Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Project
Case Number: 2:11-MC-00044

Annual Progress Report for the Period

October 1, 2010 through September 30, 2011

Submitted to

The Honorable Janis Graham Jack
US District Court for the Southern District of Texas
Corpus Christi, Texas

Ms. Kathleen Aisling
US Environmental Protection Agency, Region 6
Dallas, Texas

Ms. Susan Clewis
Texas Commission on Environmental Quality, Region 14
Corpus Christi, Texas

Submitted by

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ANNUAL PROGRESS REPORT
TO THE U.S. DISTRICT COURT
FOR THE
CORPUS CHRISTI AIR MONITORING AND SURVEILLANCE CAMERA PROJECT

Activity Summary for the period from
October 1, 2010 through September 30, 2011

INTRODUCTION

On October 1, 2003, the US District Court for the Southern District of Texas issued an order to the Clerk of the Court to distribute funds in the amount of $6,700,000, plus interest accrued, to The University of Texas at Austin (University) to implement the court ordered condition of probation (COCP) project *Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation* (Project). This annual report has been prepared pursuant to the requirements of the project proposal and is being submitted to the US District Court, the US Environmental Protection Agency (EPA), and the Texas Commission on Environmental Quality (TCEQ).

A. MONITORING SITES AND EQUIPMENT INSTALLED

The COCP consists of a network of seven (7) air monitoring stations as shown in the map below in Figure 1 with air monitoring instruments and surveillance camera equipment as shown in Table 1, page 3.

Figure 1. Map of Project monitoring station locations

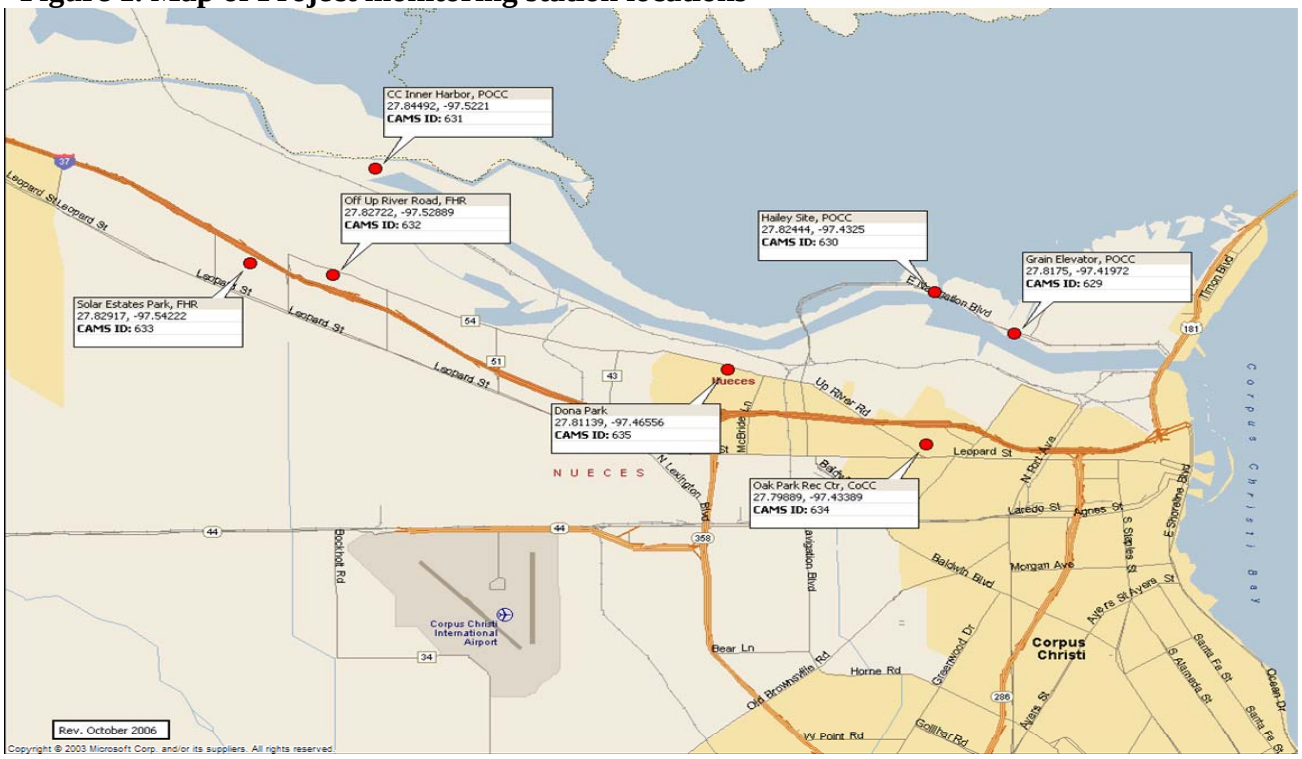

Table 1. Schedule of Air Monitoring Sites, Locations and Major Instrumentation

TCEQ CAMS NOs.	Latitude	Longitude	Description of Site Location	Monitoring Equipment				
				Auto GC	TNMHC	H2S & SO2	Met Station	Camera
634	27.798889 º North	97.433889 º West	Oak Park Recreation Center	Yes	Yes		Yes	
629	27.817500 º North	97.419722 º West	Grain Elevator @ Port of Corpus Christi		Yes	Yes	Yes	
630	27.824444 º North	97.432500 º West	J. I. Hailey Site @ Port of Corpus Christi		Yes	Yes	Yes	
635	27.811389 º North	97.465556 º West	TCEQ Monitoring Site C199 @ Dona Park		Yes	Yes	Yes	Yes
631	27.845278 º North	97.525556 º West	Port of Corpus Christi on West End of CC Inner Harbor		Yes	Yes	Yes	
632	27.827222 º North	97.528889 º West	Off Up River Road on Flint Hills Resources Easement		Yes	Yes	Yes	
633	27.908333 º North	97.542222 º West	Solar Estates Park at end of Sunshine Road	Yes	Yes	Yes	Yes	Yes

Legend

Auto GC	automated gas chromatograph
TNMHC	total non-methane hydrocarbon analyzer
H_2S	hydrogen sulfide analyzer
SO_2	sulfur dioxide analyzer
Met Station	meteorology station consisting of measurement instruments for wind speed, wind direction, ambient air temperature and relative humidity
Camera	surveillance camera

B. DATA ANALYSIS

As noted in Table 1, above, the monitoring network provides measurements of hydrocarbons, sulfur dioxide and hydrogen sulfide. Provided below are brief findings from the monitoring network during FY2011 (October 1, 2010 through September 30, 2011). More details are available in Appendix A, pages 8 through 35.

Results of Canister Sampling

At five of the seven monitoring sites, an ambient air sample may be collected in a canister for subsequent laboratory analysis if a sustained level of elevated concentrations of total nonmethane hydrocarbons has been measured. At one site (JI Hailey, CAMS 630), a canister can also be triggered by elevated sulfur dioxide concentrations. During FY2011, a total of 56 usable canister samples were triggered in the Corpus Christi network. (Occasionally a canister will trigger based on a malfunction or after a wind shift and thus not show concentrations greater than background levels.) No measured hydrocarbon concentrations were higher than the TCEQ's health reference values.

Summary of Sulfur Species Monitoring

EPA established a new federal standard for sulfur dioxide in 2010. No exceedances of the State of Texas standards for sulfur dioxide and hydrogen sulfide were measured this fiscal year; however, exceedances of the federal sulfur dioxide standard were measured at two sites.

Summary of Continuous Hydrocarbon Species Monitoring

No short-term concentrations or long-term average concentrations were measured that were greater than the State of Texas air monitoring comparison values for benzene, 1, 3-butadiene, or any other hydrocarbons this fiscal year. Most species measured have lower annual averages in the most recent three years, compared to the project's first three years.

Trends in Benzene Concentrations in Residential Areas

Because of a high level of concern with benzene, a known carcinogen, this compound is given special attention. An analysis of the benzene data shows concentrations in FY2011 were similar to the three previous years, and significantly lower than in FY2007 and FY2006.

C. ADVISORY BOARD

The Advisory Board for the Corpus Christi Air Monitoring and Surveillance Camera Project is a voluntary Board that consists of nine members. The members and their representation on the Board follow:

Ms. Gretchen Arnold	Local Air Quality Issues and Board Spokesperson
Dr. Eugene Billiot	Technical Support to the Board - Instrumentation
Mr. James Bowman	City of Corpus Christi
Dr. William Burgin	Local Public Health - Local Air Quality Issues
Ms. Joyce Jarmon	Community Representation
Dr. Glen Kost	Community Representation
Ms. Pat Suter	Local Advocacy Group
Mr. Christopher Schulz	Community Representation
Mr. Henry Williams	Community Representation

Two meetings of the Advisory Board were held during this year of the Project. Both meetings were held on the campus of Texas A&M University in Corpus Christi, Texas. Highlights from these meetings follow:

a. November 18, 2010 Meeting

- Six Board members, a guest, Ms. Jaclyn Uresti, Chief of Staff for State Representative Able Herrero, and representatives from The University of Texas at Austin and the Texas Commission on Environmental Quality attended the meeting.

- Dr. Dave Sullivan, The University of Texas at Austin, gave his presentation, "Air Monitoring Data for Corpus Christi, November 18, 2010." He explained the new EPA sulfur dioxide standard and summarized how the project's monitor readings compare with the standard. One site, J.I. Hailey, does not comply with the new sulfur dioxide standard, and can be described as being in a state of "noncompliance." He

also showed how 1,3-butadiene concentrations had significantly declined at Solar Estates.

- Dr. Elena McDonald-Buller, The University of Texas at Austin, gave her presentation, "Dispersion Modeling of Air Toxics in Corpus Christi." This presentation summarized the results of the dispersion modeling of benzene and 1,3-butadiene using the EPA regulatory models, AERMOD and CALPUFF. The modeling results were discussed in comparison with observations from the CCAQP network. Air quality modeling allows pollutant concentrations to be estimated in areas without monitors and can provide insights into emissions inventories for the region. In addition, it can indicate areas of interest for future investigation and monitoring.

- Mr. Torres, The University of Texas at Austin, transitioned the meeting from data analysis and monitoring operations, to a discussion on the Development of a Plan for Continued Operation of the Monitoring Network after Sept. 30, 2011, when the Court Order Condition of Probation Project funding will run out.

- Dr. David Allen, Project Principal Investigator, The University of Texas at Austin, gave his presentation, "Revisions to the National Ambient Air Quality Standards (NAAQS) and Implications for Air Quality Monitoring in Corpus Christi." The presentation highlighted the change to the SO_2 NAAQS and the anticipated changes to the ozone NAAQS. These 2 changes to the NAAQS have the potential to change the ability of the Corpus Christi region to meet all of the standards. In particular the J.I. Hailey monitor is currently in non-compliance with the new SO_2 NAAQS. Following Dr. Allen's presentation the Advisory Board asked questions and a discussion ensued.

- After addressing questions and the discussion that followed, Dr. Allen invited the Advisory Board to submit questions and ideas on network configuration options, i.e., addition or removal of sites, to Mr. Torres. These changes and/or suggestions will be addressed and information provided at the next board meeting, when UT Project Staff will present one or more scenarios for continued operation of the network to the Advisory Board for review, discussion, and action. The goal is to have a Board approved plan to submit to the Honorable Judge Jack at the annual report in the spring.

- Dr. Allen asked the Advisory Board for approval to conduct an evaluation of potential SO_2 sources, based on monitoring data. Dr. Kost moved approval of the request and Ms. Suter seconded the motion. The motion was approved unanimously by all Advisory Board Members present.

- Preparation of an outline detailing the content and presentation of the annual report to the US District Court was discussed. Mr. Torres suggested that we tentatively consider having the annual report presentation in March 2011.

b. March 1, 2011 Meeting

- Four Board members and representatives from the US District Court, The University of Texas at Austin, and the Texas Commission on Environmental Quality attended the meeting.

