimated cumulative annual NO_x emissions reduction of 270 tons.

TCEQ Monitoring Efforts

To minimize the risk of fraud, the TCEQ has implemented a three-tiered Quality Assurance and Fraud Prevention and Detection Program. This program evaluates risks and monitors performance in the three main project phases: application, contracting, and tracking and reporting results.

Future Considerations for the TERP Programs

Issues that will be addressed by the TCEQ during the remainder of fiscal 2009 and into the 2010–2011 biennium are outlined below.

Emissions Reduction Incentive Grants Program

- The priority for use of the grant funds will be to continue to help meet the goals of the SIP.
- Cost per ton criteria will also be evaluated each year in relation to the types of projects being submitted by applicants. Adjustments may be considered as appropriate to further encourage applications from targeted emission sectors.

Rebate Grants Program and Small Business Grants Program

- The TCEQ will continue to allocate a portion of the funding for the Rebate Grants program.
- The Small Business Grants program will continue to be implemented as a part of the Rebate Grants program.

Third-Party Grants

- The TCEQ will continue the third-party grants program and, where appropriate, expand the grants to additional parties where the grants may benefit the TERP.

Texas Clean School Bus Program

- The TCEQ will continue to implement the Texas Clean School Bus Program to help school districts in Texas reduce exposure of school children to potentially harmful diesel exhaust.

New Technology Research and Development Program

- The TCEQ will continue to administer a contract with the TERC to implement the NTRD program. The TERC is responsible for establishing the program's priorities.

Legislative Issues

- The TCEQ has neither proposed nor taken a position on any legislative changes to the criteria for the TERP. TCEQ personnel are available to provide any data and information that may be needed to assist the legislature in evaluating proposals from stakeholders regarding the TERP.

Appendix G

New Technology Research and Development

The purpose of the New Technology Research and Development (NTRD) program is to fund grants for new technologies that can be verified by the United States Environmental Protection Agency or the California Air Resources Board to reduce NOx emissions from diesel engines. Focus of the NTRD program is on federally preempted diesel emission sources such as on- and off-road sources, marine sources, railroads and airports. The data below are summary statistics since TERC began managing the NTRD program in January of 2006.

Requests for Grant Applications Issued	14
Proposals Received	161
Number of Grants Contracted	38
Amount of Funds Awarded	$19,146,575
Amount of Matching Funds	$12,060,013
Number of Pending Awards	9
Amount of Funds for Pending Awards	$4,678,094

Current NTRD portfolio of projects:

- Almost 70% are advanced technologies as defined by the NTRD statutes
- 80% are applicable to existing engines
- 30% are applicable to new engines
- 50% exhaust treatment technology
- 35% engine or vehicle modifications
- 10% fuels and additives
- 5% studies

NTRD accomplishments

- Funded first two companies to start EPA verification of SCR technology

NTRD accomplishments

- Funded first two companies to start EPA verification of SCR technology
- Same two technologies given status on Emerging Technologies list of EPA's Clean Diesel Campaign
- Funded first real world test of hydraulic hybrid refuse trucks
- National recognition as a high quality diesel emissions reduction program

NTRD Challenges

- Retrofits
  - Penalty in terms of operational cost and fuel consumption
  - Viable option because new low emission engines also have cost and fuel penalty
- Engine Replacements
  - Cost effectiveness depends on engine type and application
  - Limited potential remaining in heavy duty trucks, focus on other sectors
- Technology development for new engines
  - Usually violates the 5 year commercialization requirement
  - Few innovations can cost effectively improve on 2010 base engine emissions levels

In conclusion, on behalf of Chairman Kelly Frels and the entire Board of Directors of TERC, I would like to thank this committee for its past support. We look forward to continuing our effort, in concert with TCEQ, of assisting the State of Texas meet its air quality challenges.

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NTRD Appropriations

NTRD	FY '08	FY '09
NTRD Grants – Texas Environmental Research Consortium & University of Houston	$13,854,026	$14,198,062
Research (20% of NTRD) – Texas Environmental Research Consortium	$3,567,007	$3,662,016
Health Effects Study – TCEQ	$200,000	$200,000
NTRD Administration - TCEQ	$250,000	$250,000
TOTAL	$17,880,033	$18,310,078

NTRD Award Process

- Contract with TCEQ signed Jan. 3, 2006
- 14 RFGAs issued
- 161 proposals received
- 38 contracts for $19,146,575
- 3 pending modifications for $932,629
- 9 awards pending for $4,678,094

NTRD Current Project Portfolio

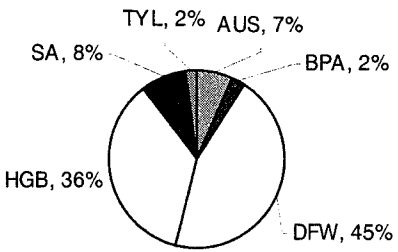
- Almost 70% are advanced technologies as defined by the NTRD statutes
- 80% are applicable to existing engines
- 20% are applicable to new engines
- 50% exhaust treatment technology
- 35% engine or vehicle modifications
- 10% fuels and additives
- 5% studies

Appendix H

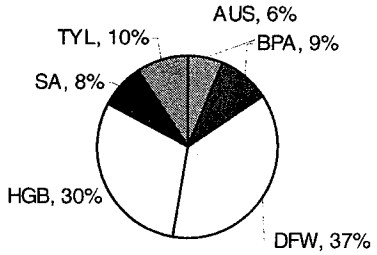
ERIG Grants 2008-2009 Awarded or Pending by Area

AREA	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Austin	73	163	1,018.2549	$8,776,886.24	$8,619.54	0.5854
Beaumont/Port Arthur	25	98	2,358.2404	$12,809,764.97	$5,431.92	0.8192
Dallas/Fort Worth	482	842	7,719.0398	$52,038,246.32	$6,741.54	3.7414
Houston/Galveston/ Brazoria	381	762	5,715.7328	$41,891,155.97	$7,329.10	3.2472
San Antonio	87	199	1,253.3504	$10,763,479.11	$8,587.77	0.7275
Tyler/Longview	25	93	2,138.8152	$13,304,037.31	$6,220.28	1.3234
	1,073	**2,157**	**20,203.4335**	**$139,583,569.92**	**$6,908.90**	**10.4440**

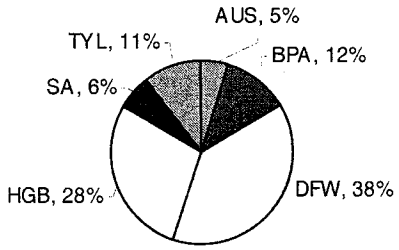
Number of Projects



Grant Amount



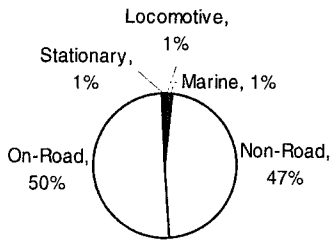
Total NOx (tons)



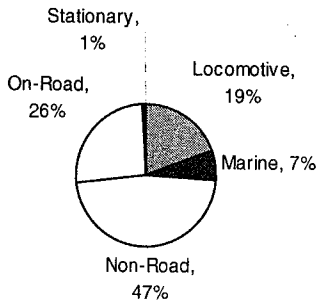
ERIG Grants 2008-2009 Awarded or Pending by Emission Source

EMISSION SOURCE	NUMBER OF PROJECTS	NUMBER OF ACTIVITIES	TOTAL NO_x REDUCED (TONS)	GRANT AMOUNT	COST PER TON	TONS PER DAY OF NO_x REDUCED
Locomotive	6	24	3,927.0672	$14,744,253.14	$3,754.52	0.8310
Marine	13	60	1,399.6696	$5,528,561.67	$3,949.90	0.7207
Non-Road	502	1,086	9,425.0235	$71,279,940.36	$7,562.84	5.7971
On-Road	544	975	5,294.5337	$47,026,298.79	$8,882.05	3.0191
Stationary	8	12	157.1395	$1,004,515.96	$6,392.51	0.0762
	1,073	**2,157**	**20,203.4335**	**$139,583,569.92**	**$6,908.90**	**10.4440**

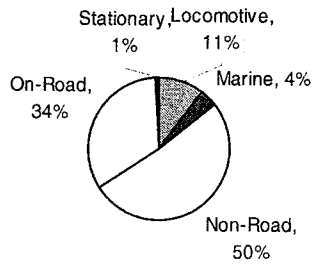
Number of Projects



Total NOx (tons)



Grant Amount



Appendix I

LIRAP/DRIVE A CLEAN MACHINE

FISCAL YEAR	REVENUES	APPROPRIATIONS	DIFFERENCE
2002	$3.95 million	$3.38 million	$0.57 million
2003	$16 million	$13.75 million	$2.25 million
2004	$21 million	$10.49 million	$10.51 million
2005	26.3 million	$10.49 million	$15.81 million
2006	$28.1 million	$5.5 million	$22.6 million
2007	$30.7 million	$5.5 million	$25.2 million
2008	$32.9 million	$50 million	($17.1 million)
2009	$31.9 million	$50 million	($18.1 million)
TOTAL	**$190.85 million**	**$149.1 million**	**$41.7 million**

LIRAP/DRIVE A CLEAN MACHINE

FISCAL YEAR	REVENUES	APPROPRIATIONS
2006	$28.1 million	$5.5 million
2007	$30.7 million	$5.5 million
2008	$32.9 million	$50 million
2009	$31.9 million	$50 million

BUDGETED ALLOCATION OF LIRAP APROPRIATIONS

	FY '06	FY '07	FY '08	FY '09
TCEQ Administration	$149,285	$149,285	$210,000	$210,000
TCEQ Outreach	-0-	-0-	$675,000	-0-
County Administration	$939,074	$766,278	$4,411,500	$4,479,000
Repairs/Replacements	$4,411,641	$4,584,437	$39,703,500	$40,311,000
Local Initiative Projects	-0-	-0-	$5 million	$5 million
TOTAL	**$5.5 million**	**$5.5 million**	**$50 million**	**$50 million**

Appendix J

DRIVE A CLEAN MACHINE 2008

	RETIRED	REPAIRED
North Central Texas COG	6,721	2,180
Houston Galveston Area COG	6,106	2,279
Travis County	528	218
Williamson County	195	55
TOTAL	**13,500**	**4,732**

Total Retired & Replace: 18,282 vehicles

FY08 Inspection & Maintenance Numbers by Area

Area	Test Type	Initial Test Counts	Percent of Test	Number Pass	Passing Rate	Number Fail	Failure Rate
Austin	All Emissions Tests	715,965	100.00%	671,105	93.73%	44,860	6.27%
	OBD II	605,542	84.58%	575,376	95.02%	30,166	4.98%
	Tailpipe	110,423	15.42%	101,743	92.14%	8,680	7.86%
	ASM	0	0.00%	0	0.00%	0	0.00%
	TSI	110,423	15.42%	101,743	92.14%	8,680	7.86%
	Gas Cap Test	715,965	100.00%	707,795	98.86%	8,170	1.14%
DFW	All Emissions Tests	3,267,925	100.00%	3,092,655	94.64%	175,270	5.36%
	OBD II	2,652,240	81.16%	2,548,759	96.10%	103,481	3.90%
	Tailpipe	615,685	18.84%	565,212	91.80%	50,473	8.20%
	ASM	543,007	16.62%	496,722	91.48%	46,285	8.52%
	TSI	72,678	2.22%	68,490	94.24%	4,188	5.76%
	Gas Cap Test	3,267,922	100.00%	3,235,620	99.01%	32,302	0.99%
HGB	All Emissions Tests	2,756,689	100.00%	2,588,791	93.91%	167,898	6.09%
	OBD II	2,262,770	82.08%	2,160,134	95.46%	102,636	4.54%
	Tailpipe	493,919	17.92%	452,524	91.62%	41,395	8.38%
	ASM	436,980	15.85%	398,519	91.20%	38,461	8.80%
	TSI	56,939	2.07%	54,005	94.85%	2,934	5.15%
	Gas Cap Test	2,756,684	100.00%	2,722,596	98.76%	34,088	1.24%
El Paso	All Emissions Tests	384,001	100.00%	357,385	93.07%	26,616	6.93%
	OBD II	295,824	77.04%	276,584	93.50%	19,240	6.50%
	Tailpipe	88,177	22.96%	83,443	94.63%	4,734	5.37%
	ASM	0	0.00%	0	0.00%	0	0.00%
	TSI	88,177	22.96%	83,443	94.63%	4,734	5.37%
	Gas Cap Test	384,001	100.00%	378,622	98.60%	5,379	1.40%
Overall	All Emissions Tests	7,124,580	100.00%	6,709,936	94.18%	414,644	5.82%
	OBD II	5,816,376	81.64%	5,560,853	95.61%	255,523	4.39%
	Tailpipe	1,308,204	18.36%	1,202,922	91.95%	105,282	8.05%
	ASM	979,987	13.76%	895,241	91.35%	84,746	8.65%
	TSI	328,217	4.61%	307,681	93.74%	20,536	6.26%
	Gas Cap Test	7,124,572	100.00%	7,044,633	98.88%	79,939	1.12%

Source - Texas Information Management System 12/17/2008: ghoffman

Appendix K

AGENDA
Senate Committee on Business and Commerce
Senate Committee on Natural Resources
Joint Interim Hearing
April 15, 2008
9:30 a.m.
Senate Finance Room, Capitol Extension E1.036

I. Call to Order

II. Invited Testimony

- Barry Smitherman, Chairman, Public Utility Commission of Texas
- Bob Kahn, CEO, Electric Reliability Council of Texas
- Buddy Garcia, Chairman, Texas Commission on Environmental Quality
- Elizabeth Ames Jones, Commissioner, Railroad Commission of Texas

Panel #1

- John Fainter, President, Association of Electric Companies of Texas
- Michael Webber, Associate Director, Center for International Energy & Environmental Policy
- Ramon Alvarez, Senior Scientist, Environmental Defense
- Phillip Oldham, Energy Counsel, Texas Association Of Manufacturers

Panel #2

- Steve Taylor, Director - North American Public Relations, Applied Materials, Inc.
- Bert Garvin, Vice President of Regulatory Affairs, FPL Energy
- Pike Powers, Counsel, Fulbright & Jaworski
- Daniel Bullock, Senior Scientist, Houston Advanced Research Center
- Paul Sadler, President, The Wind Coalition

VI. Recess

AGENDA
Senate Committee on Natural Resources
May 13, 2008, 10:00 a.m.
Erik Jonsson Public Library - First Floor Auditorium
Dallas, Texas

I. Call to Order

II. Overview - Texas Water Development Board
- Carolyn Brittin, Deputy Executive Administrator, Water Planning and Information Resources
- Bill Mullican, Deputy Executive Administrator, Water Science and Conservation

III. Regional Water Supply and Conservation Panel
- Jody Puckett, Water Utilities Director, Dallas Water Utilities
- Jim Parks, General Manager, North Texas Municipal Water District
- Jim Oliver, General Manager, Tarrant Regional Water District

IV. Update on Region C Study Commission
- Jim Parks, General Manager, North Texas Municipal Water District
- Tom Duckert, Regional EHS Manager, International Paper

V. Surface Water Salinity Panel
- Herman Settemeyer, Interstate Compacts, Texas Commission on Environmental Quality, Water Supply Division
- Matt Phillips, Government and Customer Relations Manager, Brazos River Authority
- J.W. Thrasher, Commissioner, Pecos River Interstate Compact Commission
- Allan Jones, Director, Texas Water Resources Institute
- Alan Plummer, Chairman of the Board, Alan Plummer Associates, Inc.
- Sonny Kretzschmar, Project Manager, HDR Engineering, Inc.