- Mr. Torres gave the Advisory Board a summary of the projected funding available at the end of year 8. He reported the following:

    - Neighborhood Air Toxics - $2,330,889
    - Sherwin Alumina SEP _ $10,800
    - Equistar SEP (Estimated) - $150,00
    - Free Balance in the CCAM & SC Project Funds (Estimated) $141,413
    - Total (Estimated) - $2,705,354
    - Stage 2 Settlement Funds - $5,057,120*
      *Disposition still uncertain

- Mr. Torres went on to explain the 3 year budgetary estimates for major equipment expenses. They include:

    - Miscellaneous expenses through the end of the current year will be $20,000.
    - Waiting for detailed equipment replacement costs for the auto-GC systems.
    - For other monitors, replacement of equipment (plus spares) and installation: hydrogen sulfide (7), sulfur dioxide (7), total non-methane hydrocarbon (8) analyzers, and multi-gas calibrators (10) will cost $400,000.

- Mr. Torres also explained the budgetary estimates for selected expenses include:

Item	Equipment & Installation	Annual Operating Cost
1) Network Operations & Maintenance (As is)		$1,200,000
2) NOx Analyzer (each*)	$25,000	$12,000
3) PM (Continuous)	$35,000	$12,000
4) PM (Non continuous)	$16,000	$24,000
5) Relocate a site	Up to $60,000	

*For this equipment, it is recommended that a spare unit also be purchased.

- The following plan was recommended by UT Austin for continuation of the network and presentation to The Honorable Judge Jack at the Annual Presentation on March 29, 2011.

    - Largely preserve the existing network.
    - Add NOx monitors to the Oak Park and Dona Park sites.

- Move the Flint Hills Resources site to a location north of the ship channel.
    1. Plan A. - West of Valerjo West on Port of Corpus Christi property.
    2. Plan B. - South of Dona Park.
- Add measurements for PM2.5 and PM 10 to the network as needed.
- Continue to examine the effectiveness of the network.

Ms. Pat Suter made a motion to approve the plan as recommended by UT. Dr. Glen Kost seconded the motion. The motion was unanimously approved by all Advisory Board Members present.

D. PROJECT MANAGEMENT AND PLANNING

Project Management and Planning during this period has focused on five (5) major activities.

1. Site Operations and Maintenance and Quality Assurance
   Routine operations, maintenance and quality assurance activities have become the norm at each site. These activities help to maintain high data capture and quality of data.

2. Data Analysis
   The Project now has more than six years worth of data. The focus of data analysis has been to examine the frequency, level and direction of sources when measurements exceed trigger or warning levels and to analyze data for trends and other patterns indicated in the data collected.

3. Communication
   Information about the status of the Project has been communicated through:
   a. Advisory Board Meetings,
   b. Project Website (website statistics are included in Appendix B, pages 36 and 37)
   c. Presentations to local community organizations and industry groups,
   d. Quarterly Technical and Financial Reports to the Court and Advisory Board and
   e. Sharing of technical data with the EPA and the Agency for Toxic Substances and Disease Registry.

4. Budget Monitoring
   Budget monitoring during this period has focused on:
   a. Actual project costs for Phase II-Sites Operation and Maintenance,
   b. Administration and oversight costs incurred by the University, and
   c. Budget for future years.
   The Financial Report for the year is included in Appendix C, pages 38 through 42.

5. Other Contributions
   The University of Texas at Austin has been awarded funding for six (6) Supplemental Environmental Projects (SEPs) through the Texas Commission on Environmental Quality since the Project began. These six SEPs total $1,239,379 plus interest earned, which has totaled $ 41,785.96. All of the SEPs are listed in Appendix D, page 43 through 45.

APPENDIX A

Data Analysis for Corpus Christi Annual Report
October 2010 – September 2011

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Data Analysis for Corpus Christi Annual Report

This technical report describes recent results of monitoring and analysis of data under the Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Project for the period October 1, 2010 through September 30, 2011. The monitoring network is shown in Figure 1, page 2, and is described in Table 2, below. This report contains the following elements:

- Results of canister sampling at five sites
- Summary of total nonmethane hydrocarbon monitoring
- Summary of speciated hydrocarbon monitoring in residential areas
    - Trends in benzene concentrations in residential areas
- Summary of sulfur species monitoring at UT and TCEQ sites

Table 2. Schedule of air monitoring sites, locations and major instrumentation

TCEQ CAMS#	Description of Site Location	Monitoring Equipment				
		Auto GC	TNMHC (T) / Canister (C)	H_2S & SO_2	Met Station	Camera
634	Oak Park Recreation Center (**OAK**)	Yes	T		Yes	
629	Grain Elevator @ Port of Corpus Christi (**CCG**)		T&C	Yes	Yes	
630	J. I. Hailey Site @ Port of Corpus Christi (**JIH**)		T&C	Yes	Yes	
635	TCEQ Monitoring Site C199 @ Dona Park (**DPK**)		T&C	Yes	Yes	Yes
631	Port of Corpus Christi on West End of CC Inner Harbor (**WEH**)		T&C	Yes	Yes	
632	Off Up River Road on Flint Hills Resources Easement (**FHR**)		T&C	Yes	Yes	
633	Solar Estates Park at end of Sunshine Road (**SOE**)	Yes	T	Yes	Yes	Yes

Legend

CAMS	continuous ambient monitoring station
Auto GC	automated gas chromatograph
TNMHC	total non-methane hydrocarbon analyzer (all except CAMS 633 & 634 also have canister hydrocarbon samplers)
H_2S	hydrogen sulfide analyzer
SO_2	sulfur dioxide analyzer
Met Station	meteorology station consisting of measurement instruments for wind speed, wind direction, ambient air temperature and relative humidity
Camera	surveillance camera

Glossary of terms

- **Pollutant concentrations** – Concentrations of most gaseous pollutants are expressed in units denoting their "mixing ratio" in air; i.e., the ratio of the number molecules of the pollutant to the total number of molecules per unit volume of air. Because concentrations for all gases other than molecular oxygen, nitrogen, and argon are very low, the mixing ratios are usually scaled to express a concentration in terms of "parts per million" (ppm) or "parts per billion" (ppb). Sometimes the units are explicitly expressed as ppm-volume (ppmV) or ppb-volume (ppbV) where 1 ppmV indicates that one molecule in one million molecules of ambient air is the compound of interest and 1 ppbV indicates that one molecule in one billion molecules of ambient air is the compound of interest. In general, air pollution standards and health effects screening levels are expressed in ppmV or ppbV units. Because hydrocarbon species may have a chemical reactivity related to the number of carbon atoms in the molecule, mixing ratios for these species are often expressed in ppb-carbon (ppbV times the number of carbon atoms in the molecule), to reflect the ratio of carbon atoms in that species to the total number of molecules in the volume. This is relevant to our measurement of auto-GC species and TNMHC, which are reported in ppbC units. For the purpose of relating hydrocarbons to health effects, this report notes hydrocarbon concentrations in converted ppbV units. However, because TNMHC is a composite of all species with different numbers of carbons, it cannot be converted to ppbV. Pollutant concentration measurements are time-stamped based on the start time of the sample, in Central Standard Time (CST), with sample duration noted.

- **Auto-GC** – The automated gas chromatograph collects a sample for 40 minutes, and then automatically analyzes the sample for a target list of 46 hydrocarbon species. These include benzene and 1,3-butadiene, which are air toxics, various species that have relatively low odor thresholds, and a range of gasoline and vehicle exhaust components. Auto-GCs operate at Solar Estates CAMS 633 and Oak Park CAMS 634. In June 2010 TCEQ began operating an auto-GC at Palm CAMS 83 at 1511 Palm Drive in the Hillcrest neighborhood.

- **Total non-methane hydrocarbons (TNMHC)** – TNMHC represent a large fraction of the total volatile organic compounds released into the air by human and natural processes. TNMHC is an unspeciated total of all hydrocarbons, and individual species must be resolved by other means, such as with canisters or auto-GCs. However, the time resolution of the TNMHC instrument is much shorter than the auto-GC, and results are available much faster than with canisters. TNMHC analyzers operate at all seven UT/CEER sites.

- **Canister** – Electro-polished stainless steel canisters are filled with air samples when an independent sensor detects that *elevated* (see below) levels of hydrocarbons (TNMHC) are present. Samples are taken for 20 minutes to try to capture the chemical make-up of the air. In most cases, the first time on any day that the monitored TNMHC concentration exceeds 2000 ppbC at a site for a continuous period of 15 minutes or more, the system will trigger and a sample will be collected. Samples are sent to UT Austin and

are analyzed in a lab to resolve some 60 hydrocarbon and 12 chlorinated species. Canister samplers operate at the five sites that do not take continuous hydrocarbon measurements with auto-GCs (CAMS 629, 630, 631, 632, and 635).

- **Air Monitoring Comparison Values (AMCV) –** The TCEQ uses AMCVs in assessing ambient data. Two valuable online documents ("fact sheet" and "AMCV document") that explain AMCVs are at http://www.tceq.state.tx.us/implementation/tox/regmemo/AirMain.html#compare (accessed July 2011). The following text is an excerpt from the TCEQ "fact sheet":

  > Effects Screening Levels are chemical-specific air concentrations set to protect human health and welfare. Short-term ESLs are based on data concerning acute health effects, the potential for odors to be a nuisance, and effects on vegetation, while long-term ESLs are based on data concerning chronic health and vegetation effects. Health-based ESLs are set below levels where health effects would occur whereas welfare-based ESLs (odor and vegetation) are set based on effect threshold concentrations. The ESLs are screening levels, not ambient air standards. Originally, the same long- and short-term ESLs were used for both air permitting and air monitoring.
  >
  > There are significant differences between performing health effect reviews of air permits using ESLs, and the various forms of ambient air monitoring data. The Toxicology Division is using the term "air monitoring comparison values" (AMCVs) in evaluations of air monitoring data in order to make more meaningful comparisons. "AMCVs" is a collective term and refers to all odor-, vegetative-, and health-based values used in reviewing air monitoring data. Similar to ESLs, AMCVs are chemical-specific air concentrations set to protect human health and welfare. Different terminology is appropriate because air permitting and air monitoring programs are different.

- **Rationale for Differences between ESLs and AMCVs** – A very specific difference between the permitting program and monitoring program is that permits are applied to one company or facility at a time, whereas monitors may collect data on emissions from several companies or facilities or other source types (e.g., motor vehicles). Thus, the protective ESL for permitting is set lower than the AMCV in anticipation that more than one permitted emission source may contribute to monitored concentrations.

- **National Ambient Air Quality Standards (NAAQS) –** U.S. Environmental Protection Agency (EPA) has established a set of standards for several air pollutions described in the Federal Clean Air Act[1]. NAAQS are defined in terms of *levels* of concentrations and particular *forms*. For example, the NAAQS for particulate matter with size at or less than 2.5 microns ($PM_{2.5}$) has a *level* of 15 micrograms per cubic meter averaged over 24-hours, and a *form* of the annual average based on four quarterly averages, averaged over three years. Individual concentrations measured above the level of the NAAQS are called *exceedances*. The number calculated from a monitoring site's data to compare to the level of the standard is called the site's *design value*, and the highest design value in the area for a year is the regional design value used to assess overall NAAQS compliance. A monitor or a region that does not comply with a NAAQS is said to be *noncompliant*. At some point after a monitor or region has been in noncompliance, the U.S. EPA may choose to label the region as *nonattainment*. A nonattainment designation

[1] See http://epa.gov/air/criteria.html accessed October 2011

triggers requirements under the Federal Clean Air Act for the development of a plan to bring the region back into compliance.

A more detailed description of NAAQS can be found on the TCEQ's Website at http://www.tceq.texas.gov/airquality/monops/naaqs.html (accessed October 2011).

One species measured by this project and regulated by a NAAQS is sulfur dioxide (SO_2). Effective June 2, 2010, EPA modified the SO_2 NAAQS to include a level of 0.075 ppm, or 75 ppb averaged over one hour, with a form of the three-year average of the annual 99^{th} percentiles of the daily maximum one-hour averages. The other two existing NAAQS for SO_2 are 0.03 ppm (30 ppb) averaged over one year and 0.14 ppm (140 ppb) averaged over 24 hours, not to be exceeded in any one year. There is also a secondary SO_2 standard of 0.500 ppm (500 ppb) over three hours, not to be exceeded in any one year. The reason that there has been little attention to the SO_2 NAAQS on this project until recently is that the State of Texas's standard of 0.400 ppm or 400 ppb over 30 minutes for SO_2 was much more likely to be exceeded than the older NAAQS. With the addition of a new NAAQS for SO_2 in June 2010, however, the situation has changed.

- **Elevated Concentrations** – In the event that measured pollutant concentrations are above a set threshold they are referred to as "elevated concentrations." The values for these thresholds are summarized by pollutant below. As a precursor to reviewing the data, the reader should understand the term "*statistical significance*." In the event that a concentration is higher than one would typically measure over, say, the course of a week, then one might conclude that a specific transient assignable cause may have been the pollution source, because experience shows the probability of such a measurement occurring under normal operating conditions is small. Such an event may be labeled "statistically significant" at level 0.01, meaning the observed event is rare enough that it is not expected to happen more often than once in 100 trials. This does not necessarily imply the occurrence of a violation of a health-based standard. A discussion of "elevated concentrations" and "statistical significance" by pollutant type follows:

    - For H_2S, any measured concentration greater than the level of the state residential standards, which is 80 ppb over 30 minutes, is considered "elevated." For SO_2, any measured concentration greater than the level of the NAAQS, which is 75 ppb over one hour, is considered "elevated." Note that the concentrations of SO_2 and H_2S need not persist long enough to constitute an exceedance of the standard to be regarded as elevated. In addition, any closely spaced values that are statistically significantly (at 0.01 level) greater than the long-run average concentration for a period of one hour or more will be considered "elevated" because of their unusual appearance, as opposed to possible health consequence. The rationale for doing so is that unusually high concentrations at a monitor may suggest the existence of unmonitored concentrations closer to the source area that are potentially above the state's standards.
    - For TNMHC, any measured concentration greater than the canister triggering threshold of 2000 ppbC is considered "elevated." Note that the concentrations

need not persist long enough to trigger a canister (900 seconds) to be considered elevated.

- For benzene and other air toxics in canister samples or auto-GC measurements, any concentration above the AMCV is considered “elevated.” Note that 20-minute canister samples and 40-minute auto-GC measurements are both compared with the short-term AMCV.
- Some hydrocarbon species measured in canister samples or by the auto-GC generally appear in the air in very low concentrations close to the method detection level. Similar to the case above with H_2S and SO_2, any values that are statistically significantly (at 0.01 level) greater than the long-run average concentration at a given time or annual quarter will be considered “elevated” because of their unusual appearance, as opposed to possible health consequence. The rationale for doing so is that unusually high concentrations at a monitor may suggest an unusual emission event in the area upwind of the monitoring site.

1. Results of Canister Sampling

In FY 2011 a total of 56 usable canister samples were taken. A summary of the benzene concentrations appears in Table 3, below. No measured concentration of any species exceeded the TCEQ's AMCV. This year, a new feature was added to canister sampling at the JIH C630 site: because of concern about elevated concentrations of SO_2 being measured at the site, canisters may now be triggered by SO_2 exceeding 50 ppb. The intent is to try to characterize what other chemicals may be present in the air coincident with the SO_2, which may help identify the emission source. On the first two occasions that canisters were triggered on SO_2 at JIH, the hydrocarbon concentrations in the canister samples were relatively low.

Table 3. Summary of canister sample counts and benzene concentrations FY 2011

Row Labels	Max of benzene ppbV	Number of cans	Cans triggered on SO_2
CCG CAMS 629	7.1	7	N/A
DPK CAMS 635	8.2	35	N/A
FHR CAMS 632	4.6	2	N/A
JIH CAMS 630	9.2	11	2
WEH CAMS 631	6.4	1	N/A
Grand Total	9.2	56	2

Dona Park C635 produced the most canister samples. As has been discussed in past reports, this site is affected by hydrocarbons carried by northerly winds across the Nueces Bay from natural gas well activity on the north side of the Bay. An examination of these canisters shows robustly similar mixes of species, and as a result the project is more deliberate in selecting canisters from this site for chemical analysis.

2. Summary of Total Nonmethane Hydrocarbon Monitoring at Seven Sites

In this section, trends in total nonmethane hydrocarbon (TNMHC) concentrations at the seven UT CAMS sites are discussed. The approach taken herein is to use the data from each site over each calendar quarter July 2005 through September 2011 to assess seasonality and trends. As has been shown in past reports, each site measures its highest concentrations when the wind blows from the industrial source areas, including areas where natural gas extraction is occurring. Thus, Oak Park and Solar Estates have higher concentration measured in the winter than in the summer, because of the increased frequency of northerly winds between October and March. Other sites can see higher concentrations year around, owing to exposure to industrial sources to the south and natural gas extraction to the north. Other meteorological factors affect the concentrations. In winter months, winds tend to be slower and the air does not mix as much as in the summer, giving air pollutants more opportunities to accumulate. So all else being equal, one can expect higher concentrations for many pollutants in colder weather months.

Because of concern about the frequency of elevated concentrations, the frequency of such events on the five-minute time scale has been graphed in Figures 2 – 8, on pages 15 through 18. The

frequency is determined by counting the number of observations at or above 2000 ppbC and then dividing by the large number of valid five-minute observations per quarter (approximately 25,000). Each site's data are graphed on different scales in the following figures. The FHR C632 site frequency values are graphed over the widest range, as that site had been affected by a particular source that has ceased operation, thus leading to a rapid decline in concentrations in late 2007. Two other sites also show a significant decline since 2005: Port Grain C629 and J. I. Hailey C630. West End Harbor C631 dropped after the first year but shows no trend since. The two residential sites – Oak Park C634 and Solar Estates C633 – have had the lowest incidence of elevated observations all along showing no clear trend. The Dona Park C635 site has shown dramatic changes from year to year, and realized an increase in frequency in 2011. This is hypothesized to be related to natural gas extraction on the north side of Nueces Bay, but may also be related to nearby industrial activity and land use changes just to the north of the site.

When all TNMHC measurements from all seven sites are grouped together, they suggest that overall concentrations declined since 2005. This is reflected in Figure 9, on page 19, showing the pooled average of the measurements by fiscal year, 2006 – 2011. This is shown for all seven sites and for six sites excluding the FHR C632 site that has shown the most significant drop in concentrations.

Figure 2. Frequency of elevated (>2000 ppbC) TNMHC at Port Grain CAMS 629, 3Q CY05 – 3Q CY11

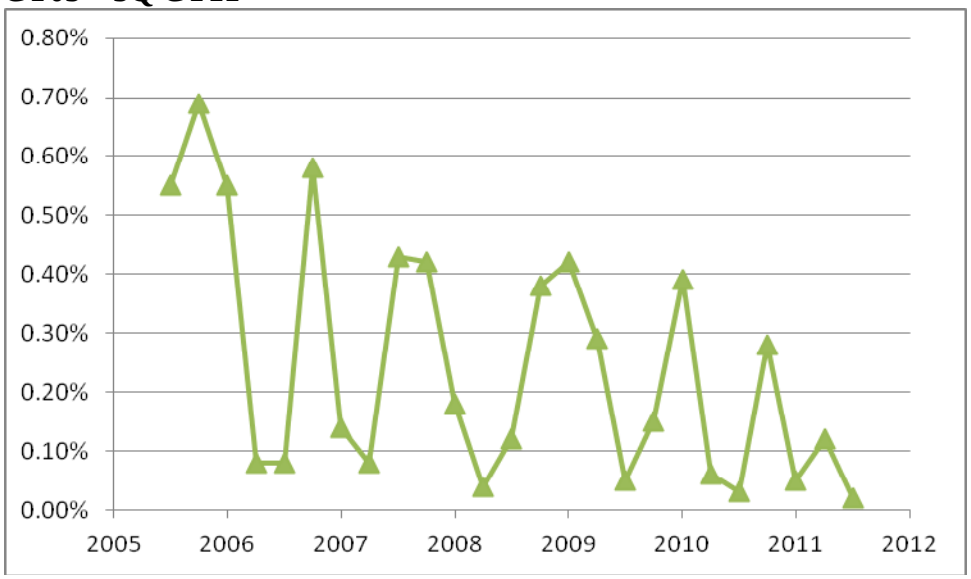


Figure 3. Frequency of elevated (>2000 ppbC) TNMHC at J.I. Hailey CAMS 630, 3Q CY05 – 3Q CY11

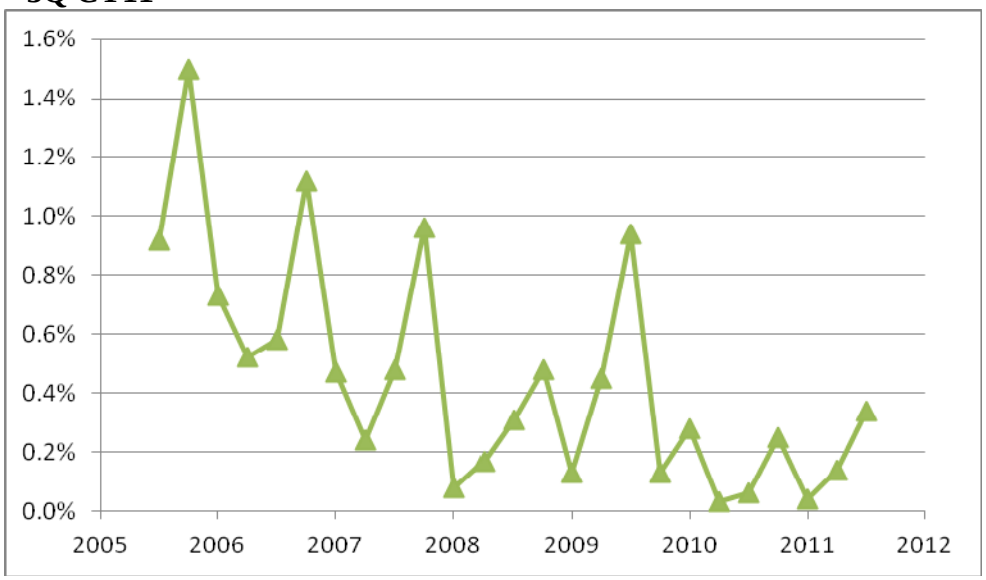


Figure 4. Frequency of elevated (>2000 ppbC) TNMHC at West End Harbor CAMS 631, 3Q CY05 – 3Q CY11