VI. Dam Safety Audit Report

- Michael Stiernberg, Assistant Project Manager, State Auditor's Office
- John Young, Audit Manager, State Auditor's Office

VII Dam Safety Overview

- Warren Samuelson, Dam Safety Program Coordinator, Field Operations Division, Texas Commission on Environmental Quality

VIII. Dam Safety Panel

- Rex Isom, Executive Director, Texas State Soil and Water Conservation Board
- John Foster, Statewide Programs Officer, Texas State Soil and Water Conservation Board
- Mark Jordan, Manager, River Management Services, Lower Colorado River Authority
- Louie Verreault, Dam Safety Engineer, Tarrant Regional Water District
- Dean Robbins, Assistant General Manager, TWCA

IX. Public Testimony

X. Recess

AGENDA
Senate Committee on Natural Resources
July 8, 2008, 10:00 a.m.
Lone Star College System Training and Development Center, Room 102
The Woodlands, Texas

I. Call to Order

II. General Overview of Federal/State Rules and Requirements
- Keith Sheedy, Technical Advisor/Chief Engineer's Office, Texas Commission on Environmental Quality (TCEQ)
- Richard Hyde, Director of Air Permits/Office of Permitting, Remediation, and Registration, TCEQ

III. Climate Change
- Larry Soward, Commissioner, Texas Commission on Environmental Quality

IV. Conflicting Federal and State Positions
- Kathleen Hartnett-White, Director, Center for Natural Resources at the Texas Public Policy Foundation
- Jed Anderson, Attorney, SIP Transformation Workgroup

V. Carbon Capture / Storage
- Jay Dauenhauer, Manager, Policy & Research, Clean Coal Technology Foundation of Texas
- Steve Melzer, President, Texas Carbon Capture and Storage Association
- Dr. Tip Meckel, Research Associate, Gulf Coast Carbon Center, BEG

VI. Industry Panel
- John W. Fainter, Jr., President and CEO, Association of Electric Companies of Texas
- Christina Wisdom, Vice President and General Counsel, Texas Chemical Council
- Debbie Hastings, Vice President for Environmental Affairs, Texas Oil and Gas Association
- Mary Miksa, Senior Vice President - Governmental Affairs, Texas Association of Business
- Phillip Oldham, Energy Counsel, Texas Association of Manufacturers

VII. Local Air Quality Issues
- Tracy Hester, Lawyer in Renewable Energy, Defense, & Environmental law, Greater Houston Partnership

VIII. Environmental Panel

- Tom "Smitty" Smith, Director, Public Citizen
- Ramon Alvarez, Scientist, Environmental Defense
- Luke Metzger, Legislative Director, Environment Texas
- Cyrus Reed, Conservation Director, Lone Star Chapter of Sierra Club

IX. New Technology Panel

- John W. Fainter, Jr., President and CEO, Association of Electric Companies of Texas
- Keith Sheedy, Technical Advisor/Chief Engineer's Office, TCEQ
- Alex Cuclis, Research Scientist, Houston Advanced Research Center
- Greg Kunkel, Senior Vice President and Chief Environmental Officer, Tenaska
- Suzi McClellan, Legislative Director, Good Company and Associates
- Allen Jones, Director, Water Resources Institute, Texas A&M University

IX. Public Testimony

X. Recess

AGENDA
Senate Committee on Natural Resources
September 9, 2008, 10:00 a.m.
University of Texas at Arlington - Central Library
Arlington, Texas

I. WELCOME

- Mayor Robert Cluck, City of Arlington
- Ron Natinsky, Chair, City Council Economic Development Committee

II. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

- David Schanbacher, Chief Engineer, TCEQ
- Richard Hyde, Director, Air Permits Division, TCEQ

III. ENVIRONMENTAL PROTECTION AGENCY

- Thomas Diggs, Associate Director - Air Program Region 6, EPA

IV. REGIONAL AIR QUALITY EFFORTS

- Judge Margaret Keliher, Executive Director, Texas Business for Clean Air
- Judge Chad Adams, Chair, Texas Clean Air Working Group
- Jim Crites, Executive Vice President, DFW Airport

V. ENVIRONMENTAL PANEL

- Cyrus Reed, Conservation Director, Lone Star Chapter of Sierra Club
- Ramon Alvarez, Scientist, Environmental Defense
- Rachel McClure, Director, Energy and Environmental Projects, Public Citizen
- Jim Schermbeck, Field Organizer, Downwinders at Risk

VI. INDUSTRY PANEL

- Mike Stewart, President, Texas Aggregate and Concrete Association
- Shawn Glacken, Luminant, Association of Electric Companies of Texas
- Gilbert Horton, Devon Energy, Texas Oil and Gas Association
- Maribeth Malloy, Lockheed Aeronautics Company, Texas Association of Business

VII. PUBLIC TESTIMONY

VIII. RECESS

AGENDA
Senate Committee on Natural Resources
Tuesday, September 30, 2008, 10:00 a.m.
Capitol Extension, Room E1.012
Austin, Texas

I. Update on the Houston State Implementation Plan

- Susana Hildebrand, Director, Air Quality Division, Texas Commission on Environmental Quality
- Craig Beskid, Chairman, Greater Houston Partnership Clean Air Committee

II. The Water-Energy Nexus

- Carolyn Brittin, Deputy Executive Administrator, Water Planning and Information Resources, Texas Water Development Board
- Ashlyn Stillwell, University of Texas Department of Environmental and Water Resources Engineering
- John Fainter, President and CEO, Association of Electric Companies of Texas
- Joseph Beal, Consulting Engineer

III. Air Quality and Energy Efficiency Incentive Programs

- Susana Hildebrand, Director, Air Quality Division, Texas Commission on Environmental Quality
- Bahman Yazdani, Associate Director of the Energy Systems Laboratory of Texas Engineering Experiment Station
- Jeff Haberl, Associate Director of the Energy Systems Laboratory of Texas Engineering Experiment Station
- George Beatty, Executive Director, Texas Environmental Research Consortium
- Dub Taylor, Director, State Energy Conservation Office, Comptroller of Public Accounts
- Ned Munoz, Director of Regulatory Affairs, Texas Association of Builders
- Mike Nasi, General Counsel, Clean Coal Foundation of Texas
- Les Findeisen, Director of Policy, Intergovernmental Relations, Texas Motor Transportation Association
- John Chisolm, President, W&B Service Company, L.P.
- Michael Stockard, Director of Energy Efficiency, Oncor
- Suzi McClellan, Legislative Director, Good Company Associates

IV. Public Testimony

V. Adjourn

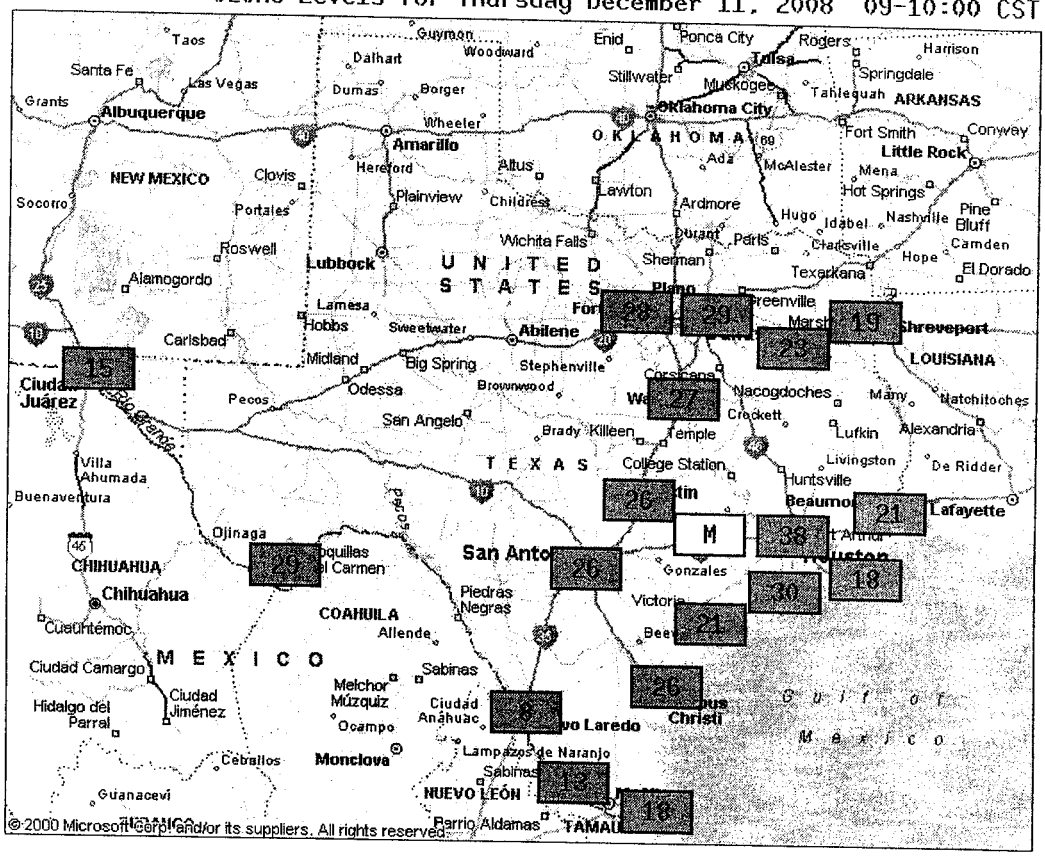
Appendix L

Current Ozone Levels

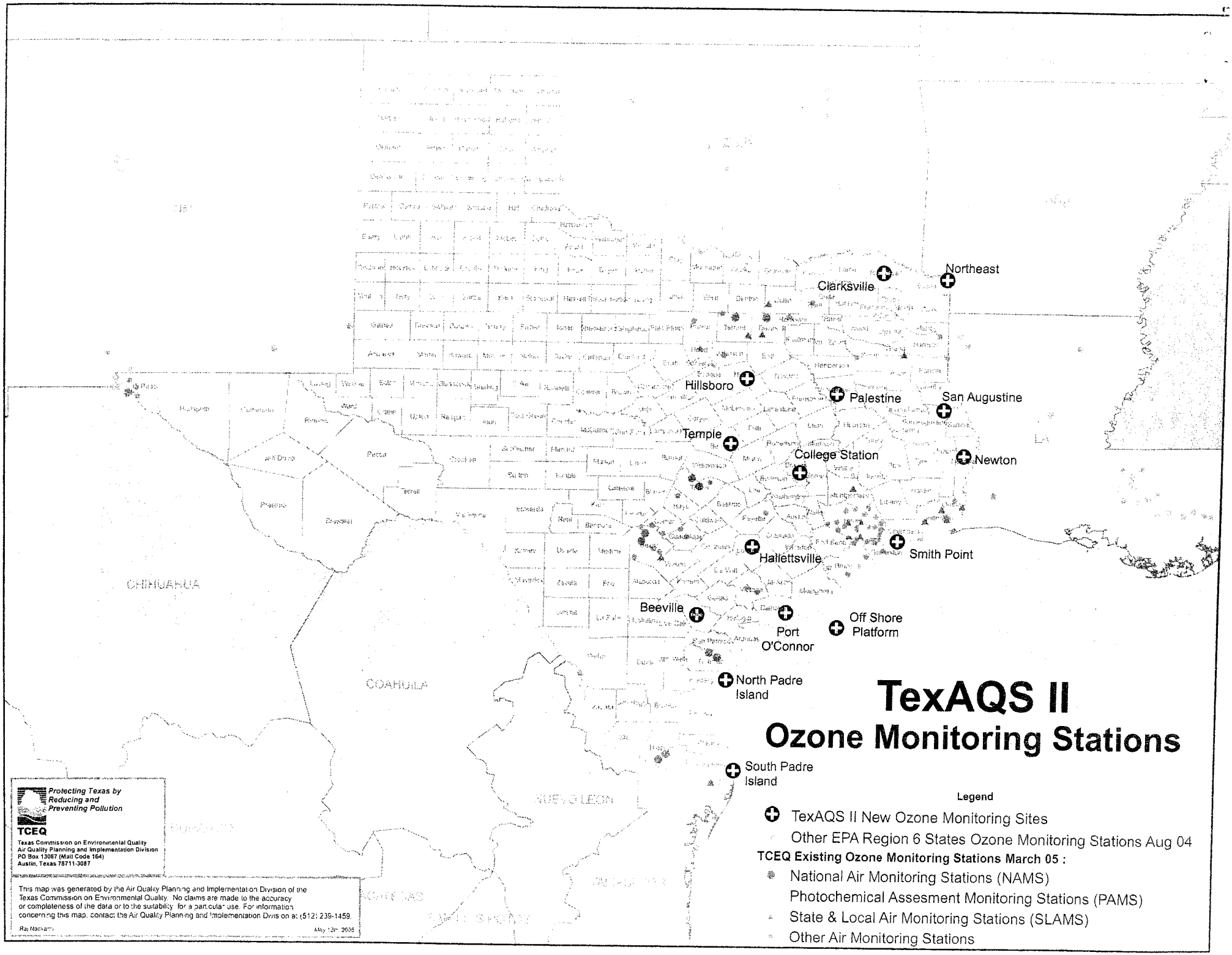
The map below shows the current highest ozone levels in each of the metropolitan areas across Texas where ozone is measured by the TCEQ. More detailed maps showing the current ozone levels measured at each site in a particular metropolitan area are available by clicking on the colored boxes below. These levels are based on data measured at the TCEQ's continuous air monitoring stations and includes data from local governments and private monitoring networks.

Images are normally available on this server approximately 31 minutes past the hour. A new image is expected in 21 minutes. The latest image available is for **Thursday December 11, 2008 09-10:00 CST**. If the image below is older than this, you will need to force your browser to reload this page by clicking on the browser "Reload" or "Refresh" button.

Ozone Levels for Thursday December 11, 2008 09-10:00 CST



The TCEQ has not verified this data and it may change. This is the most current data, but it is not official until it has been certified by our technical staff.