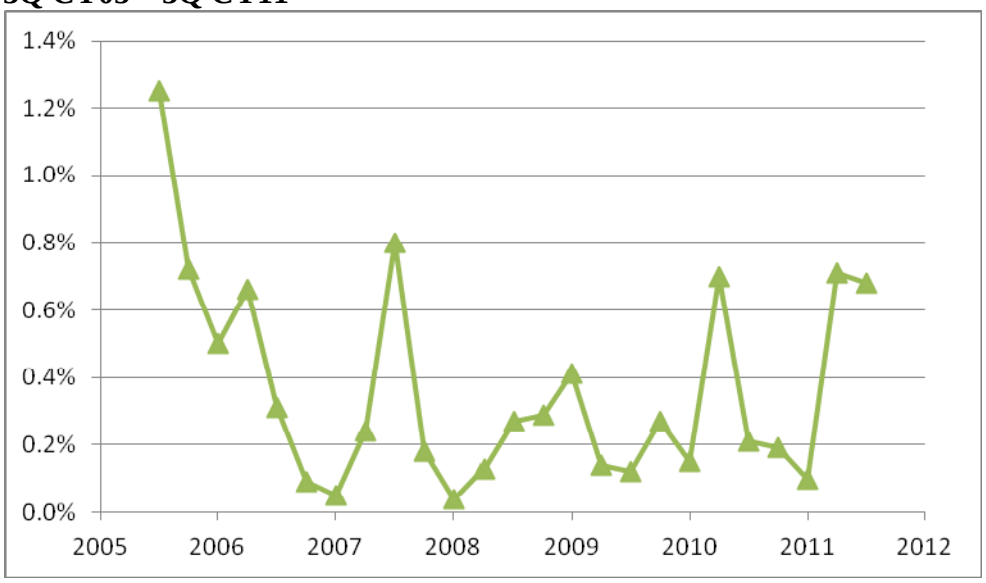


Figure 5. Frequency of elevated (>2000 ppbC)TNMHC at Flint Hills Resources CAMS 632, 3Q CY05 – 3Q CY11

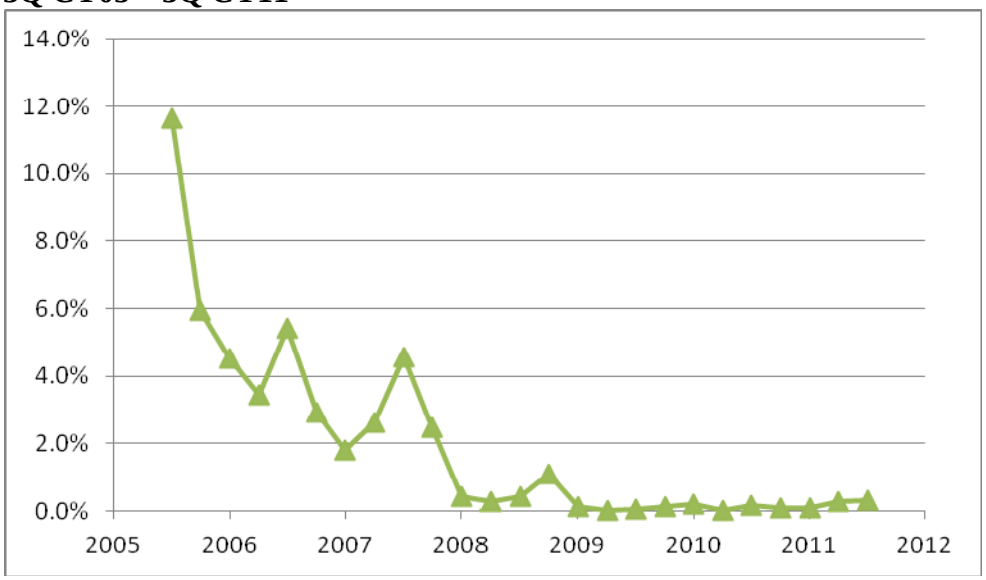


Figure 6. Frequency of elevated (>2000 ppbC) TNMHC at Solar Estates CAMS 633, 3Q CY05 – 3Q CY11

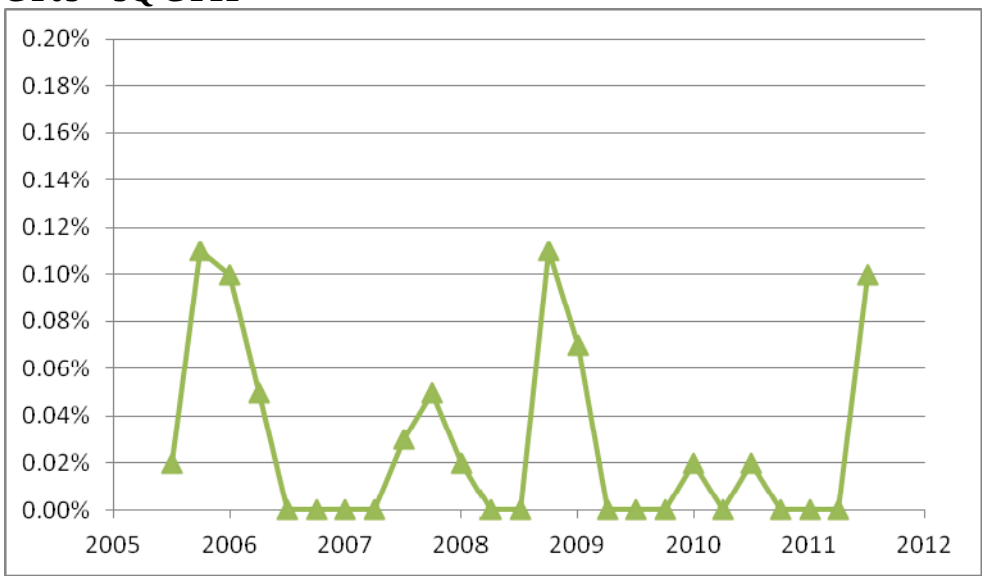


Figure 7. Frequency of elevated (>2000 ppbC) TNMHC at Oak Park CAMS 634, 3Q CY05 – 3Q CY11

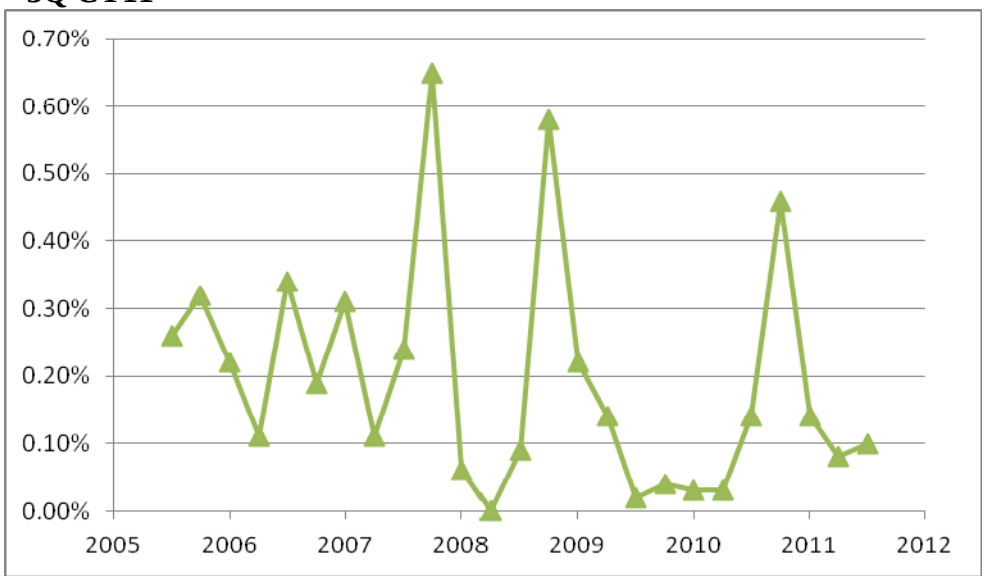


Figure 8. Quarterly geometric mean TNMHC ppbC at Dona Park CAMS 635, 3Q CY05 – 3Q CY11

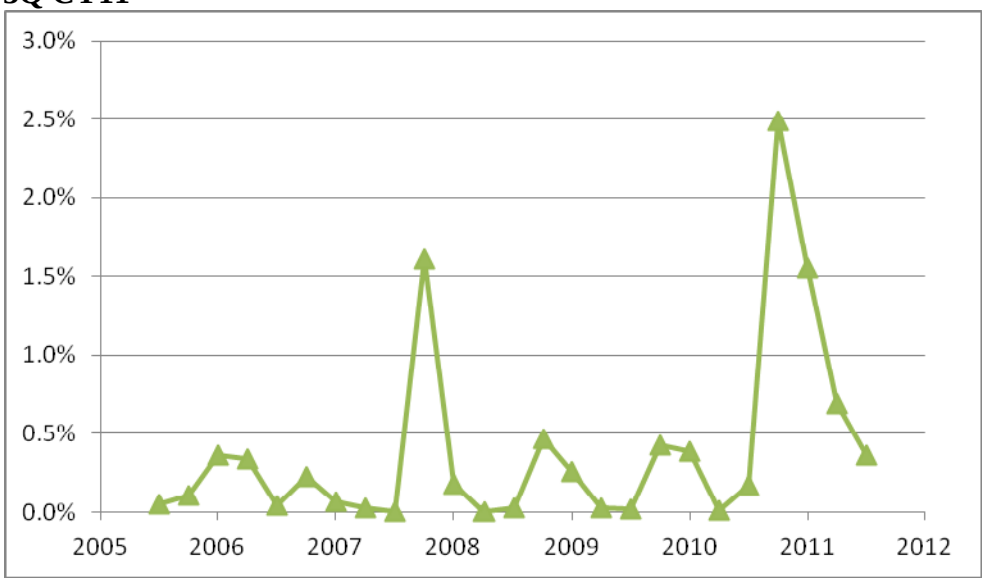
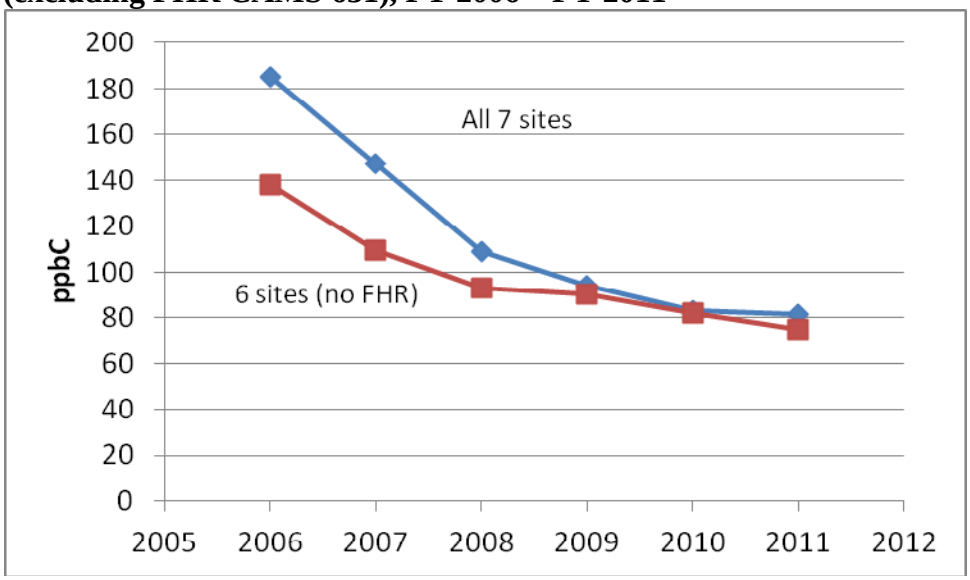


Figure 9. Average of the mean TNMHC concentration at seven sites and at six sites (excluding FHR CAMS 631), FY 2006 – FY 2011



3. Auto-GC Data Summaries in Residential Areas

In this section the results of semi-continuous sampling for hydrocarbons at the project auto-GC sites – Solar Estates C633, Oak Park C634 – are presented. These sites are located in residential areas. Solar Estates and Oak Park are generally downwind of industrial emissions under northerly winds. TCEQ began operating a new auto-GC at their Palm site located between the TCEQ's Hillcrest and Williams Park sites in the Hillcrest neighborhood in 2010. In examining aggregated data one observes similar patterns of hydrocarbons at all three sites. The TCEQ Palm site's concentration statistics are similar to those at Oak Park and Solar Estates.

Table 4, on page 21, summarizes data for Solar Estates and Oak Park from FY 2011. The data summarized in Table 4 have not completed the standard data validation process; however, generally very few changes occur during the standard validation process.

Table 4 shows the average concentrations along with the maximum one-hour and 24-hour average concentrations for 27 hydrocarbon species of interest. All concentration values in the table are in ppbV units. No concentrations or averages of concentrations were greater than TCEQ's air monitoring comparison values (AMCV) during FY 2011.

The rows for ***benzene*** are bold-faced in Table 4 owing to the concern that the concentrations for this species tend to be closer to the AMCV than are concentrations of other species. The benzene short-term AMCV is 180 ppbV and the benzene long-term AMCV is 1.4 ppbV.

Figure 10, on page 22, shows the mean concentration for the 27 species of interest by fiscal year at Oak Park, and Figure 11, on page 23, shows the same graphical synopsis for Solar Estates. As is clear in these two graphs, species mean concentrations more or less fall into three categories. The lower molecular-weight and less chemically-reactive alkane species (ethane, propane, butane, iso-butane, pentane, and iso-pentane) have mean concentrations greater than 1.0 ppbV. The second category would be the lower molecular-weight and more reactive alkenes (ethylene and propylene) and some six and seven carbon species (hexane, benzene, cyclohexane, and xylene-isomers), which have mean concentrations between 0.2 and 1.0 ppbV. The third category based on mean concentration is all the other species averaging less than 0.2 ppbV. In order to better show the trends in these data, a second pair of graphs are shown in Figures 12 and 13, on pages 24 and 25, respectively, for the concentration means of the lower concentration species. Note that the scales for the two auto-GCs are the same between Figures 10 and 11 and between Figures 12 and 13. In comparing these four graphs we can make the following conclusions:

1. Ethane means are about the same at both sites. For other alkane species, concentrations at Oak Park are generally higher.
2. Mean concentrations have declined overall since FY2006.
3. However, mean concentrations are relatively constant over the past two or three years.

Table 4. Auto-GC statistics for FY 2011

	Oak Park FY11			Solar Estates FY11		
Species	**1-Hour**	**24-Hour**	**Mean**	**1-Hour**	**24-Hour**	**Mean**
Ethane	288.06	39.90	6.10	202.57	24.67	6.14
Ethylene	66.80	6.59	0.59	6.59	1.91	0.33
Propane	497.94	55.88	4.44	129.62	13.56	3.79
Propylene	42.04	2.81	0.34	70.31	4.90	0.25
Isobutane	208.26	22.34	1.43	52.12	4.84	1.29
n-Butane	243.29	27.06	2.14	47.88	8.26	1.71
t-2-Butene	3.58	0.39	0.05	1.04	0.19	0.03
1-Butene	9.42	0.58	0.05	2.00	0.23	0.03
c-2-Butene	2.91	0.37	0.05	0.71	0.16	0.02
Isopentane	101.94	11.36	1.43	39.16	4.29	0.88
n-Pentane	75.77	9.12	0.87	29.69	2.77	0.56
1,3-Butadiene	15.61	0.86	0.03	9.18	0.55	0.02
t-2-Pentene	2.00	0.22	0.04	0.64	0.07	0.01
1-Pentene	0.86	0.12	0.02	0.41	0.05	0.01
c-2-Pentene	0.99	0.10	0.02	0.36	0.04	0.00
n-Hexane	34.24	3.82	0.36	10.72	1.01	0.24
Benzene	**34.17**	**3.49**	**0.30**	**9.77**	**0.72**	**0.17**
Cyclohexane	10.16	1.42	0.15	4.57	0.54	0.13
Toluene	57.15	4.27	0.38	9.31	0.86	0.20
Ethyl Benzene	1.65	0.28	0.03	1.03	0.19	0.02
p-Xylene + m-Xylene	6.47	0.93	0.12	8.53	1.27	0.13
o-Xylene	1.80	0.29	0.04	1.26	0.22	0.03
Isopropyl Benzene &Cumene	1.78	0.43	0.02	1.16	0.15	0.01
1,3,5-TMB*	0.86	0.13	0.01	2.32	0.34	0.01
1,2,4-TMB*	1.60	0.33	0.04	6.43	0.44	0.03
n-Decane	1.41	0.27	0.03	4.50	0.69	0.03
1,2,3-TMB*	0.53	0.09	0.01	0.75	0.17	0.01

* TMB= trimethylbenzene

Although the Long Term Health Work Group only asks for reports on the 27 species in Table 4, the auto-GC measure 46 species. One 1-hour value above the odor effects AMCV was measured at Solar Estates for the species n-propylbenzene, which is one of the other 19 auto-GC species. This species has the lowest odor threshold among the auto-GC species (3.8 ppbV).

Figure 10. Mean concentrations for 27 hydrocarbon species at Oak Park auto-GC, by FY 2006 - 2011

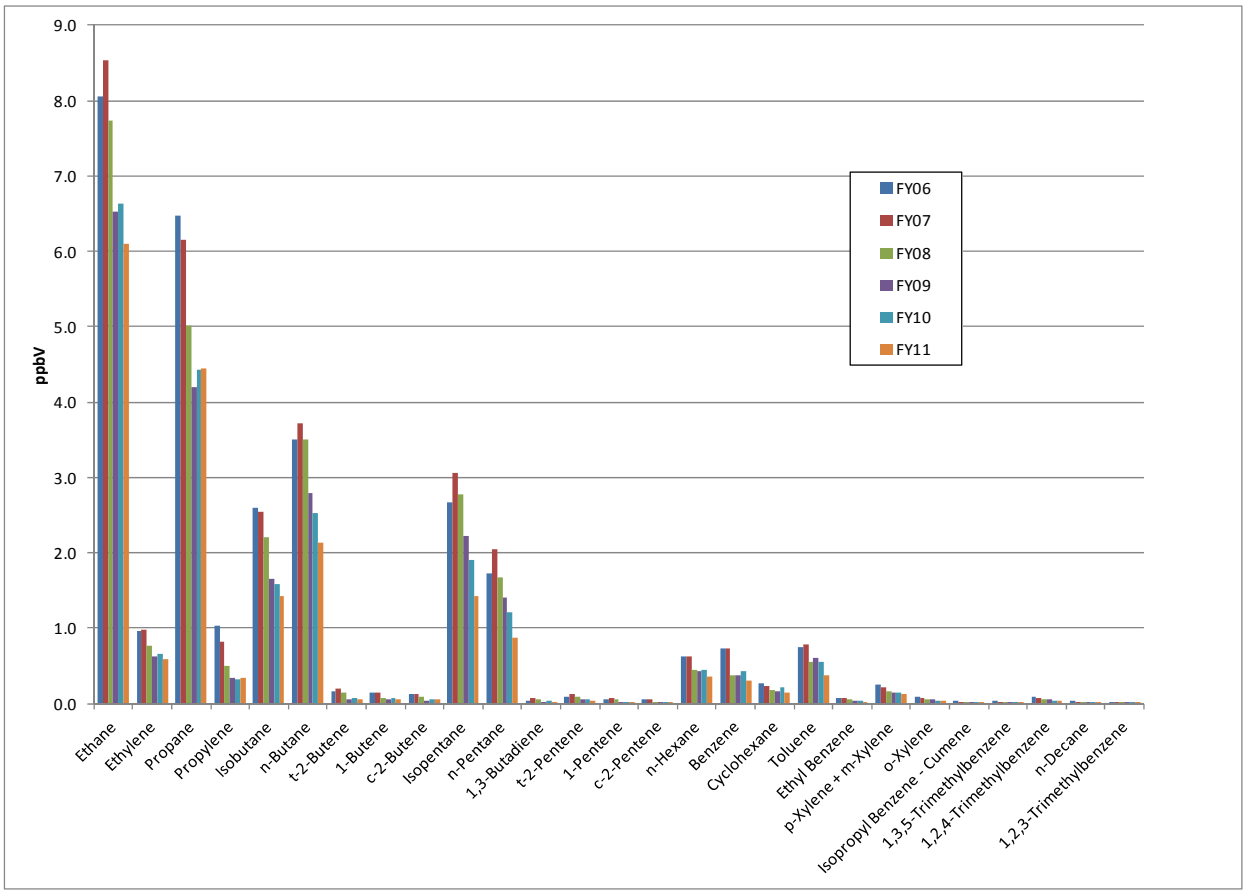


Figure 11. Mean concentrations for 27 hydrocarbon species at Solar Estates auto-GC, by FY 2006 - 2011

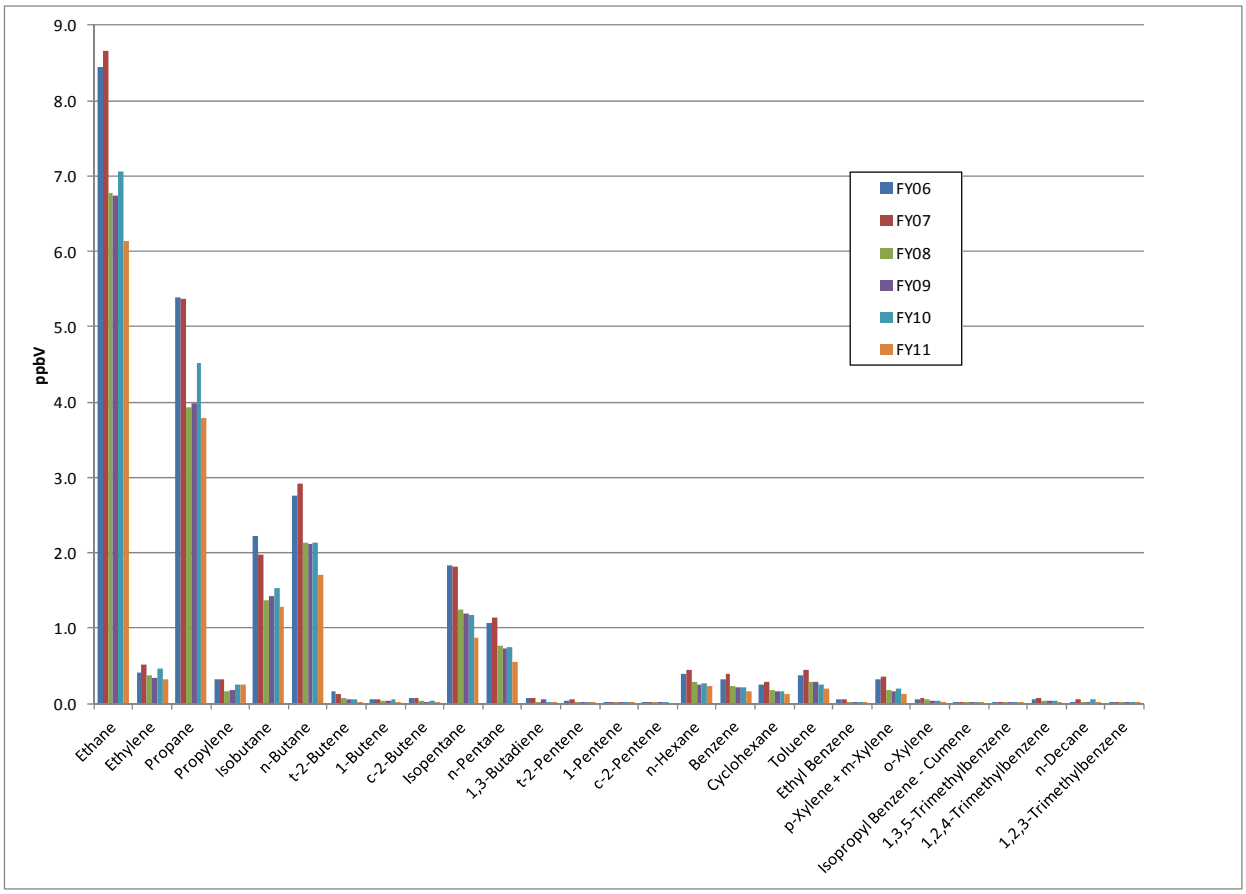


Figure 12. Mean concentrations for 21 hydrocarbon species at Oak Park auto-GC, by FY 2006 - 2011