TexAQS II
Ozone Monitoring Stations

Legend

- TexAQS II New Ozone Monitoring Sites
- Other EPA Region 6 States Ozone Monitoring Stations Aug 04

TCEQ Existing Ozone Monitoring Stations March 05 :

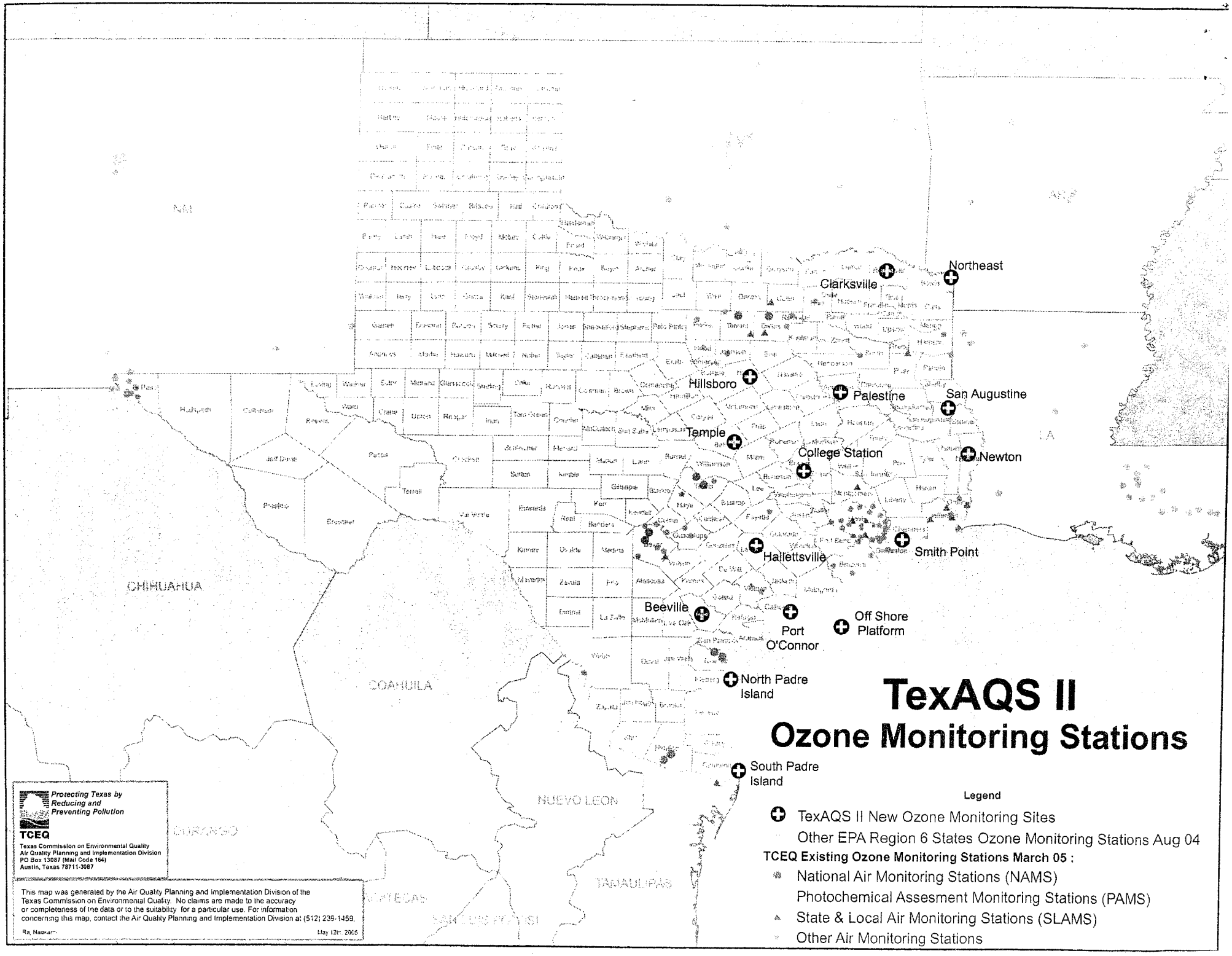
- National Air Monitoring Stations (NAMS)
- Photochemical Assesment Monitoring Stations (PAMS)
- State & Local Air Monitoring Stations (SLAMS)
- Other Air Monitoring Stations

Protecting Texas by Reducing and Preventing Pollution

TCEQ
Texas Commission on Environmental Quality
Air Quality Planning and Implementation Division
PO Box 13087 (Mail Code 164)
Austin, Texas 78711-3087

This map was generated by the Air Quality Planning and Implementation Division of the Texas Commission on Environmental Quality. No claims are made to the accuracy or completeness of the data or to the suitability for a particular use. For information concerning this map, contact the Air Quality Planning and Implementation Divis on at (512) 239-1459.

Raj Nackarmi May 12th, 2006


Northeast
Clarksville
Hillsboro
Palestine
San Augustine
Temple
College Station
Newton
Hallettsville
Smith Point
Beeville
Port O'Connor
Off Shore Platform
North Padre Island
South Padre Island
TexAQS II
Ozone Monitoring Stations
Legend
TexAQS II New Ozone Monitoring Sites
Other EPA Region 6 States Ozone Monitoring Stations Aug 04
TCEQ Existing Ozone Monitoring Stations March 05 :
National Air Monitoring Stations (NAMS)
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Protecting Texas by Reducing and Preventing Pollution
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May 12th, 2005
NEW MEXICO
CHIHUAHUA
COAHUILA
NUEVO LEON
TAMAULIPAS
DURANGO
ZACATECAS
SAN LUIS POTOSI
LA

Appendix M

North America's Leaders Solving Climate Change Together

Appendix N

DRIVE A CLEAN MACHINE/LIRAP
EXPENDITURES, DISTRIBUTIONS AND VEHICLE REPAIRS AND REPLACEMENTS

	FY '02	FY '03	FY '04	FY '05
TCEQ Administration	$186,365	$162,365	$162,365	$162,365
TCEQ Outreach	-0-	-0-	-0-	-0-
County Administration	$159,881	$679,682	$79,340	$81,693
Repairs/Replacements	-0-	$2,121,642	$3,770,913	$3,776,971
# Vehicles Repaired	-0-	4,163	7,296	7,270
# Vehicles Replaced	-0-	222	364	291
Local Initiative Projects	-0-	-0-	-0-	-0-

	FY '06	FY '07	FY '08	FY '09
TCEQ Administration	$149,285	$149,285	$210,000	$210,000
TCEQ Outreach	-0-	-0-	$675,000	-0-
County Administration	$939,074	$766,278	$4,411,500	$4,479,000
Repairs/Replacements	$4,411,641	$4,584,437	$39,703,500	$40,311,000
# Vehicles Repaired	8,034	6,885	4,732	869*
# Vehicles Replaced	230	213	13,760	1,792*
Local Initiative Projects	-0-	-0-	$5 million	$5 million

* Based on 1st quarter of FY' 09

AirCheckTexas - Drive a Clean Machine

FY 2008 Information

(December 1, 2008 to August 31, 2008)

Drive a Clean Machine – Grand Totals
FY 2008 (December 1, 2008 to August 31, 2008)

All Replacement Vehicles by Year

2,378	Model Year 2005
2,248	Model Year 2006
2,878	Model Year 2007*
5,233	Model Year 2008**
709	Model Year 2009
24	Model Year Not Provided*
22	Model Year Other***
13,492	**Total Replaced***

Ten Most Popular Models Purchased

990	Toyota Corolla
715	Toyota Camry
433	Ford Taurus
404	Honda Accord
401	Ford Focus
394	Chevrolet Cobalt
385	Honda Civic
351	Chevrolet Impala
336	Nissan Altima
306	Chevrolet Malibu

Top 8 Manufacturers - All Replacement Vehicles

2,971	Toyota
2,617	GM
2,011	Ford
1,640	Chrysler
1,338	Honda
1,009	Nissan
680	Kia
647	Hyundai

Total Hybrids

39	Toyota Prius
14	Honda Civic
4	Toyota Camry
1	Saturn Vue
1	Honda Accord

All Replacement Vehicles by Make

2,960	Toyota
1,806	Chevrolet
1,540	Ford
1,306	Honda
991	Nissan
777	Dodge
680	Kia
663	Chrysler
647	Hyundai
386	Pontiac
325	Mazda
233	Saturn
212	Suzuki
200	Jeep
167	Mitsubishi
114	Mercury
90	Volkswagen
87	Buick
79	GMC
32	Acura
29	Not Provided
26	BMW
23	Cadillac
18	Infiniti
18	Lincoln
15	Subaru
14	Volvo
12	Mercedes-Benz
11	Lexus
10	Audi
7	Isuzu
7	Mini Cooper
4	Jaguar
2	Saab
1	Hummer
13,492	**Total Replaced**

*Two vehicles that were reported as other/not provided in the 2nd quarter report were later determined to be 2007 models.
** The numbers reported in the 2nd quarter included an ineligible Ford. NCTCOG did not pay the voucher. It was removed from the database.
***Pre-SB 12 LIRAP.

NCTCOG
FY 2008 (December 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

1,328	Model Year 2005
1,196	Model Year 2006
1,545	Model Year 2007
2,358	Model Year 2008
257	Model Year 2009
12	Model Year Other*
6,696	**Total Replaced****

Top 5 Dealers

111	Freeman Toyota
110	Public Auto Sales
110	Toyota of Richardson
92	Chacon Autos of Dallas
91	Toyota of Plano
81	Carmax

Replacement Vehicles by Make

1,053	Toyota
916	Chevrolet
889	Ford**
554	Honda
490	Nissan
457	Kia
448	Dodge
404	Hyundai
381	Chrysler
190	Pontiac
161	Suzuki
143	Mazda
108	Jeep
108	Saturn
93	Mitsubishi
75	Mercury
52	Volkswagen
40	Buick
29	GMC
16	BMW
12	Cadillac
11	Infiniti
10	Acura
8	Subaru
8	Volvo
6	Lincoln
6	Isuzu
6	Audi
5	Lexus
5	Mini
5	Mercedes-Benz
3	Jaguar
2	Saab
2	Not Provided

Top 10 Most Popular Models Purchased

392	Toyota Corolla
270	Toyota Camry
250	Ford Focus
232	Ford Taurus
207	Chevrolet Cobalt
187	Honda Civic
187	Honda Accord
186	Kia Spectra
178	Nissan Altima
175	Chevrolet Impala

Total Hybrids

15	Toyota Prius
7	Honda Civic
1	Toyota Camry
1	Honda Accord

Top 10 Manufacturers of Replacement Vehicles

1,297	GM
1,121	Ford
1,058	Toyota
937	Chrysler
564	Honda
501	Nissan
457	Kia
404	Hyundai
161	Suzuki
93	Mitsubishi

* Pre-SB 12 LIRAP.

** The numbers reported in the 2nd quarter included an ineligible Ford. NCTCOG did not pay the voucher. It was removed from the database.

HGAC
FY 2008 (December 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

930	Model Year 2005
941	Model Year 2006
1,171	Model Year 2007*
2,573	Model Year 2008
427	Model Year 2009
24	Model Year Not Provided*
9	Model Year Other**
6,075	**Total Replaced**

Replacement Vehicles by Make

1,777	Toyota
799	Chevrolet
638	Honda
573	Ford
455	Nissan
297	Dodge
249	Chrysler
202	Hyundai
190	Kia
175	Pontiac
140	Mazda
113	Saturn
80	Jeep
66	Mitsubishi
48	GMC
46	Buick
44	Suzuki
35	Mercury
34	Volkswagen
27	Not Provided
20	Acura
12	Lincoln
11	Cadillac
7	Mercedes-Benz
7	Infiniti
6	Volvo
6	BMW
5	Lexus
5	Subaru
4	Audi
2	Mini Cooper
1	Hummer
1	Jaguar

Top 5 Dealers

339	Sterling McCall Toyota
287	Joe Myers Toyota
200	Mike Calvert Toyota
146	Fred Hass Toyota World
120	Carmax Auto Superstores, Inc.(SW Frwy)

Top 10 Most Popular Models Purchased

556	Toyota Corolla
424	Toyota Camry
195	Honda Accord
182	Ford Taurus
170	Chevrolet Cobalt
162	Honda Civic
158	Chevrolet Impala
142	Nissan Altima
135	Chevrolet Malibu
131	Ford Focus

Total Hybrids

11	Toyota Prius
4	Honda Civic
3	Toyota Camry
1	Saturn Vue

Top 10 Manufacturers of Replacement Vehicles

1,782	Toyota
1,193	GM
766	Ford
658	Honda
626	Chrysler
462	Nissan
202	Hyundai
190	Kia
66	Mitsubishi
44	Suzuki

*Two vehicles that were reported as other/not provided in the 2nd quarter report were later determined to be 2007 models.
** Pre-SB 12 LIRAP.

Travis County
FY 2008 (December 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

86	Model Year 2005
84	Model Year 2006
112	Model Year 2007
222	Model Year 2008
21	Model Year 2009
1	Model Year Other*
526	**Total Replaced**

Replacement Vehicles by Make

103	Toyota
96	Honda
71	Chevrolet
49	Ford
39	Mazda
30	Nissan
24	Hyundai
23	Kia
20	Dodge
18	Chrysler
15	Pontiac
7	Mitsubishi
6	Jeep
5	Saturn
4	BMW
4	Suzuki
4	Volkswagen
2	GMC
2	Mercury
1	Lexus
1	Isuzu
1	Acura
1	Subaru

Top 5 Dealers

60	Car Max Auto Super Stores Inc.
42	Champion Toyota
41	Howdy Honda
35	First Texas Honda
35	Mazda South
23	Charles Maund Toyota

Most Popular Models Purchased

33	Toyota Corolla
31	Honda Civic
26	Mazda 3
26	Honda Fit
20	Honda Accord
15	Ford Focus
14	Toyota Camry
14	Chevrolet Impala
13	Chevrolet Malibu
13	Toyota Prius

Total Hybrids

13	Toyota Prius
3	Honda Civic

Top 5 Manufacturers of Replacement Vehicles

104	Toyota
97	Honda
93	GM
90	Ford
44	Chrysler

* Pre-SB 12 LIRAP.

Williamson County
FY 2008 (December 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

34	Model Year 2005
27	Model Year 2006
50	Model Year 2007
80	Model Year 2008
4	Model Year 2009
195	**Total Replaced**

Replacement Vehicles by Make

29	Ford
27	Toyota
20	Chevrolet
18	Honda
17	Hyundai
16	Nissan
15	Chrysler
12	Dodge
10	Kia
7	Saturn
6	Jeep
6	Pontiac
3	Suzuki
3	Mazda
2	Mercury
1	Acura
1	Subaru
1	Buick
1	Mitsubishi

Top 3 Dealers

25	Car Max Auto
9	Classic Honda
8	Champion Toyota
8	Classic Hyundai
8	Classic Toyota
8	Leif Johnson Ford
8	Round Rock Nissan

Most Popular Models Purchased

9	Toyota Corolla
7	Ford Taurus
7	Toyota Camry
6	Honda Fit
6	Saturn Ion
6	Nissan Altima
6	Hyundai Elantra
5	Honda Civic
5	Ford F-150
5	Chrysler Pt Cruiser
5	Chevrolet Cobalt
5	Ford Focus

Top 9 Manufacturers of Replacement Vehicles

34	Ford
34	GM
33	Chrysler
27	Toyota
19	Honda
17	Hyundai
16	Nissan
10	Kia
3	Suzuki
1	Mitsubishi
1	Subaru

Drive a Clean Machine – Retired Vehicle Information
FY 2008 (December 1, 2008 to August 31, 2008)