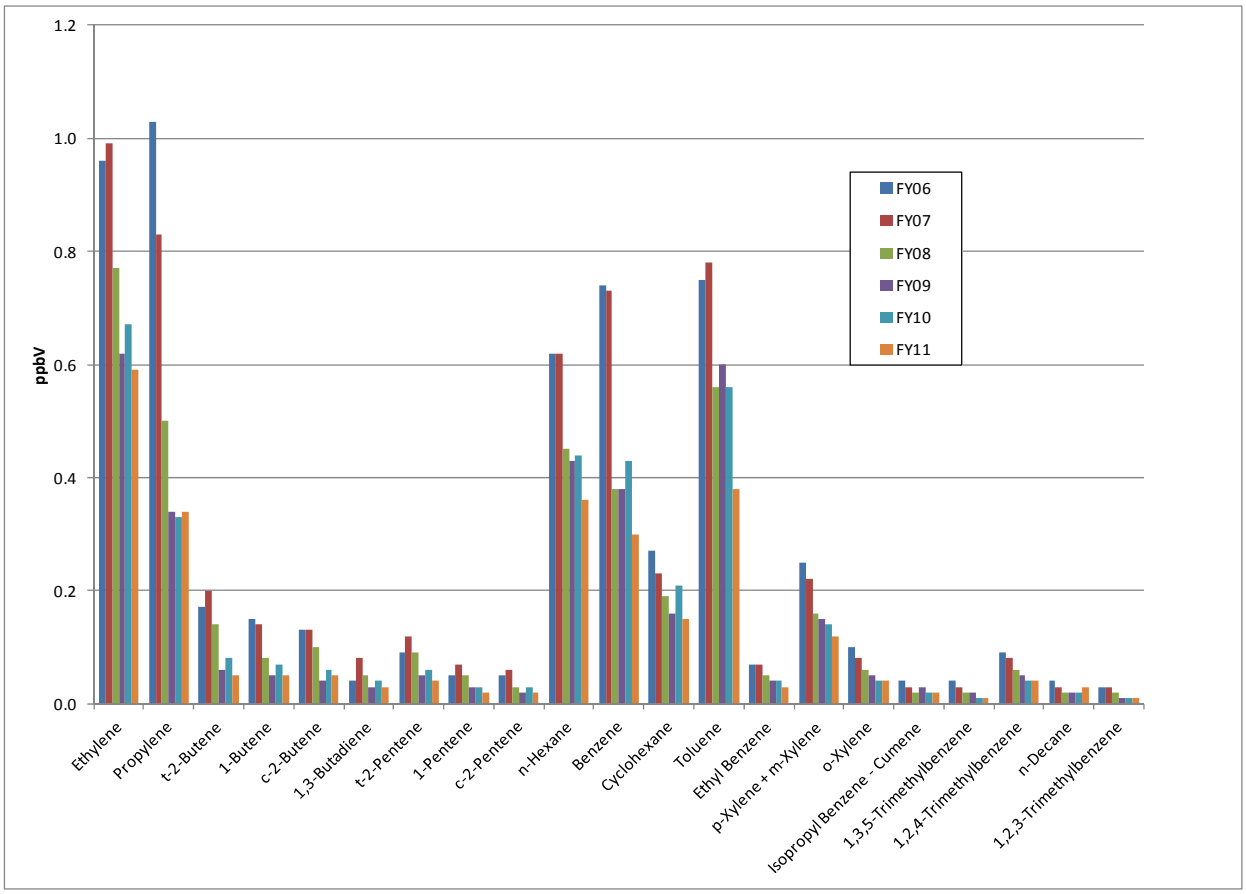
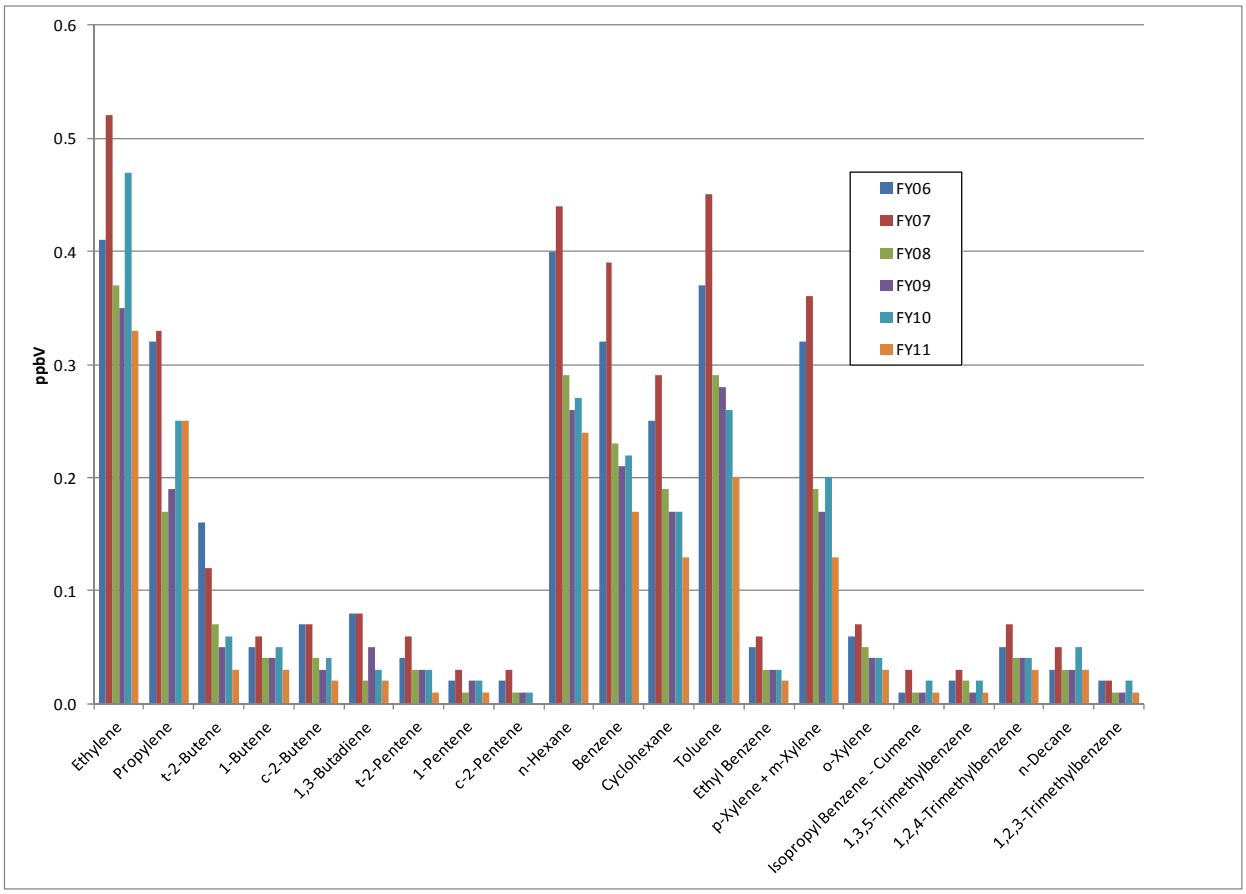


Figure 13. Mean concentrations for 21 hydrocarbon species at Solar Estates auto-GC, by FY 2006 - 2011



As was noted above, benzene tends to be a species of concern because measurements and averages sometimes approach the AMCV. In recent years, benzene concentrations have declined in Corpus Christi at both UT and at TCEQ canister sampling sites. In January 2010, the TCEQ removed Nueces County from its Air Pollution Watch List for benzene based on the improvements in air quality.

Table 5, on page 26, shows the concentrations at all the auto-GCs operating in Texas in FY2011 in rank order for mean concentration. The mean concentration at Oak Park is 8th highest among 24 sites, after having been third highest among 22 sites last year. Solar Estates appears to rank in the lower half. The AMCV for benzene for long-term (e.g., annual) data comparisons is 1.4 ppbV.

Table 5. Statistics on benzene ppbV at 24 auto-GCs operating in Texas in FY 2011

Site	Num Samples	Peak 1-Hr ppbV	Peak 24-hr ppbV	Mean
Lynchburg Ferry	6,908	131.46	16.24	0.70
Channelview	7,245	20.42	1.53	0.39
Odessa Hays	7,610	5.65	1.04	0.32
Beaumont-Downtown	7,463	23.98	2.81	0.31
Nederland High School	7,617	26.26	1.90	0.31
Clinton	7,527	8.36	1.88	0.31
Chamizal	6,689	8.08	1.87	0.30
Oak Park	6,964	34.17	3.49	0.30
Corpus Christi Palm	7,423	28.15	4.70	0.28
Houston Deer Park	6,496	37.08	3.21	0.27
HRM-3 Haden Rd	7,425	9.12	1.50	0.26
Cesar Chavez	7,706	7.21	1.38	0.26
Houston Milby Park	7,432	6.28	1.35	0.22
Wallisville Rd	7,319	5.96	1.06	0.21
Fort Worth Northwest	7,555	2.14	0.64	0.19
DISH Airfield	7,683	2.52	0.54	0.17
Decatur Thompson	7,497	1.05	0.43	0.17
Solar Estates	7,196	9.77	0.72	0.17
Dallas Hinton	7,471	2.31	0.57	0.16
Texas City 34th St	7,627	16.0	0.94	0.16
Flower Mound Shiloh	6,514	8.63	0.60	0.12
Lake Jackson	7,398	1.86	0.45	0.10
Danciger	7,327	4.78	0.37	0.09
Eagle Mountain Lake	7,618	4.09	0.35	0.08

4. Sulfur Dioxide Concentrations around Corpus Christi

Up until 2010, Corpus Christi complied with all of the EPA's National Ambient Air Quality Standards (NAAQS). However, as was described on pages 12 and 13 of this report, EPA revised the SO_2 NAAQS in 2010. The new standard is based on the three-year rolling mean of each year's 99th percentile of daily one-hour SO_2 maxima. The 99th percentile would be the fourth highest daily maximum in a complete 365 day year. Daily one-hour maxima and the annual 99th percentiles for each Corpus Christi site, 2005 – 2011 (through 10/15/11) have been calculated. The JIH CAMS 630 site appears to be in noncompliance of the NAAQS. A table of the estimated critical statistics – known as "design values" – is below in Table 6. Values greater than 75 ppb represent noncompliance and are highlighted. Table 6 contains the rounded results of averaging the 99th percentile values for three years which end in the year shown in the first column of Table 6.

Table 6. SO_2 NAAQS design values for Corpus Christi area sites, ppb units

Year	C21	C4	C629	C630	C631	C632	C633	C635	C98
2007	8	24	34	**119**	38	21	51	34	36
2008	8	21	30	**131**	33	19	31	31	33
2009	8	18	30	**89**	32	17	21	23	28
2010	9	17	26	**103**	21	13	11	22	33
2011*	9	12	19	**80**	15	13	30	20	27

* Incomplete three year period

Both the J.I. Hailey C630 and the Solar Estates C633 sites measured exceedance days in 2011. The time series for hourly SO_2 measurements at the J.I. Hailey C630 site is shown in Figure 14 page 28. As can be observed in the figure, exceedances of the 75 ppb level of the NAAQS have been measured since the beginning of the monitoring program. Exceedances have occurred during all seasons of the year. The main characteristic of exceedances is that they are associated with southerly winds, and in a few cases southwesterly winds. The hourly data are graphed against coincident wind direction in Figure 15, on page 28. A map of the area south of JIH C630 with emission point sources and other monitors appears on page 29 in Figure 16. The key directions for the highest mean SO_2 concentrations associated with each monitoring site are shown in this figure. The key directions from JIH C630 and from CCG C629 converge at the docks south for JIH C630. This result helps to point to the ships docked along the Ship Channel as the major source affecting JIH C630. Additional evidence is that in a few cases for which the logs for ship activity have been shared with UT and TCEQ, ships were upwind when elevated SO_2 was measured. In at least one case, a UT contractor observed a visible ship stack plume near the JIH site. When elevated SO_2 has been measured at JIH C630 there have generally not been any low molecular weight hydrocarbon species with elevated concentrations present, which is consistent with fuel oil combustion common to ships. Lastly, an analysis of speciated fine particulate matter from the TCEQ's sampler at the Dona Park C635 site suggests that a fuel oil combustion emission signature appears under wind conditions that would put docks upwind of the site, including the docks across the Ship Channel from JIH C630.

Figure 14. J.I. Hailey hourly SO_2 data, ppb units, January 2005 – October 2011

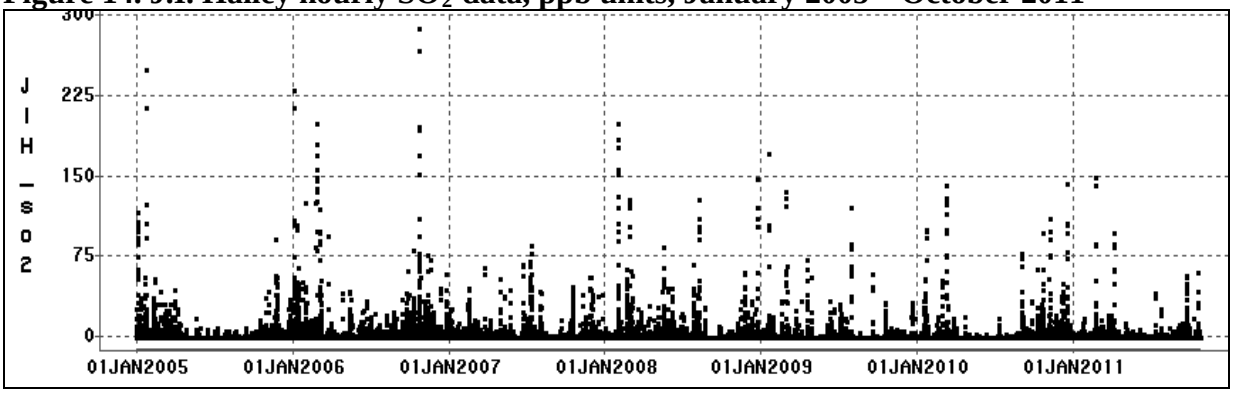


Figure 15. J.I. Hailey hourly SO_2 data by wind direction, ppb units, January 2005 – October 2011

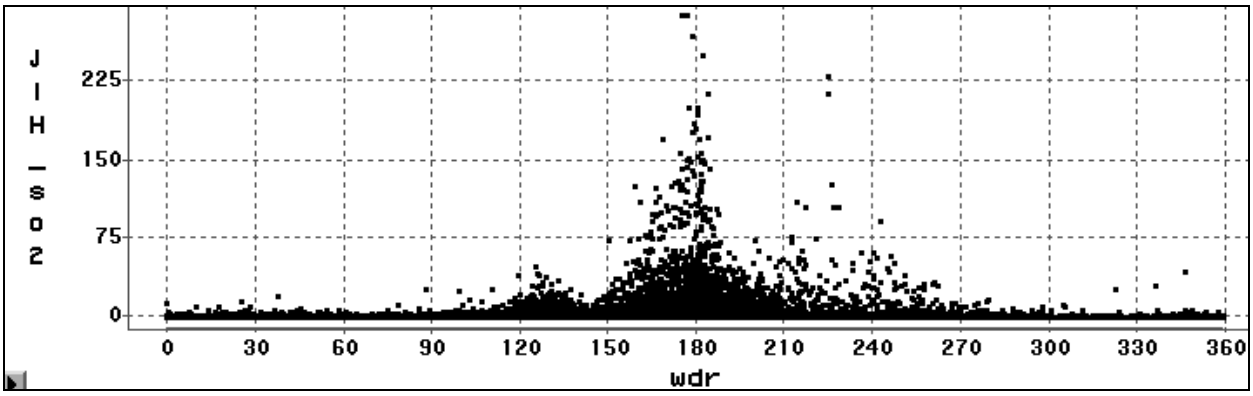
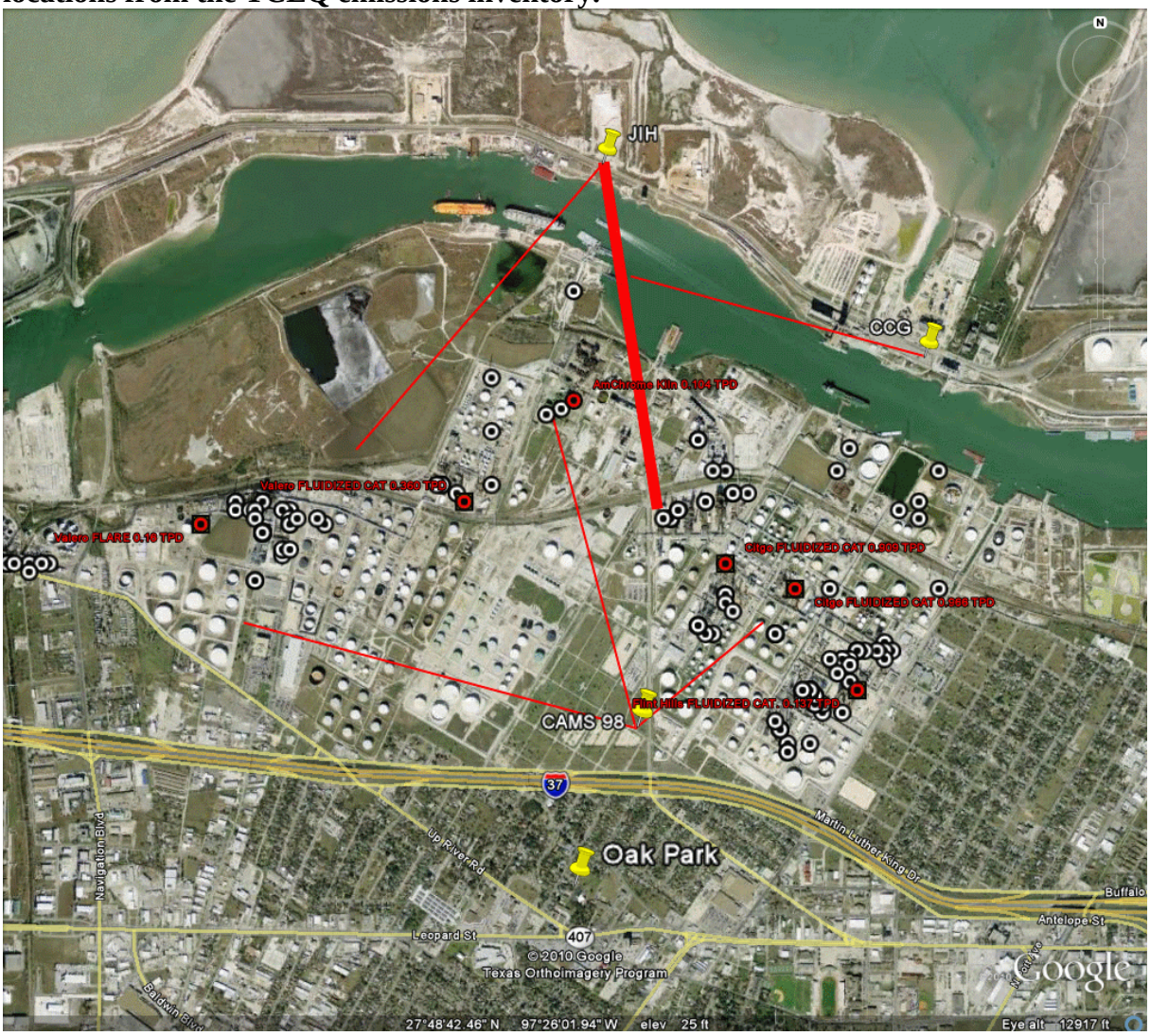


Figure 16. Aerial view of the J.I. Hailey site and other SO_2 monitoring sites, with key directions associated with the highest SO_2 measurements at the sites, and SO_2 point source locations from the TCEQ emissions inventory.



The recent history of SO_2 monitoring at Solar Estates is that elevated concentrations that would have been exceedances under the current NAAQS had been measured in 2005 and 2006, after which none were measured until July 14, 2011. A time series of the hourly SO_2 data at Solar Estates from the start of monitoring appears in Figure 17, on page 30. A second graph covering the most recent three years (January 2009 – October 2011) using the 5-minute time scale data appears in Figure 18, on page 30. Data measured on a shorter time scale have greater maximum concentrations than data measured on longer time scales, which is evident in comparing Figures 17 and 18. Figure 18 helps to identify when the change in behavior of the data began, which is late-May 2011.

Figure 17. Solar Estates hourly SO_2 data, ppb units, January 2005 – October 2011

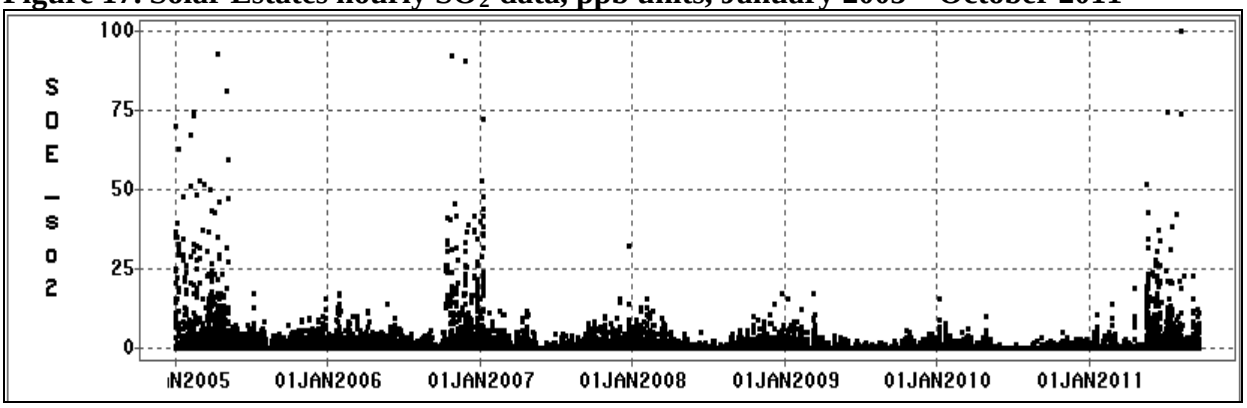
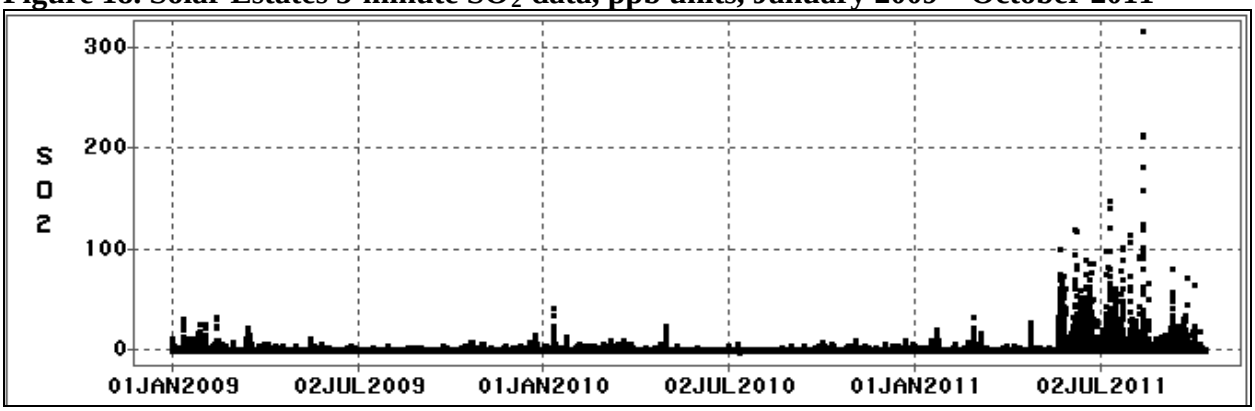


Figure 18. Solar Estates 5-minute SO_2 data, ppb units, January 2009 – October 2011



The monitor closest to Solar Estates is the Flint Hills Resources CAMS 632 (FHR C632) site. Figure 19, on page 31, shows the 5-minute time scale data for FHR C632 from January 2009 – October 2011. The range of concentrations at FHR C632 is much smaller than at Solar Estates. FHR C632 is located near a refinery, and is affected more frequently by nearby SO_2 emissions presumed to be associated with oil refining. Close examination of Figure 19 reveals that in summer months of 2009 and 2010, the SO_2 concentrations at FHR C632 were lower than in the recent summer months of 2011. This is made more evident in Figure 20, on page 31, which shows only the FHR SO_2 data from June through August in 2009, 2010, and 2011.