All Retired Vehicles by Make 13,492	NCTCOG Retired Vehicles by Make 6,696	HGAC Retired Vehicles by Make 6,075	Travis County Retired Vehicles by Make 526	Williamson County Retired Vehicles by Make 195
1,988 Ford	1,068 Ford	1,050 Toyota	61 Chevrolet	24 Ford
1,753 Toyota	785 Chevrolet	838 Ford	60 Toyota	20 Toyota
1,498 Chevrolet	623 Toyota	633 Chevrolet	58 Honda	19 Chevrolet
1,213 Honda	559 Honda	581 Honda	58 Ford	18 Nissan
959 Nissan	466 Nissan	441 Nissan	38 Mazda	15 Honda
619 Dodge	313 Dodge	289 Mazda	34 Nissan	13 Mercury
605 Mazda	278 Buick	269 Dodge	30 Buick	12 Mazda
546 Buick	266 Mazda	231 Buick	29 Dodge	8 Mitsubishi
461 Oldsmobile	246 Mercury	197 Oldsmobile	16 Mercury	8 Dodge
450 Mercury	246 Oldsmobile	175 Mercury	13 Pontiac	7 Buick
406 Pontiac	227 Pontiac	161 Pontiac	12 Oldsmobile	6 Oldsmobile
273 Saturn	162 Chrysler	119 Saturn	12 Volvo	5 Lincoln
259 Plymouth	147 Mitsubishi	100 Cadillac	10 Mitsubishi	5 GEO
258 Mitsubishi	147 Plymouth	98 Plymouth	10 Plymouth	5 Pontiac
253 Chrysler	143 Saturn	93 Mitsubishi	9 Jeep	4 Plymouth
238 Cadillac	131 Cadillac	88 Acura	9 GEO	3 Volvo
218 Jeep	120 Jeep	86 Jeep	8 Saturn	3 Mercedes
201 Geo	112 Geo	80 Chrysler	8 Chrysler	3 Chrysler
184 Acura	106 Lincoln	77 GMC	6 Cadillac	3 Jeep
176 Lincoln	90 GMC	75 GEO	5 GMC	3 Saturn
174 GMC	89 Acura	60 Lincoln	5 Lincoln	2 Subaru
118 Isuzu	59 Isuzu	58 Lexus	5 Acura	2 Isuzu
117 Volvo	52 Volvo	52 Isuzu	5 Mercedes	2 GMC
104 Lexus	44 Lexus	50 Volvo	5 Isuzu	2 Acura
73 Hyundai	33 Hyundai	39 Hyundai	5 BMW	1 Cadillac
61 Infiniti	32 Infiniti	26 Infiniti	3 Infiniti	1 Kia
53 Subaru	27 BMW	23 Subaru	3 Volkswagen	1 Volkswagen
52 Mercedes	26 Subaru	21 Mercedes	2 Lexus	
48 BMW	25 Volkswagen	16 BMW	2 Subaru	
45 Volkswagen	23 Mercedes	16 Volkswagen	1 Kia	
29 Kia	16 Kia	11 Kia	1 Saab	
19 Suzuki	11 Suzuki	8 Suzuki	1 Hyundai	
16 Eagle	11 Eagle	4 Audi	1 Daewoo	
7 Audi	3 Audi	4 Eagle	1 Eagle	
3 Jaguar	3 Jaguar	3 Not Provided		
3 Not Provided	2 Land Rover	1 Land Rover		
3 Saab	1 Alfa Romeo	1 SAAB		
3 Land Rover	1 AMC	1 Sterling		
1 each - AMC, Alfa Romeo, Daewoo, Peugeot, Porsche & Sterling	1 Peugeot			
	1 Porsche			
	1 Saab			

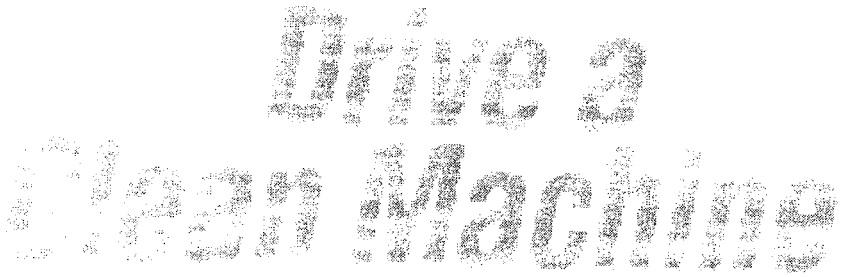
Drive a Clean Machine – Retired Vehicle Information
FY 2008 (December 1, 2008 to August 31, 2008)

All Retired Vehicles by Year 13,492		NCTCOG Retired Vehicles by Year 6,696		HGAC Retired Vehicles by Year 6,075		Travis County Retired Vehicles by Year 526		Williamson County Retired Vehicles by Year 195	
1	1955	1	1959	1	1955	1	1970	1	1973
1	1959	3	1969	1	1966	1	1971	1	1982
1	1966	1	1971	1	1970	2	1978	1	1983
3	1969	4	1972	3	1971	1	1979	1	1984
2	1970	2	1973	2	1972	1	1982	2	1985
5	1971	1	1974	1	1973	1	1983	2	1986
6	1972	1	1975	3	1974	3	1984	2	1987
4	1973	3	1976	3	1976	15	1985	5	1988
4	1974	17	1977	10	1978	10	1986	8	1989
1	1975	14	1978	10	1979	14	1987	6	1990
6	1976	20	1979	6	1980	19	1988	10	1991
17	1977	15	1980	16	1981	22	1989	16	1992
26	1978	21	1981	16	1982	25	1990	22	1993
31	1979	20	1982	17	1983	37	1991	28	1994
21	1980	25	1983	36	1984	42	1992	35	1995
37	1981	55	1984	58	1985	66	1993	24	1996
38	1982	82	1985	79	1986	62	1994	23	1997
44	1983	92	1986	109	1987	65	1995	8	1998
95	1984	133	1987	135	1988	52	1996		
157	1985	188	1988	251	1989	54	1997		
183	1986	275	1989	374	1990	29	1998		
258	1987	382	1990	489	1991	3	2000		
347	1988	429	1991	551	1992	1	2001		
556	1989	575	1992	684	1993				
787	1990	712	1993	671	1994				
965	1991	765	1994	838	1995				
1,184	1992	955	1995	658	1996				
1,484	1993	738	1996	596	1997				
1,526	1994	681	1997	392	1998				
1,893	1995	454	1998	42	1999				
1,472	1996	23	1999	14	2000				
1,354	1997	6	2000	5	2001				
883	1998	1	2001	2	2003				
65	1999	1	2003	1	2005				
23	2000	1	2006						
7	2001								
3	2003								
1	2005								
1	2006								

AirCheckTexas - Drive a Clean Machine

4th Quarter Information

(June 1, 2008 to August 31, 2008)



Drive a Clean Machine – Grand Totals
4th Quarter (June 1, 2008 to August 31, 2008)

All Replacement Vehicles by Year

761	Model Year 2005
706	Model Year 2006
896	Model Year 2007
1665	Model Year 2008
350	Model Year 2009
19	Model Year Not Provided*

**H-GAC did not provide*

4,397 Total Replaced

Ten Most Popular Models Purchased

256	Toyota Corolla
216	Toyota Camry
151	Honda Civic
145	Honda Accord
140	Ford Taurus
126	Nissan Altima
124	Ford Focus
117	Chevrolet Impala
114	Chevrolet Cobalt
103	Chevrolet Malibu

Top 8 Manufacturers - All Replacement Vehicles

859	Toyota
806	GM
646	Ford
537	Chrysler
514	Honda
367	Nissan
239	Hyundai
222	Kia

Total Hybrids

5	Honda Civic
1	Toyota Camry Hybrid
13	Toyota Prius

All Replacement Vehicles by Make

854	Toyota
565	Chevrolet
497	Honda
487	Ford
361	Nissan
251	Dodge
239	Hyundai
222	Kia
215	Chrysler
115	Mazda
111	Pontiac
75	Saturn
71	Jeep
65	Suzuki
65	Mitsubishi
30	Mercury
27	Volkswagen
26	Buick
18	GMC
17	Acura
16	Not Provided
12	BMW
10	Cadillac
9	Volvo
8	Subaru
6	Infiniti
5	Mercedes-Benz
5	Lexus
5	Lincoln
4	Audi
2	Jaguar
2	Mini
1	Isuzu
1	Hummer

NCTCOG
4th Quarter (June 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

302	Model Year 2005
283	Model Year 2006
352	Model Year 2007
598	Model Year 2008
118	Model Year 2009
1,653	**Total Replaced**

Replacement Vehicles by Make

257	Toyota
190	Ford
180	Chevrolet
166	Honda
147	Nissan
121	Kia
119	Hyundai
117	Dodge
88	Chrysler
47	Pontiac
44	Suzuki
36	Mazda
33	Saturn
32	Jeep
18	Mitsubishi
11	Mercury
7	BMW
5	Volkswagen
5	Buick
4	Volvo
4	Infiniti
4	Subaru
3	Acura
3	Cadillac
3	GMC
2	Audi
2	Lexus
1	Lincoln
1	Jaguar
1	Mercedes-Benz
1	Mini
1	Not Provided

Top 5 Dealers

41	Southwest Kia of Dallas on LBJ
41	Toyota of Richardson
41	Vandergriff Toyota
35	Lute Riley Honda
30	Chacon Autos of Dallas
29	David McDavid Honda of Irving
28	Public Auto Sales of Dallas
28	Vandergriff Honda

Top 10 Most Popular Models Purchased

90	Toyota Corolla
70	Toyota Camry
68	Honda Civic
56	Ford Focus
54	Nissan Altima
49	Honda Accord
48	Kia Spectra
45	Ford Taurus
41	Chevrolet Cobalt
37	Chevrolet Malibu

Total Hybrids

1	Toyota Prius
1	Honda Civic

Top 10 Manufacturers of Replacement Vehicles

271	GM
259	Toyota
242	Ford
237	Chrysler
169	Honda
151	Nissan
121	Kia
119	Hyundai
44	Suzuki
18	Mitsubishi

HGAC
4th Quarter (June 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

401	Model Year 2005
361	Model Year 2006
465	Model Year 2007
910	Model Year 2008
213	Model Year 2009
19	Model Year Not Provided
2,369	**Total Replaced**

Replacement Vehicles by Make

533	Toyota
335	Chevrolet
266	Honda
250	Ford
191	Nissan
113	Dodge
112	Chrysler
94	Hyundai
87	Kia
61	Mazda
54	Pontiac
42	Mitsubishi
39	Saturn
35	Jeep
21	Buick
19	Suzuki
19	Volkswagen
17	Mercury
15	GMC
15	Not Provided
14	Acura
7	Cadillac
5	Volvo
4	BMW
4	Lincoln
4	Mercedes-Benz
3	Lexus
3	Subaru
2	Audi
2	Infiniti
1	Jaguar
1	Hummer
1	Mini

Top 5 Dealers

146	Sterling McCall Toyota
71	Carmax Auto Superstores, Inc (SW frwy.)
69	Joe Myers Toyota
65	Champion Toyota
64	Gillman Honda

Top 10 Most Popular Models Purchased

148	Toyota Corolla
136	Toyota Camry
86	Honda Accord
82	Ford Taurus
70	Chevrolet Impala
64	Nissan Altima
63	Honda Civic
62	Chevrolet Cobalt
61	Chevrolet Malibu
58	Honda CR-V

Total Hybrids

5	Toyota Prius
2	Honda Civic Hybrid
1	Toyota Camry Hybrid

Top 10 Manufacturers of Replacement Vehicles

536	Toyota
472	GM
337	Ford
280	Honda
260	Chrysler
193	Nissan
94	Hyundai
87	Kia
42	Mitsubishi
19	Suzuki
19	Volkswagen

Travis County
4th Quarter (June 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

47 Model Year 2005
55 Model Year 2006
62 Model Year 2007
130 Model Year 2008
16 Model Year 2009
310 Total Replaced

Top 5 Dealers

25 First Texas Honda
21 Carmax Auto Superstores
19 Howdy Honda
16 Champion Toyota
14 Round Rock Toyota
14 Round Rock Honda

Replacement Vehicles by Make

58 Honda
54 Toyota
43 Chevrolet
34 Ford
21 Hyundai
20 Nissan
16 Dodge
16 Mazda
13 Chrysler
12 Kia
7 Pontiac
4 Mitsubishi
3 Volkswagen
2 Jeep
2 Saturn
1 BMW
1 Isuzu
1 Mercury
1 Subaru
1 Suzuki

Most Popular Models Purchased

20 Honda Fit
17 Honda Civic
15 Toyota Corolla
11 Chevrolet Impala
10 Ford Taurus
10 Honda Accord
9 Chevrolet Cobalt
9 Ford Focus
8 Hyundai Elantra
8 Mazda 3
8 Toyota Camry

Total Hybrids

7 Toyota Prius
2 Honda Civic

Top 5 Manufacturers of Replacement Vehicles

58 Honda
54 Toyota
52 GM
51 Ford
31 Chrysler

Williamson County
4th Quarter (June 1, 2008 to August 31, 2008)

Replacement Vehicles by Year

11 Model Year 2005
7 Model Year 2006
17 Model Year 2007
27 Model Year 2008
3 Model Year 2009
65 Total Replaced

Top 3 Dealership

8 Carmax
4 Leif Johnson Ford
3 Classic Honda

Most Popular Models Purchased

3 Chevrolet Impala
3 Ford F150
3 Ford Taurus
3 Honda Fit
3 Honda Civic
3 Toyota Corolla
2 Pontiac G6 CT/GTP

Replacement Vehicles by Make

13 Ford
10 Toyota
7 Chevrolet
7 Honda
5 Dodge
5 Hyundai
3 Nissan
3 Pontiac
2 Chrysler
2 Jeep
2 Kia
2 Mazda
1 Mercury
1 Mitsubishi
1 Saturn
1 Suzuki

Top 5 Manufacturers of Replacement Vehicles

16 Ford
11 GM
10 Toyota
9 Chrysler
7 Honda

Drive a Clean Machine – Retired Vehicle Information
4th Quarter (June 1, 2008 to August 31, 2008)

All Retired Vehicles by Make		NCTCOG Retired Vehicles by Make		HGAC Retired Vehicles by Make		Travis County Retired Vehicles by Make		Williamson County Retired Vehicles by Make	
4,397		1,653		2,369		310		65	
633	Ford	248	Ford	380	Toyota	36	Chevrolet	8	Chevrolet
592	Toyota	209	Chevrolet	346	Ford	36	Honda	8	Toyota
506	Chevrolet	173	Toyota	253	Chevrolet	34	Ford	7	Honda
434	Honda	162	Honda	229	Honda	31	Toyota	7	Nissan
311	Nissan	126	Nissan	159	Nissan	24	Mazda	5	Ford
202	Dodge	77	Dodge	111	Dodge	19	Nissan	4	Mercury
201	Mazda	68	Mazda	106	Mazda	17	Buick	4	Mitsubishi
160	Buick	60	Pontiac	88	Buick	13	Dodge	3	Buick
142	Oldsmobile	53	Oldsmobile	81	Mercury	9	Oldsmobile	3	Mazda
139	Mercury	52	Buick	80	Oldsmobile	9	Plymouth	3	Mercedes
134	Pontiac	47	Mercury	64	Pontiac	9	Pontiac	2	Geo
97	Plymouth	43	Plymouth	43	Plymouth	8	Volvo	2	Jeep
83	Saturn	35	Chrysler	42	Saturn	7	Mercury	2	Plymouth
82	Mitsubishi	33	Saturn	41	Jeep	7	Mitsubishi	1	Chrysler
78	Jeep	32	Mitsubishi	39	Mitsubishi	7	Saturn	1	Dodge
71	Chrysler	31	Jeep	37	Acura	6	Cadillac	1	Isuzu
61	Cadillac	28	Cadillac	35	GMC	6	Chrysler	1	Lincoln
60	Lincoln	27	Lincoln	29	Chrysler	6	Geo	1	Pontiac
58	Acura	25	Geo	28	Lincoln	4	Jeep	1	Saturn
58	GMC	21	GMC	27	Cadillac	4	Lincoln	1	Volkswagen
54	Geo	19	Acura	21	Geo	3	BMW		
37	Volvo	14	Volvo	19	Lexus	3	Infiniti		
33	Lexus	13	Lexus	17	Isuzu	3	Mercedes		
28	Isuzu	10	Hyundai	15	Hyundai	2	Acura		
25	Hyundai	9	Isuzu	15	Volvo	2	GMC		
20	Mercedes	8	BMW	12	Infiniti	1	Eagle		
20	Subaru	8	Subaru	11	Subaru	1	Isuzu		
19	BMW	4	Infiniti	10	Kia	1	Lexus		
19	Infiniti	4	Mercedes	10	Mercedes	1	Subaru		
12	Kia	4	Suzuki	8	BMW	1	Volkswagen		
11	Volkswagen	4	Volkswagen	5	Volkswagen				
7	Suzuki	2	Eagle	3	Suzuki				
4	Eagle	2	Kia	1	Eagle				
1	AMC	1	AMC	1	Land Rover				
1	Audi	1	Audi	1	Not Provided				
1	Land Rover			1	SAAB				
1	Not Provided			1	Sterling				
1	Saab								
1	Sterling								

Drive a Clean Machine – Retired Vehicle Information
4th Quarter (June 1, 2008 to August 31, 2008)

All Retired Vehicles by Year		NCTCOG Retired Vehicles by Year		HGAC Retired Vehicles by Year		Travis County Retired Vehicles by Year		Williamson County Retired Vehicles by Year	
4,397		1,653		2,369		310		65	
1	1955	1	1969	1	1955	1	1970	1	1973
1	1969	1	1972	1	1970	1	1971	1	1982
2	1970	1	1973	1	1971	2	1978	1	1983
2	1971	1	1974	1	1972	1	1979	3	1988
2	1972	1	1976	1	1973	1	1983	1	1989
3	1973	2	1977	5	1978	3	1984	2	1990
1	1974	5	1979	3	1979	8	1985	3	1991
1	1976	1	1980	2	1980	4	1986	9	1992
2	1977	3	1981	6	1981	8	1987	3	1993
7	1978	2	1982	5	1982	8	1988	6	1994
9	1979	4	1983	7	1983	13	1989	9	1995
3	1980	14	1984	12	1984	14	1990	8	1996
9	1981	17	1985	22	1985	22	1991	13	1997
8	1982	15	1986	31	1986	28	1992	5	1998
13	1983	29	1987	37	1987	37	1993		
29	1984	56	1988	48	1988	35	1994		
47	1985	49	1989	89	1989	40	1995		
50	1986	101	1990	158	1990	31	1996		
74	1987	109	1991	185	1991	35	1997		
115	1988	130	1992	214	1992	17	1998		
152	1989	166	1993	256	1993	1	2000		
275	1990	174	1994	235	1994				
319	1991	234	1995	323	1995				
381	1992	187	1996	262	1996				
462	1993	193	1997	255	1997				
450	1994	150	1998	175	1998				
606	1995	3	1999	24	1999				
488	1996	4	2000	8	2000				
496	1997			1	2001				
347	1998			1	2003				
27	1999								
13	2000								
1	2001								
1	2003								

Appendix O

Texas Administrative Code

TITLE 34 PUBLIC FINANCE

PART 1 COMPTROLLER OF PUBLIC ACCOUNTS

CHAPTER 19 STATE ENERGY CONSERVATION OFFICE

SUBCHAPTER E TEXAS BUILDING ENERGY PERFORMANCE STANDARDS

RULE §19.51 Definitions

The following words and terms, when used in this subchapter shall have the following meanings, unless the context clearly indicates otherwise.

(1) "Codes" means the International Energy Conservation Code and the International Residential Code.

(2) "International Energy Conservation Code" means the International Energy Conservation Code as developed, maintained and promulgated by the International Code Council.

(3) "International Residential Code" means the International Residential Code for One- and Two-Family Dwellings as developed, maintained and promulgated by the International Code Council.

(4) "Laboratory" means the Energy Systems Laboratory at the Texas Engineering Experiment Station of The Texas A&M University System.

Source Note: The provisions of this §19.51 adopted to be effective February 4, 2008, 33 TexReg 946

Texas Administrative Code

TITLE 34 PUBLIC FINANCE

PART 1 COMPTROLLER OF PUBLIC ACCOUNTS

CHAPTER 19 STATE ENERGY CONSERVATION OFFICE

SUBCHAPTER E TEXAS BUILDING ENERGY PERFORMANCE STANDARDS

RULE §19.52 Public Comment on Building Energy Efficiency Performance Standards

(a) Pursuant to Health and Safety Code, §388.003, following publication of a new edition of the International Energy Conservation Code, or a new edition of the International Residential Code, the State Energy Conservation Office (SECO) will publish notice in the Texas Register and on the SECO website informing interested persons that they may provide written comments to SECO on the new editions of the Codes.

(b) Comments are encouraged from any interested persons, including without limitation: commercial and residential builders; architects and engineers; municipal, county, and other local government authorities; and environmental groups.

(c) Comments will be accepted for a minimum of 30 days after publication of the notice in the Texas Register or for a longer period as specified in the request for comments.

(d) Written comments should be submitted to SECO's business or mailing address specified in §19.2 of this title (relating to State Energy Conservation Office Business Location and Mailing Address), or the comments may be submitted electronically to SECO's electronic mail address specified on SECO's web site.

(e) SECO will forward any written comments received on the Codes pursuant to this section to the Laboratory for the Laboratory to consider in developing their written recommendations.

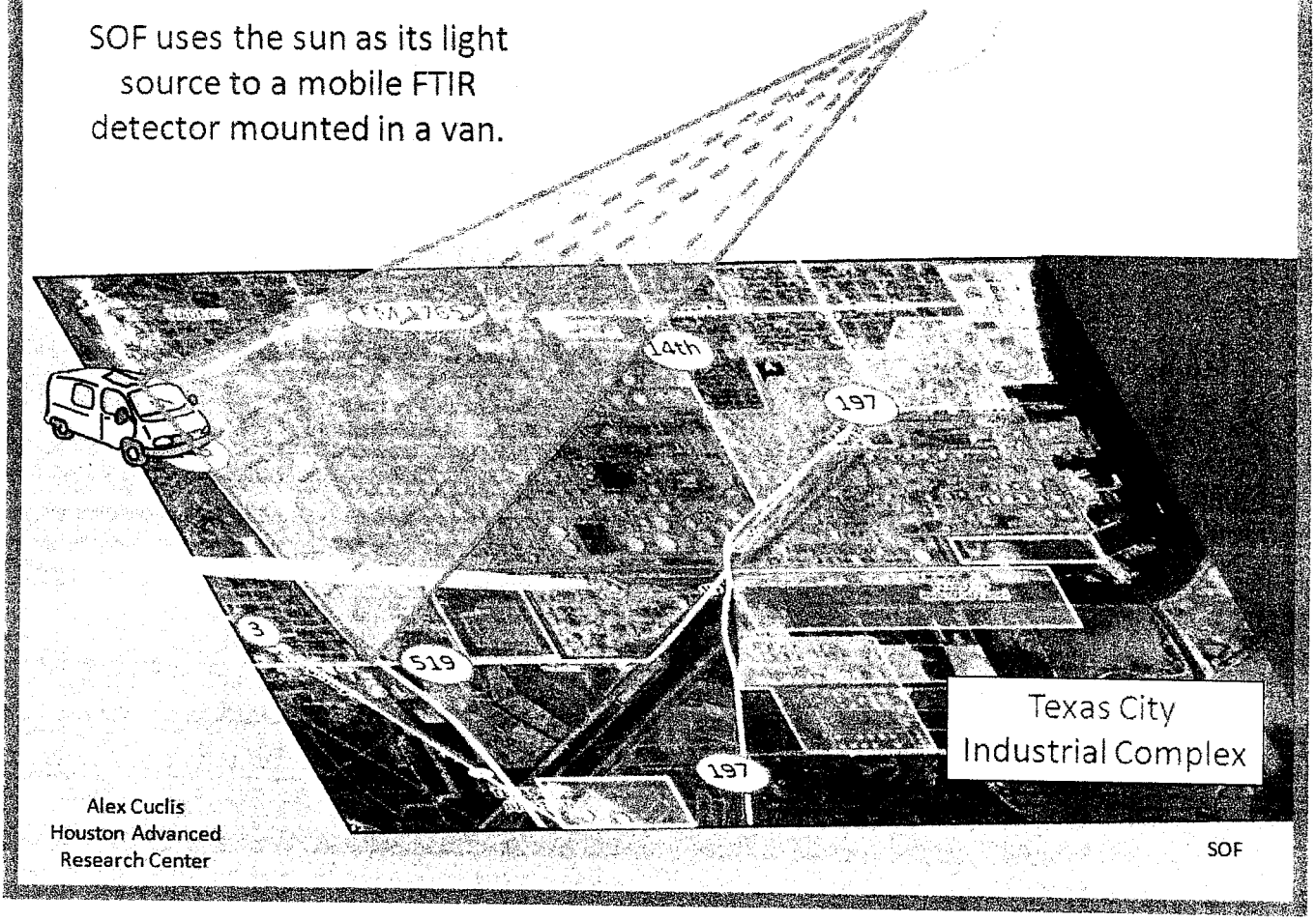
Source Note: The provisions of this §19.52 adopted to be effective February 4, 2008, 33 TexReg 946

Appendix P

6

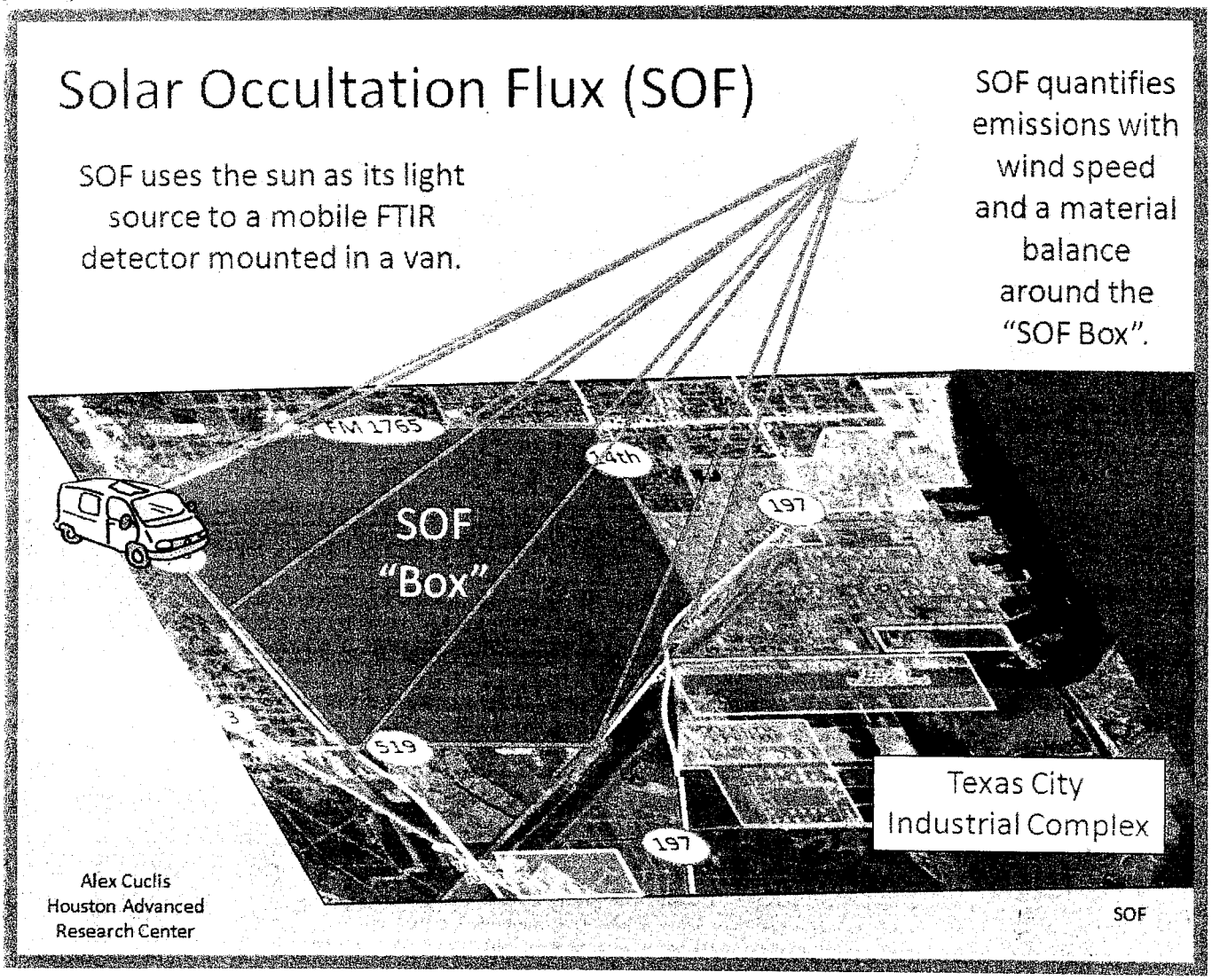
Solar Occultation Flux (SOF)

SOF uses the sun as its light source to a mobile FTIR detector mounted in a van.



Emissions measured at Texas City suggest that U.S. chemical plants and refineries have issues with underestimating alkanes.

In 2006 Chalmers University (which has been measuring emissions from refineries in Sweden since 2005) used Solar Occultation Flux (SOF) to take measurements while travelling down Hwy 146 on 3 different days (Sept. 2, 14 and 20), making a total of 6 traverses. The wind was from the east. The total alkanes measured averaged the weight equivalent of about 500 bbls/day. The 3 Texas City refineries were processing approximately 550,000 bbls/day of crude. The largest refinery, which represents 50% of the total reported emissions, was running at ½ rates. The annual emissions from all industry sources, if converted directly to an hourly number, would be less than 125 barrels per day, however each barrel would have many other hydrocarbons not included in these estimates with SOF, including HRVOCs and aromatic compounds.

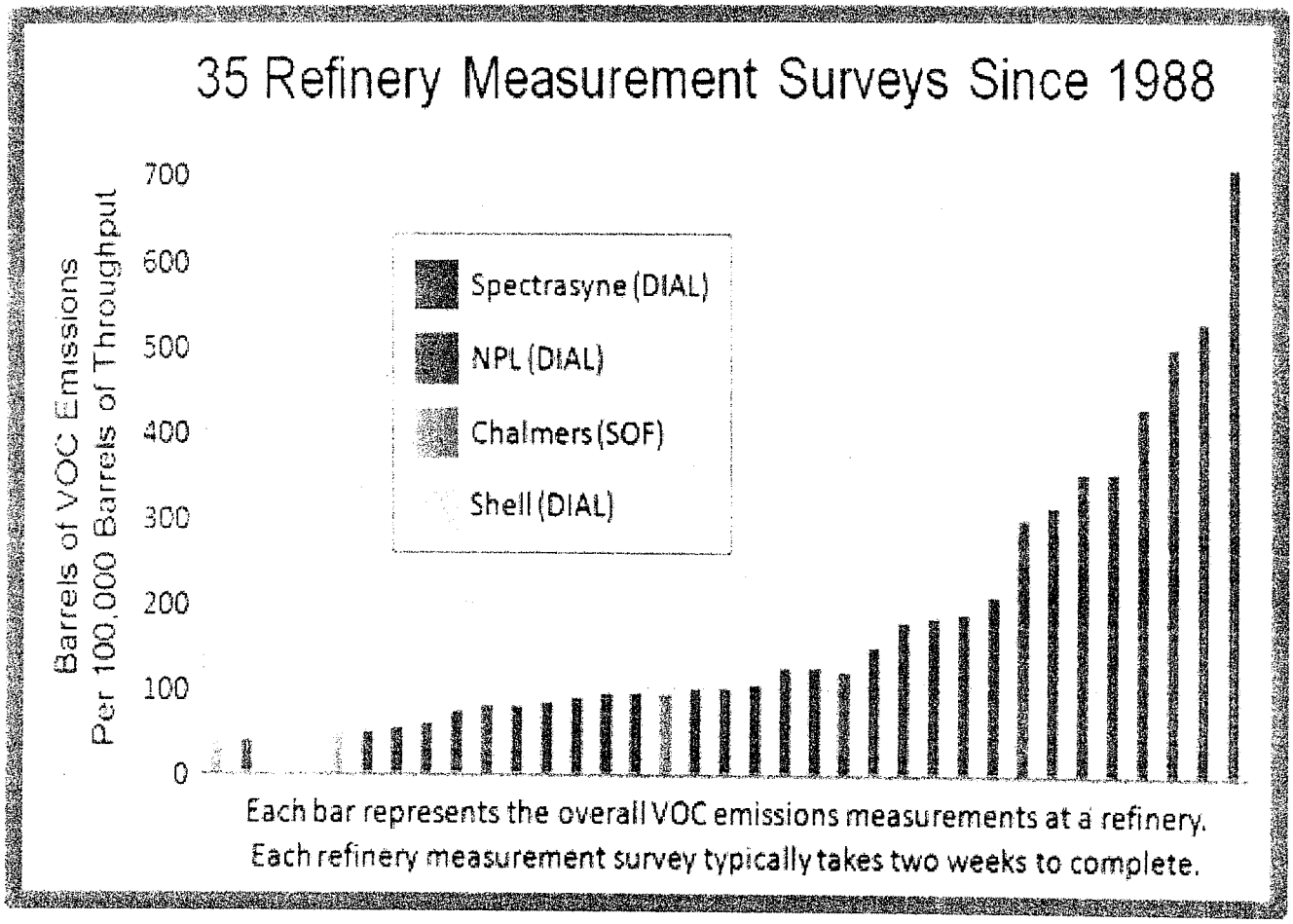


Because of concerns about VOC emissions being off, there is currently a lot of effort being spent on revising the emissions factors for various operations within refineries including flares, tanks, cokers, etc. There is another approach that regulating agencies may want to consider, use SOF technology to measure the VOCs at the perimeter of the facilities. Take the measurements multiple times and throw out the outliers, and then use the numbers to determine compliance with permits. This avoids estimating emissions from specific sources: flares, tanks, coker, wastewater treatment area or anything else.

Use of SOF would keep the regulatory agencies from having to spend millions of dollars revising emissions factors. It keeps them from having to go into specific parts of plants, where proprietary information may be an issue. It keeps regulators, who often have relatively little or no actual plant experience, from being responsible for determining the "typical" condition, and regulating the operating procedures that are the forte of the plant owners.

SOF (and some other analyses) could also generate numbers that could be used as inputs for modeling. This way the numbers would be based on total measurements, rather than estimating techniques that may not accurately take into account the condition of the equipment.

In some cases it might be useful to do DIAL studies instead of, or in conjunction with SOF studies.



BP developed Differential Absorption LIDAR (DIAL) technology in 1979 specifically to locate, measure and quantify emissions from petrochemical plants. NPL and Shell also developed DIAL systems for the same applications. The results from a DIAL survey in 1988 indicated that emissions were more than an order of magnitude higher than reported numbers, and that DIAL could be used to isolate emissions from different parts of the refinery, as well as track the success for failure of emission reduction strategies over time. After the Swedish regulatory officials saw the results in 1988 and 1989 from a refinery in Gothenburg, Swedish regulator Lennart Frisch and others told refiners to stop sending in the emissions inventory numbers based on emissions factors and required them to measure emissions beginning in 1992. By 1995 the Swedish authorities required emissions to be measured using DIAL. In 2005 they switched to Solar Occultation Flux, a technique developed at Chalmers University in Sweden. Today Sweden requires all of their refineries to perform a SOF survey once every year.

The reported numbers , which are based on emission factors, do not change much in time, but the measured numbers change significantly because DIAL was able to locate emissions in specific parts of the facilities related to equipment failures that are not considered in the emissions estimating techniques.

In a survey of all currently operating DIAL and SOF vendors that have used their technologies to evaluate refinery emissions, they agreed that the Shell refinery in Gotenburg, Sweden was the "Greenest Refinery in the World", as judged by refineries that have used DIAL or SOF to measure emissions. The Shell refinery had emissions of 30 bbls/100,000 bbls of throughput. (note that Houston area refineries **report** an average of 12 bbls/100,000 bbls of throughput). They caution however that the Shell Gotenburg refinery is relatively small and simple. The best measurements at a large complex refinery indicate VOC emissions of 50 bbls/100,000 bbls of throughput. All 35 refinery surveys were performed in Europe, except for one in Canada. Typically refineries **report** emissions of 5-20 bbls/100,000 bbls. So far, no complete DIAL or SOF surveys have been performed on any U.S. refinery.

Appendix Q

LEGEND

GEE = General Electric IGCC

GEE w CO2 capture = General Electric IGCC with Carbon Capture

CoP w CO2 capture - Conoco Phillips IGCC w Carbon Capture

Shell - Shell IGCC

Shell w CO2 = Shell IGCC with Carbon Capture

Subcritical PC = Subcritical Pulverized Coal

Subcritical PC w CO2 = Subcritical Pulverized Coal with Carbon Capture

NGCC = Natural Gas Combined Cycle

NGCC w CO2 Capture = Natural Gas Combined Cycle with Carbon Capture

*Nuclear, wind, and solar are not included because they do not produce air emissions.

Exhibit ES-13 SO_2, NOx and Particulate Emission Rates

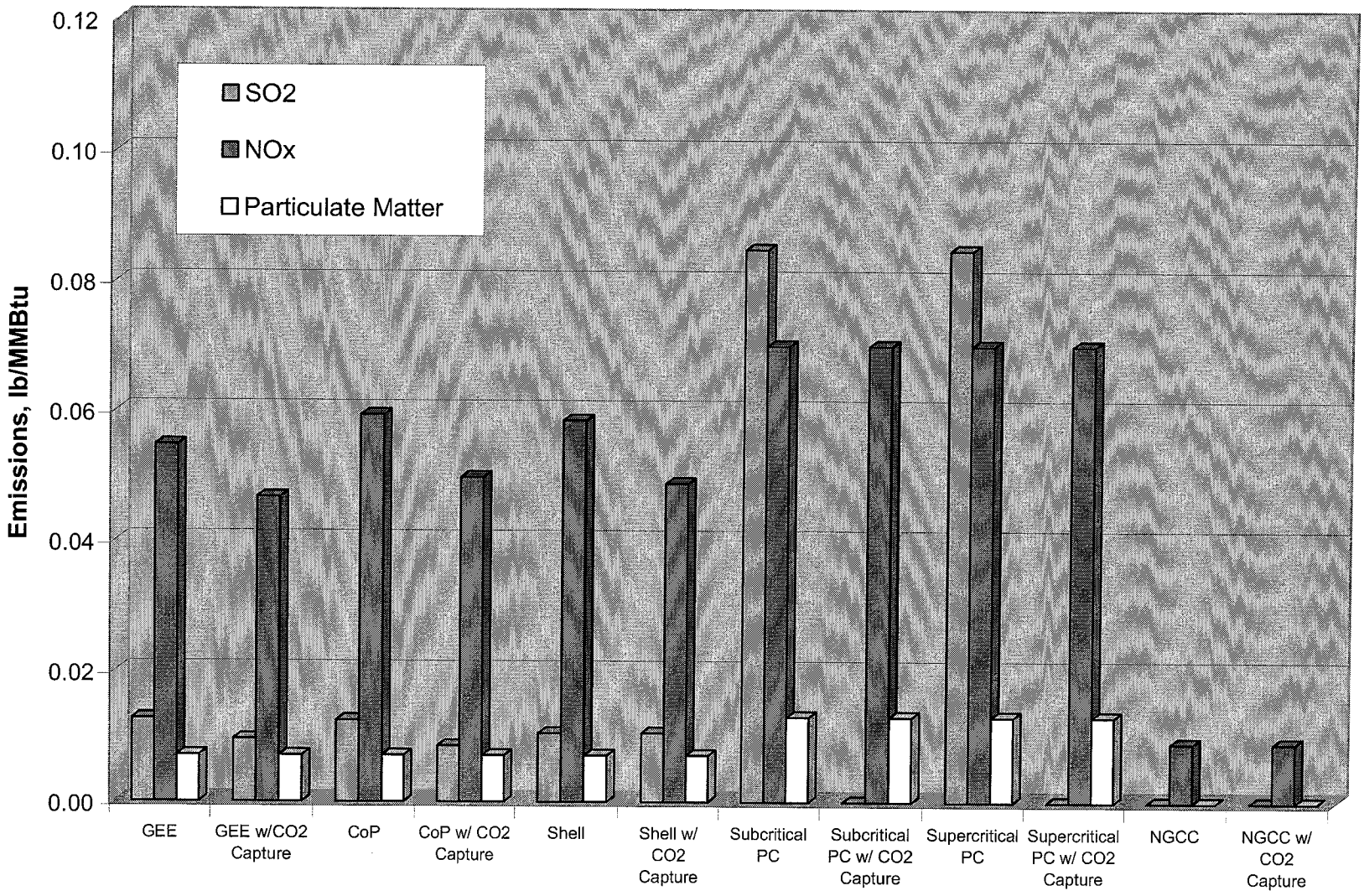
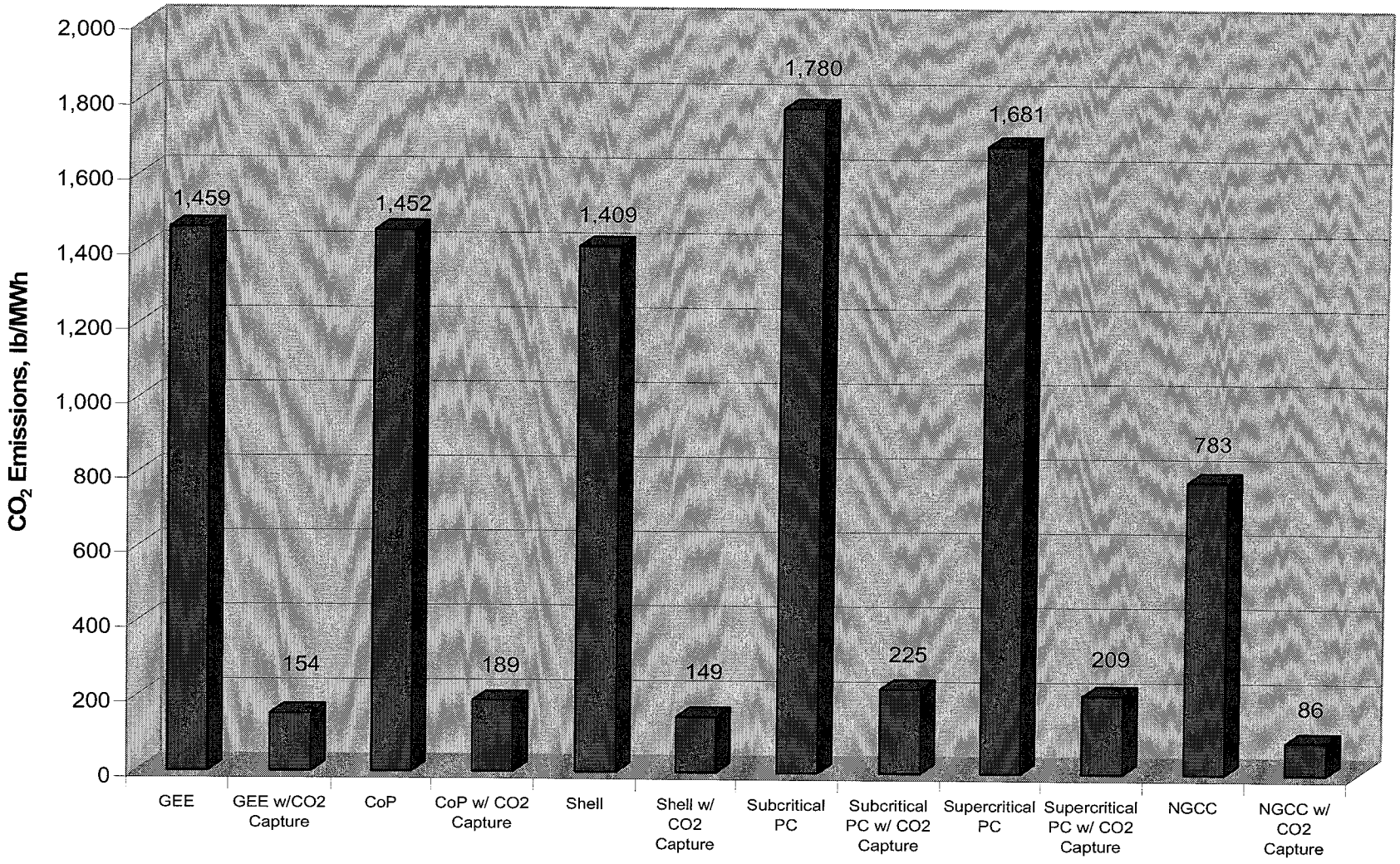


Exhibit ES-15 CO_2 Emissions Normalized By Gross Output



Appendix R

Type A: Once-through with Reservoir

(Reservoir can serve many purposes: recreation, municipal supply, wildlife habitat, etc.)

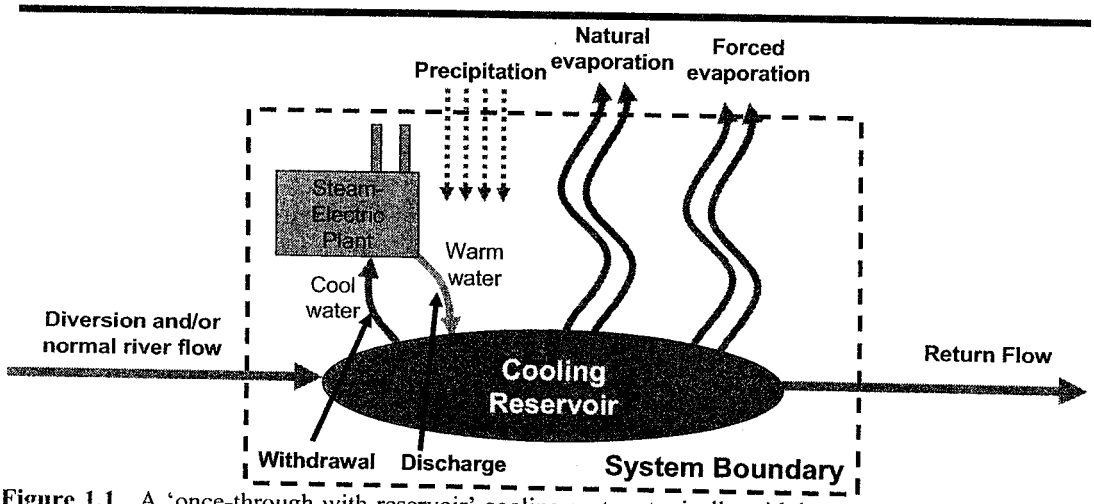


Figure 1.1. A 'once-through with reservoir' cooling system typically withdraws 1-2 orders of magnitude more water than is consumed and uses the reservoir as a heat sink such that most consumption results from the forced evaporation from the reservoir that is caused by discharging warm water from the power plant.

Type B: Once-through with Freshwater River

(River has many purposes: recreation, municipal supply, etc.)

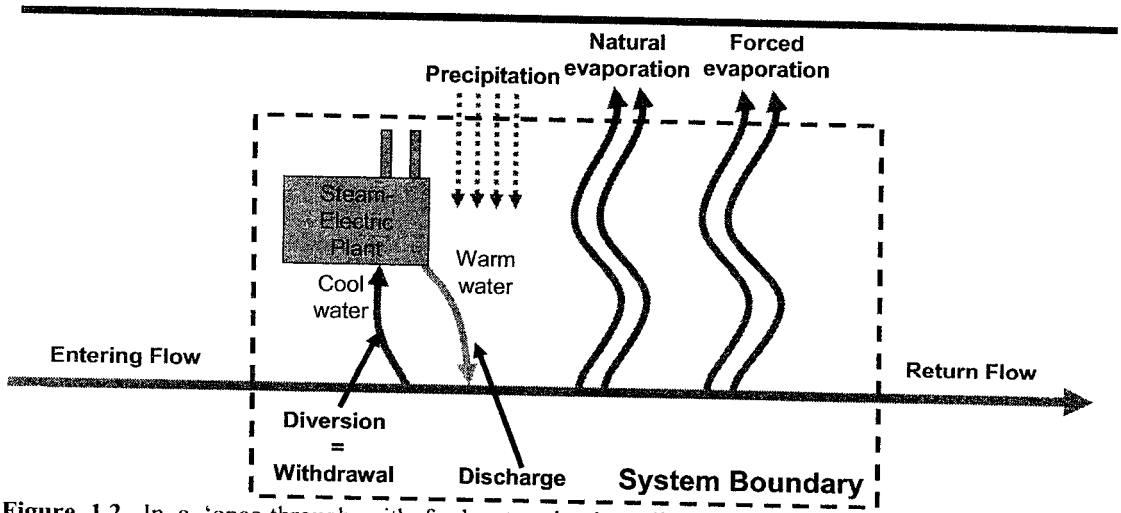


Figure 1.2. In a 'once-through with freshwater river' cooling system the diverted water equals the withdrawn water and the power plant water consumption mainly results from the forced evaporation of the heated cooling water that is discharged to the river.

Type C: Once-through with Saline Bay or Canal

(Saline source has many purposes: recreation, shipping, etc., and extends outside of the plant system boundary)

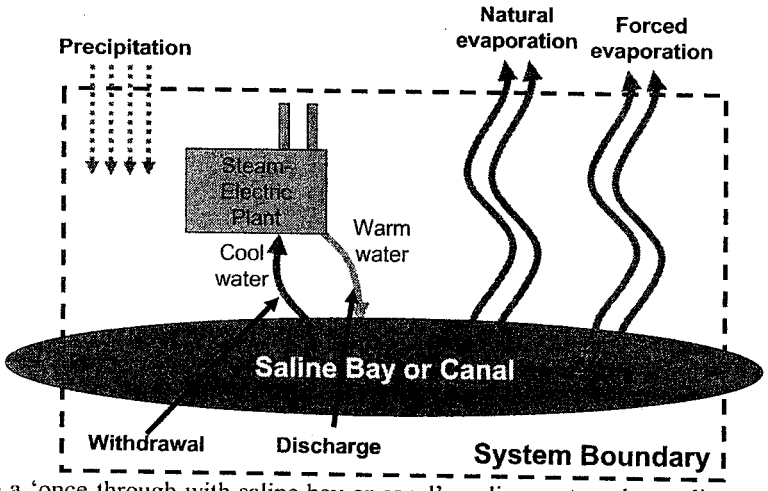
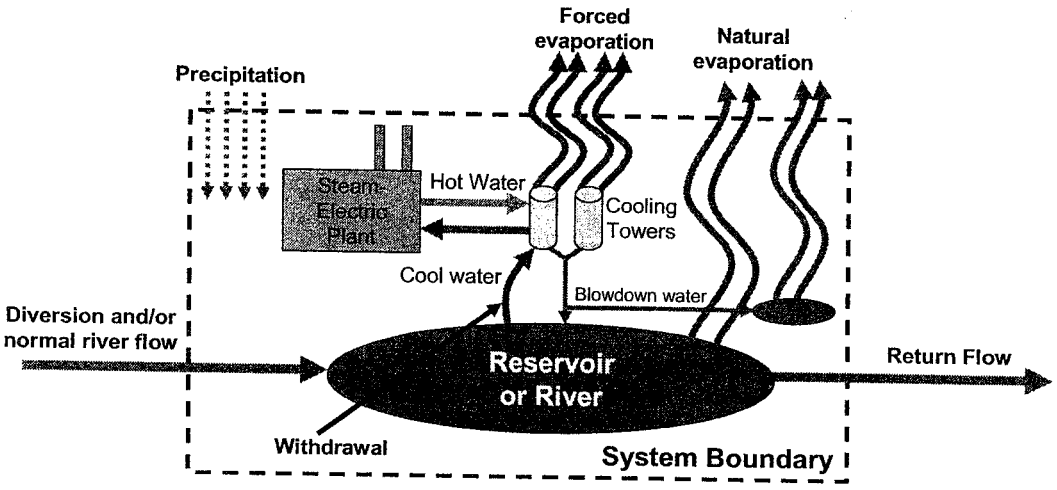


Figure 1.3. In a 'once-through with saline bay or canal' cooling system the cooling water source is saline instead of fresh water, withdrawal = diversion, and discharge = return flow. When used, this type of cooling systems is usually employed in coastal areas.

Type D: Cooling Tower with surface water

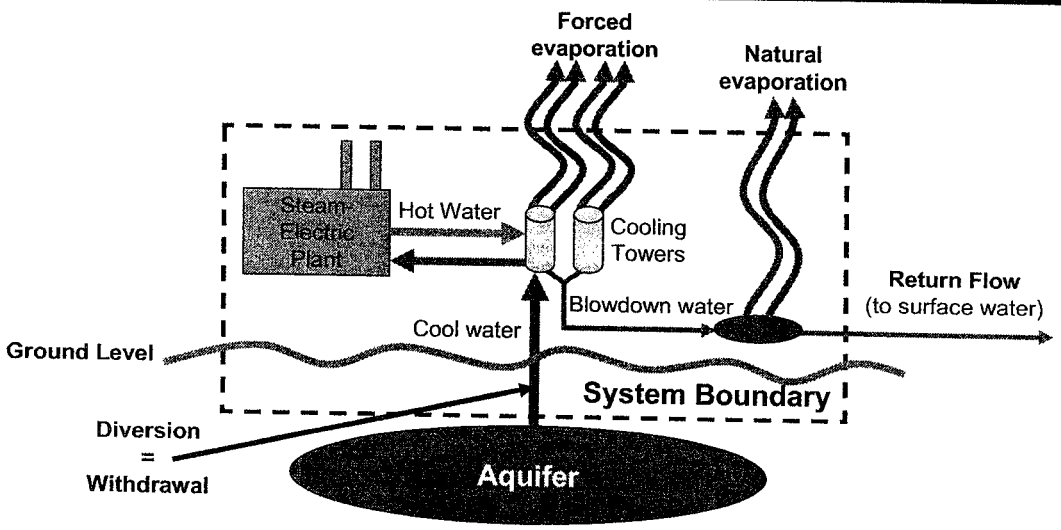
(Surface water can serve many purposes: recreation, municipal supply, wildlife habitat, etc.)



Consumption = forced evaporation
Withdrawal ~ Consumption

Figure 1.4. In a cooling system using cooling towers and surface water, the vast majority of water that is diverted and withdrawn is evaporated in the cooing towers. Some water remains within the cooling tower subsystem, and when it becomes sufficiently high in concentration of dissolved solids, this 'blowdown water' is discharged into the reservoir or a separate evaporation pond.

Type E: Cooling Tower with groundwater



Consumption = forced evaporation
Withdrawal = Diversion ~ Consumption

Figure 1.5. In a cooling system that uses cooling towers and groundwater as the water source, diversion = withdrawal, and there may or may not exist any return flow that goes to surface water supplies.

Using Figures 1.1-1.5 we can gain a context for the available water usage information that exists from state and federal agencies. Because different agencies collect different data using different methodologies, comparing the data from each source is not straightforward. We have attempted to report the data in a manner consistent with the definitions defined in this report. The term "water use" is ambiguous, and understanding how water is cycled through power plants and their associated subsystems requires careful use of terms.

Figures 1.6 and 1.7 demonstrate a real-world example by showing the 2006 water balance and cooling reservoir surface level, respectively, of the South Texas Project (STP) nuclear power generation facility in Matagorda County. The STP cooling system can be described as of the type A system of Figure 1.1 as well as a recirculating closed system with cooling pond (see Table 1.1). Notice how both diversions (50,012 ac-ft) and rainfall (25,142 ac-ft) play major roles in maintaining the volume of water stored in the reservoir. The decreasing slopes of Figure 1.7 are approximately 0.23-0.27 ft/day. If we multiply these slopes by the 7000 acre surface area of the lake to get a volumetric decrease rate, and divide by the electricity generated during the associated dates, we obtain a total water consumption rate of approximately 0.84 gal/kWh. Of this total water consumption rate,

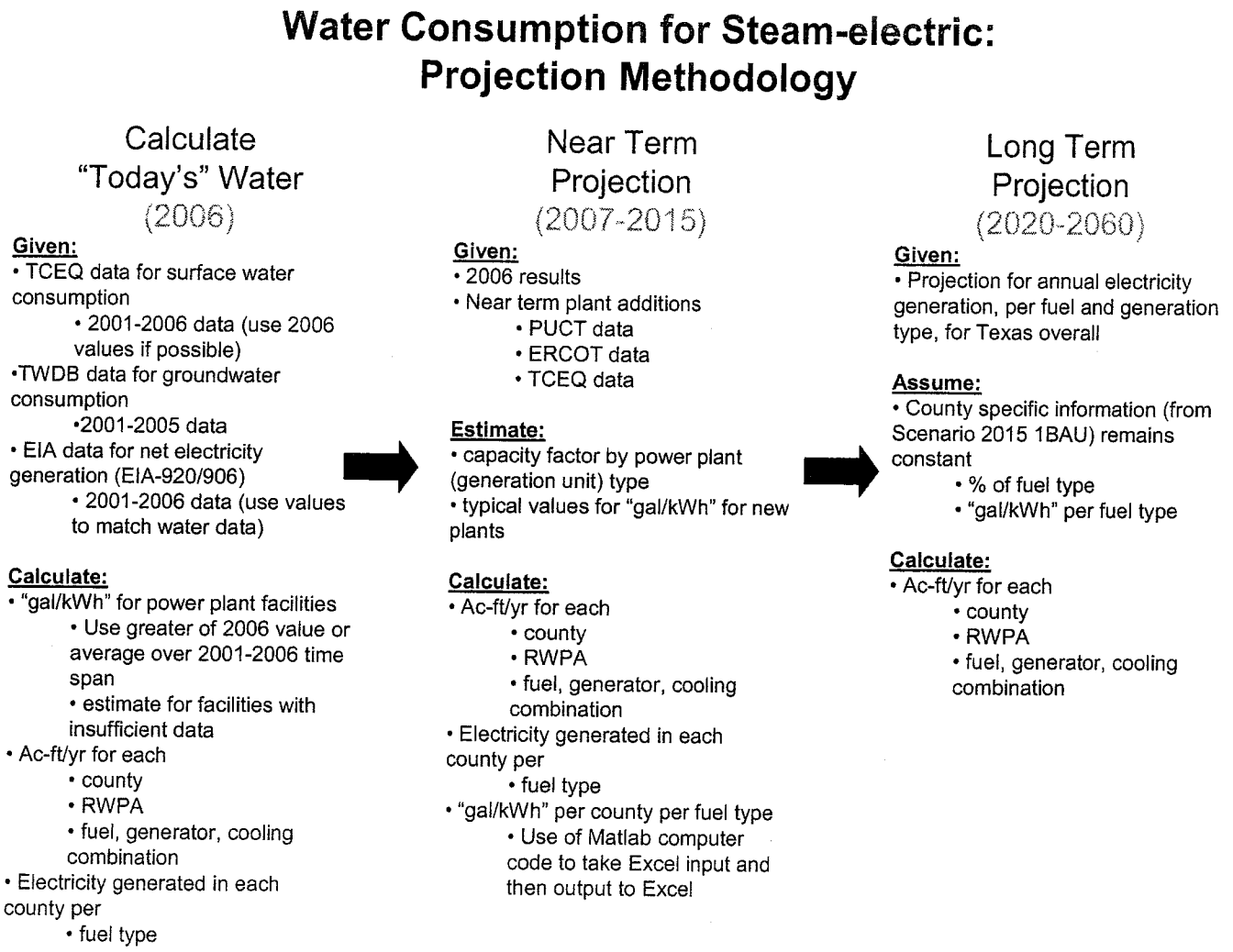


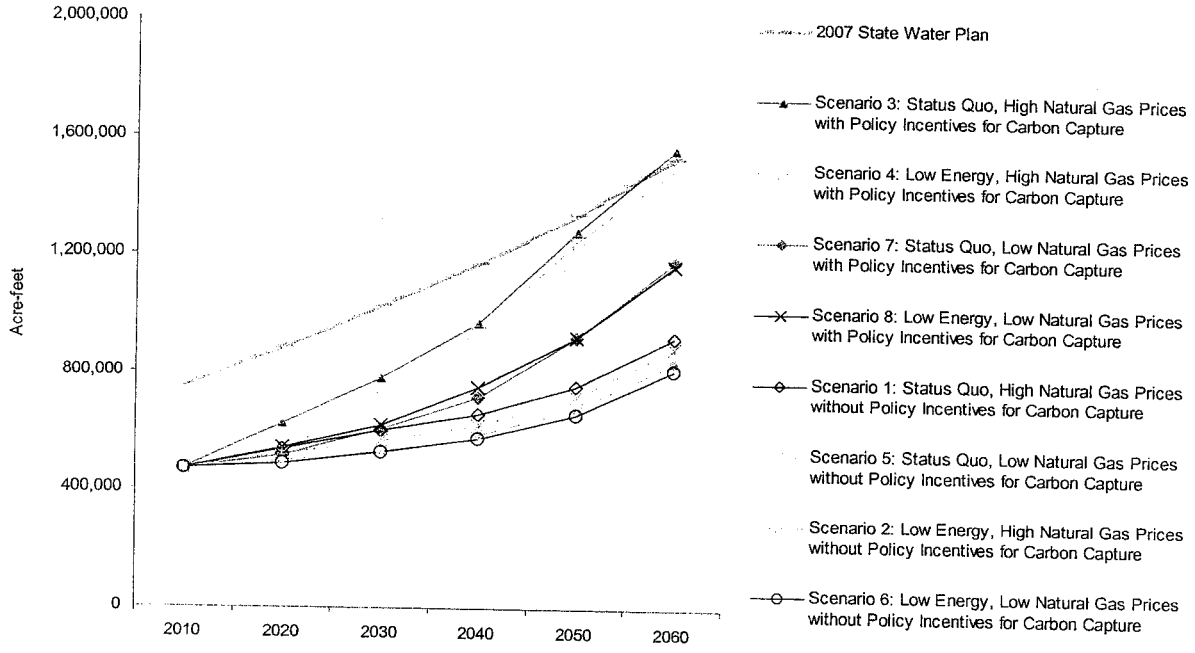
Figure 3.2. The method for projecting future water demand for electricity generation starts with 2006 calculations ("today"), moves to a near term projection (through 2015), and then uses the distribution of water demand from 2015 to project into the long term future through 2060.

Appendix S

Table 1: Comparison of 2007 State Water Plan Projections and Current Study Projections (2010-2060)

Scenario	2010	2020	2030	2040	2050	2060
Scenario 1: Status Quo, High Natural Gas Prices without Policy Incentives for Carbon Capture	471,762	498,781	532,343	590,023	681,332	836,922
Scenario 2: Low Energy, High Natural Gas Prices without Policy Incentives for Carbon Capture	471,762	535,489	603,949	657,724	754,604	922,941
Scenario 3: Status Quo, High Natural Gas Prices with Policy Incentives for Carbon Capture	471,762	623,887	779,680	968,328	1,280,167	1,558,515
Scenario 4: Low Energy, High Natural Gas Prices with Policy Incentives for Carbon Capture	471,762	517,958	739,718	938,134	1,248,296	1,492,359
Scenario 5: Status Quo, Low Natural Gas Prices without Policy Incentives for Carbon Capture	471,762	488,879	528,057	575,525	660,560	811,773
Scenario 6: Low Energy, Low Natural Gas Prices without Policy Incentives for Carbon Capture	471,762	519,994	568,521	621,724	718,326	886,383
Scenario 7: Status Quo, Low Natural Gas Prices with Policy Incentives for Carbon Capture	471,762	539,116	617,923	748,401	919,983	1,163,482
Scenario 8: Low Energy, Low Natural Gas Prices with Policy Incentives for Carbon Capture	471,762	498,781	532,343	590,023	681,332	836,922
2007 State Water Plan	755,170	886,580	1,030,212	1,174,170	1,339.,733	1,533,556

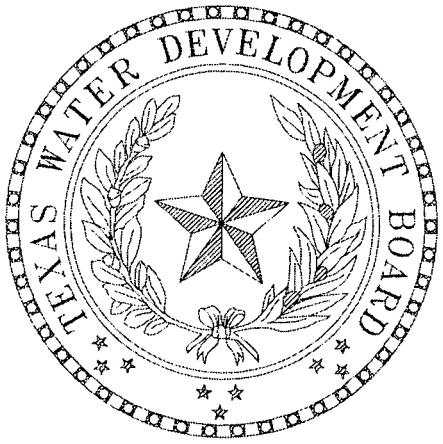
Figure 1: Comparison of 2007 State Water Plan Projections and Current Study Projections (2010-2060)



* "*Status Quo*" assumes limited increases in energy efficiency measures in terms of both consumption (i.e., energy conservation) and production (e.g., improving plant operations and technology)

* "*Low Energy*" assumes significant increases in energy efficiency measures in terms of both consumption (i.e., energy conservation) and production (e.g., improving plant operations and technology) – enough to offset long-term demand by 50 million megawatt hours.

Appendix T



Summary of Texas Water Development Board Study Entitled

"Water Demand Projections for Power Generation in Texas"

December 2008

1. Study Objective and Participants

The primary study objectives were to 1) estimate current water requirements of the Texas power industry, and 2) develop projections for future water requirements of the industry. Study authors from the Bureau of Economic Geology (BEG) at the University of Texas at Austin are Dr. Ian Duncan, Dr. Carey King and Dr. Michael Webber. The Texas Water Development Board (TWDB) organized a steering committee consisting of industry professionals from major power companies throughout Texas who reviewed and commented on the draft findings of the study, and met with the authors and TWDB staff to discuss their comments. The steering committee consisted of representatives of American Electric Power, the South Texas Project, NRG Energy, Xcel Energy, Luminant Power and Wolf Hollow LP.

2. Current Water Requirements of the Texas Power Industry

Water requirements for the power industry in Texas total about 446,400 acre-feet per year.[1] Estimates are for consumptive water use, which primarily includes evaporative water losses during the cooling process. Estimates take into account different types of generators such as steam and gas turbines, cooling systems, and different fuels used to power generators.

The primary types of fuels used to generate electricity in Texas are coal, natural gas and uranium (nuclear). Today, coal (subbituminous and lignite) generates about 40 percent of the state's electricity and uses 50 percent of the water needed to generate the electricity (Table 1 and Figure 1). Natural gas produces about 46 percent of the state's power and accounts for about 33 percent of water demands for power, while nuclear consumes approximately 17 percent of the water and generates 11 percent of the energy. Renewable energy such as wind and hydroelectric provide a relatively small amount of our electricity (3 percent), and do not consume any water.

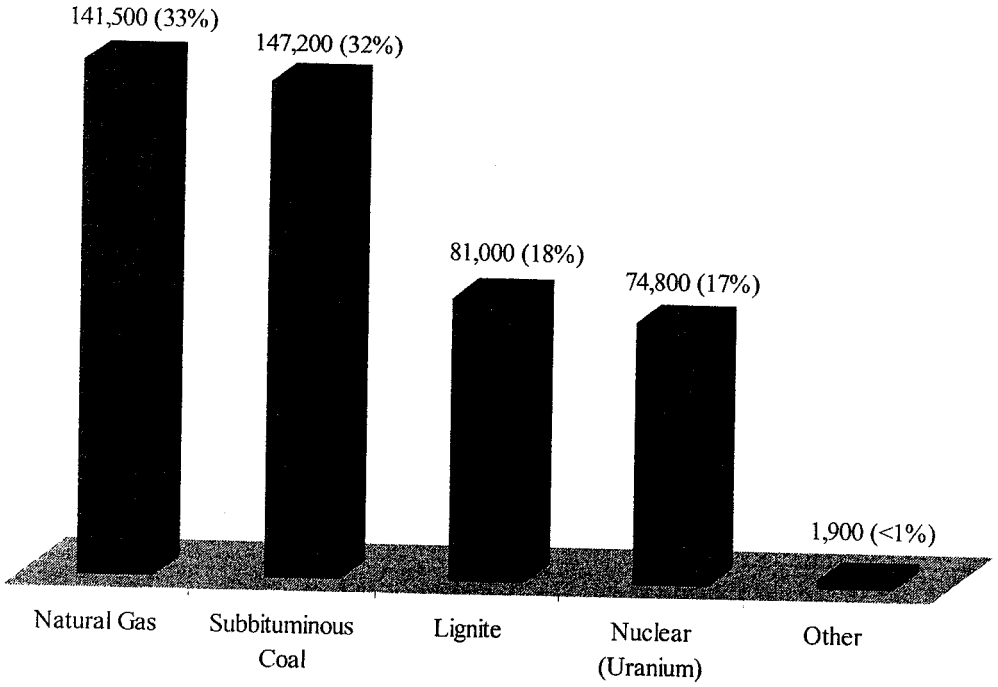
[1] The current estimate is based on 2006 data and includes only non-industrial thermoelectric generation. The value reported in the Executive Summary of the main report (482,000 acre-feet) includes industrial generation. The TWDB classifies water requirements for power generated by industrial facilities as manufacturing water demand.

Table 1: Current Estimated Water Requirements of the Texas Power Industry

Fuel	Electrical generation (millions of megawatt hours)	Percent of total generation	Consumptive water use (acre-feet)	Percent of consumptive water use
Natural gas	165.0	46%	147,200	33%
Subbituminous coal	77.5	21%	141,500	32%
Lignite coal	68.1	19%	81,000	18%
Nuclear (Uranium)	41.3	11%	74,800	17%
Wind	6.7	2%	0	0%
Other	1.8	<1%	1,900	<1%
Hydroelectric (water)	0.7	<1%	0	0%
Total	361.9	100%	446,400	100%

*Other includes a variety of miscellaneous fuels such as pulverized coal or agricultural byproducts. Figures for water requirements are rounded.

Figure 1: Current Estimated Water Requirements for the Texas Power Industry (acre-feet)



3. Future Water Requirements for the Texas Power Industry

Future water requirements by the power industry will likely be affected by the following factors:

- economic and population growth;
- increases in demand side energy efficiency;
- the price of natural gas;
- types of electrical generating technology employed; and
- potential federal legislation to reduce carbon dioxide emissions.

Each of the above factors will shape demands for electricity in Texas, the types of technology used to generate it; and thus, the amount of water needed by the industry in the future. The study generated forecasts based on six variables that attempt to capture uncertainties in future markets for electricity and water demand.

Uncertainty in Demands for Electricity and Changes in Energy Efficiency

Variable 1: "*Status Quo*" measures future energy demand based on forecasts generated by the Electric Reliability Council of Texas (ERCOT) and assumes limited increases in demand side energy efficiency.

Variable 2: "*Low Energy*" uses the current ERCOT growth rate, but assumes that electricity demand is offset by 50 million megawatts over the planning horizon through demand side management (similar to water conservation).

Uncertainty in Future Natural Gas Prices

Variable 3: "*High Natural Gas Prices*" assumes gas prices are high enough to prevent certain types of natural gas units from operating as base load facilities.[2]

Variable 4: "*Low Natural Gas Prices*" assumes natural gas plants form part of the state's base load generation as they do today.

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[2] Peaking power units are facilities that generally operate only when there is a high demand for electricity. In the U.S., this occurs in the afternoon, especially during the summer. In contrast, base load power plants operate continuously stopping only for maintenance or unexpected outages. Intermediate plants operate between these extremes, curtailing output in periods of low demand, such as during the night. Base load and intermediate plants are used preferentially to meet electrical demand because the lower efficiencies of peaking plants make them more expensive to operate. Peaking units are usually gas turbines that burn natural gas; however, a few burn diesel oil.

Policy Uncertainty

Variable 5: "*With Policy Incentives for Carbon Capture*" assumes federal legislation will establish a "cap and trade" policy setting limits on carbon dioxide emissions, and many power generators will implement carbon capture and storage technologies.

- Carbon capture and storage technology greatly increases energy and water requirements for the industry.
- Scenario modeled based on emissions reduction targets specified in the Lieberman-Warner Climate Security Act of 2007.

Variable 6: "W*ithout Policy Incentives for Carbon Capture*" assumes no future federal cap and trade legislation.

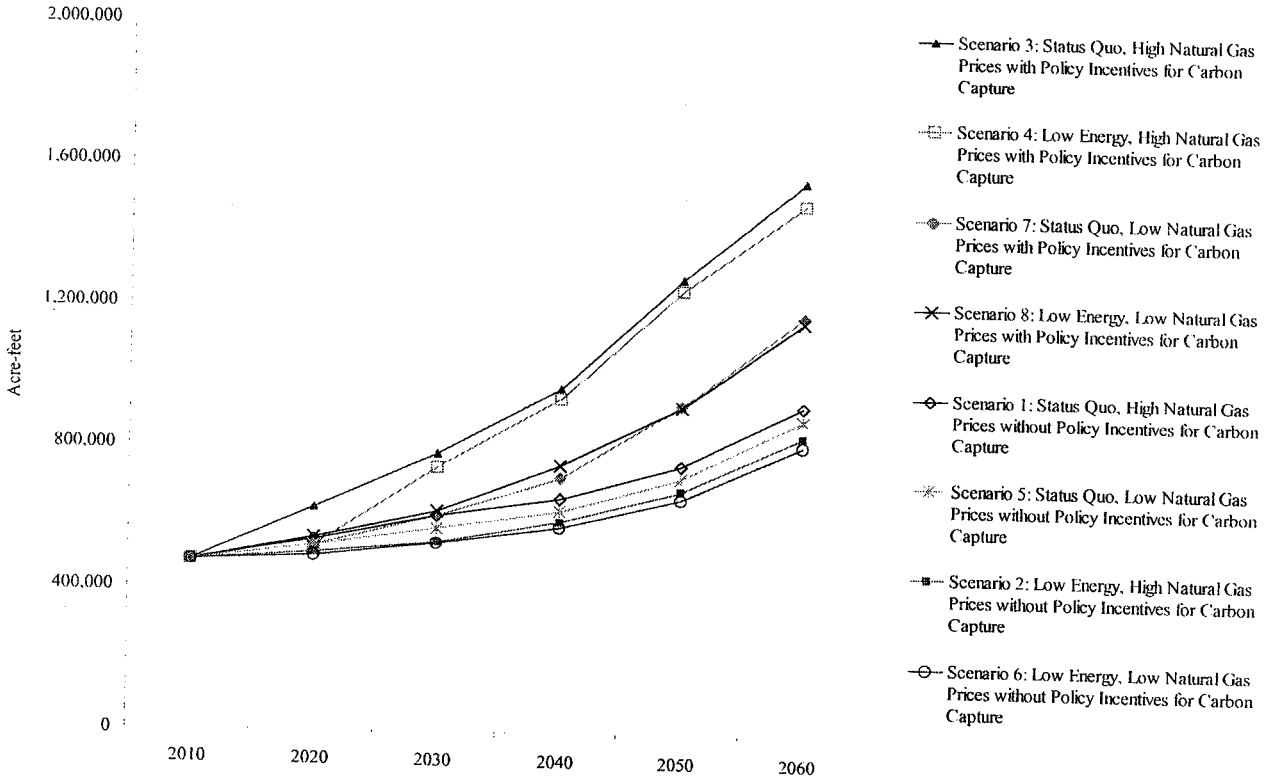
Thus, the study generated eight different projections:

- **Scenario 1**: "*Status Quo, High Natural Gas Prices without Policy Incentives for Carbon Capture*"
- **Scenario 2**: "*Low Energy, High Natural Gas Prices without Policy Incentives for Carbon Capture*"
- **Scenario 3**: "*Status Quo, High Natural Gas Prices with Policy Incentives for Carbon Capture*"
- **Scenario 4**: "*Low Energy, High Natural Gas Prices with Policy Incentives for Carbon Capture*"
- **Scenario 5**: "*Status Quo, Low Natural Gas Prices without Policy Incentives for Carbon Capture*"
- **Scenario 6**: "*Low Energy, Low Natural Gas Prices without Policy Incentives for Carbon Capture*"
- **Scenario 7**: "*Status Quo, Low Natural Gas Prices with Policy Incentives for Carbon Capture*"
- **Scenario 8**: "*Low Energy, Low Natural Gas Prices with Policy Incentives for Carbon Capture*"

As shown in Figure 2, scenarios with the highest projected values assume that federal cap and trade legislation is put in place, and that gas prices increase significantly in the future. One other hand, the lowest scenarios assume no cap and trade legislation goes into effect and that gas prices remain relatively low (Figure 2). The range of projections over the 50-year period varies considerably in the long-term, but less in the

near-term. For example, in 2010 each scenario has the same value (472,000 acre-feet). However, through time the difference becomes increasingly large representing the inherent uncertainty over what is a very long forecast horizon. Thus, near-term projections (2010 through 2020) are the most reliable.

Figure 2: Estimated Future Water Requirements of the Texas Power Industry (2010 through 2060, acre-feet)



	2010	2020	2030	2040	2050	2060
Scenario 1	472,000	536,000	604,000	658,000	755,000	923,000
Scenario 2	472,000	499,000	533,000	591,000	682,000	837,000
Scenario 3	472,000	624,000	780,000	969,000	1,281,000	1,559,000
Scenario 4	472,000	518,000	740,000	939,000	1,249,000	1,493,000
Scenario 5	472,000	520,000	569,000	622,000	719,000	887,000
Scenario 6	472,000	489,000	529,000	576,000	661,000	812,000
Scenario 7	472,000	517,000	605,000	714,000	923,000	1,179,000
Scenario 8	472,000	540,000	618,000	749,000	920,000	1,164,000

* Figures are rounded to the nearest 1000th