Figure 19. FHR 5-minute SO_2 data, ppb units, January 2009 – October 2011

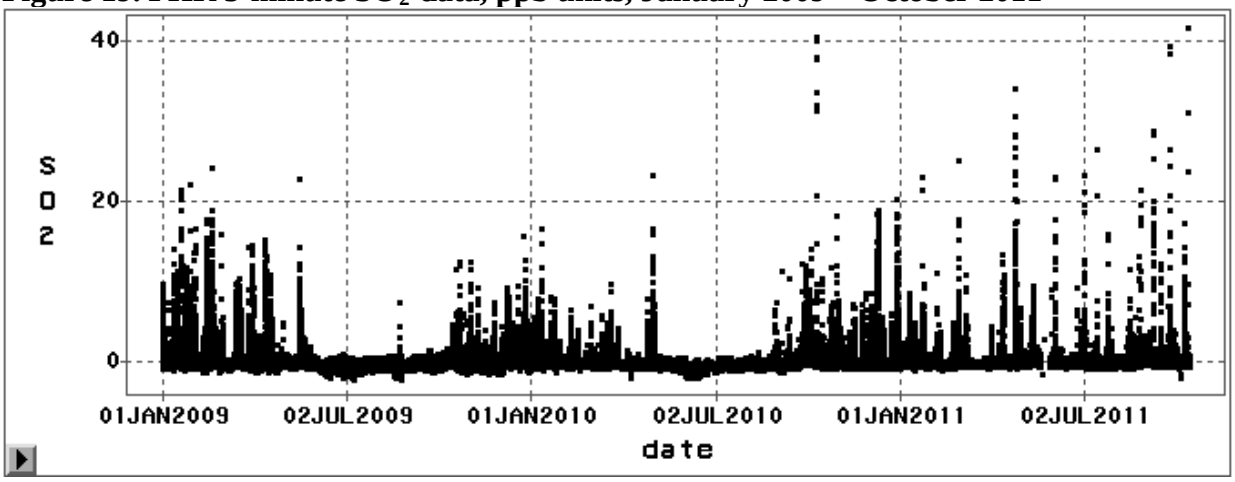
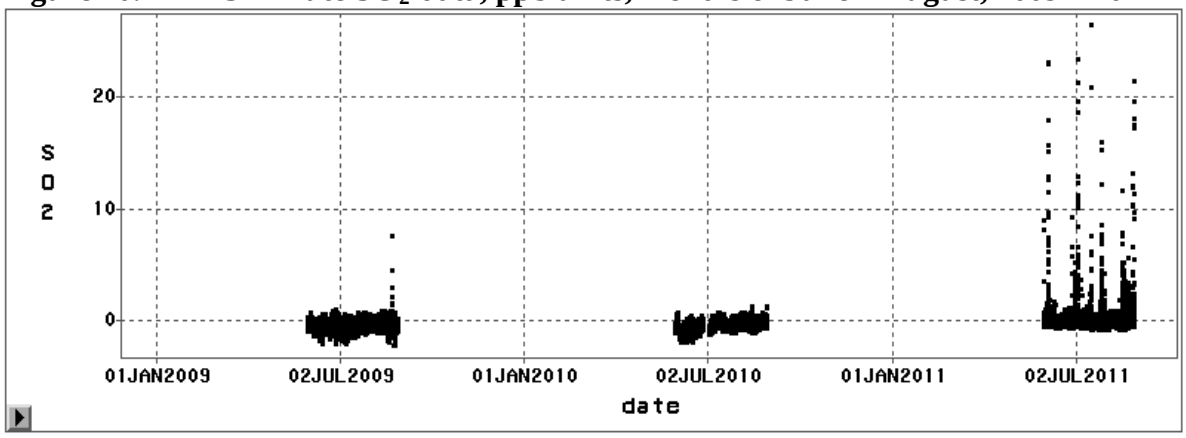


Figure 20. FHR 5-minute SO_2 data, ppb units, months of June – August, 2009 – 2011



By merging the wind direction and wind speed measurements with SO_2 data for the two sites, estimates as to the SO_2 emissions source may be derived. Figure 21, on page 32, shows the mean concentration of SO_2 as a function of wind direction using two approaches. The line graph labeled "SO2_Mean" is the simple average value associated with each angle degree wind direction using the 5-minute time scale data from May 25, 2011 through October 11, 2011. The line graph labeled "so2_ws_Mean" is the "wind speed adjusted" average value associated with each degree wind direction. Wind speed adjustment tries to take into account that, in general, higher speed winds produce lower concentrations and lower speed winds produce higher concentrations, all else held equal. So by multiplying concentrations by the coincident wind speed and dividing the product by the average wind speed one can reduce the effects of varying wind speed on concentrations resulting from a constant emission. The results for the two approaches are consistent that an emission source lies at an approximate south-southeast bearing (160 degrees around from north) away from Solar Estates. A similar analysis is shown in Figure 22, on page 32, for FHR C632, where west-southwest winds are associated with the highest mean concentrations. The key direction for FHR is spread over a wider range of angles than for Solar Estates. An issue here is that winds from the west are less frequent than other directions, and westerly winds in Corpus Christi are more likely to be light and variable than winds from other directions. So whereas the analysis for Solar Estates can be conducted on mean

concentrations by one-degree resolution angle of direction, the analysis at FHR is conducted with five-degree wind bins. The intersection of rays from Solar Estates at 160 degrees and from FHR at 240 degrees occurs at an industrial facility on Leopard Street. The TCEQ emissions inventory does not have a record for SO_2 emissions near this location.

Figure 21. Solar Estates mean and wind-speed-adjusted mean concentration 5-minute SO_2 data, ppb units, by one-degree wind direction, May 25 – October 11, 2011

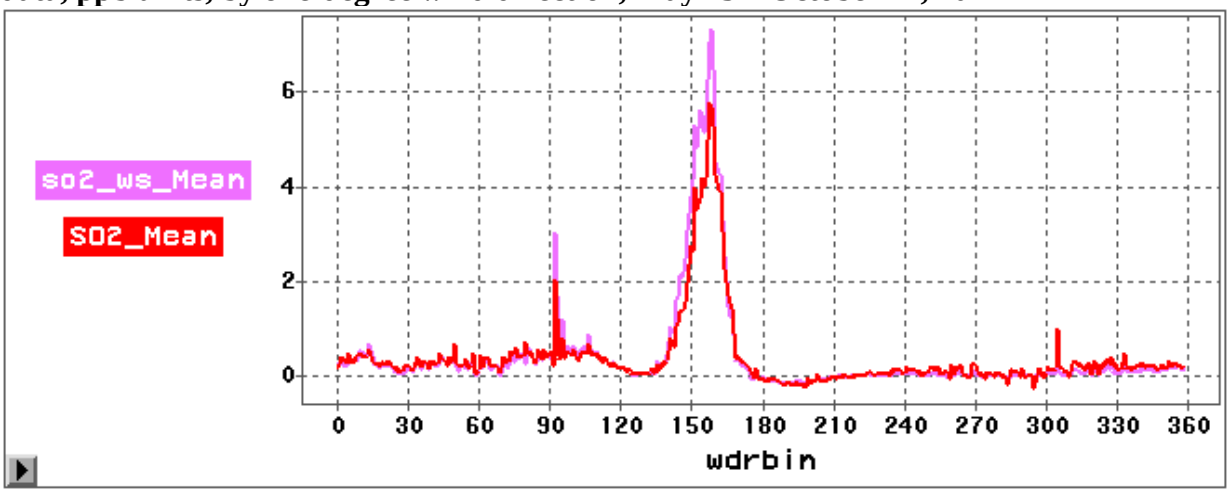
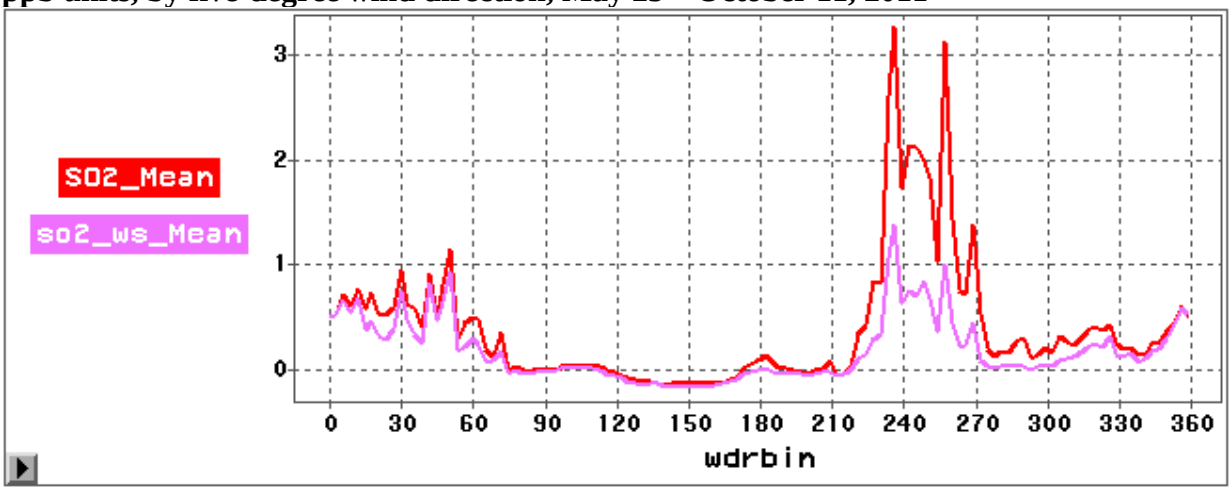


Figure 22. FHR mean and wind-speed-adjusted mean concentration 5-minute SO_2 data, ppb units, by five-degree wind direction, May 25 – October 11, 2011



A different question to ask about concentrations related to wind direction is "how often are concentrations measured above some threshold for each wind direction?" After all, a high average concentration could be the result of a small number of isolated individual samples that are statistical outliers. A method sometimes used to address this is referred to as probability density function (PDF) analysis. For PDF analysis, one selects a threshold concentration and then counts how many times for a given wind direction that threshold is exceeded, and then one divides this count by the count of wind observations in that same direction. The result is the fraction of times the threshold was exceeded by wind direction. In applying this method using 10-degree wind direction bins for both sites, one sees results similar to the mean-by-wind

direction results. The overall mean concentrations since May 25, 2011 – October 11, 2011 at the two sites are 0.05 ppb at FHR and 1.11 ppb at Solar Estates. Various thresholds were tested for each site. Figures 23 and 24, below, show the results of using thresholds of 2.0 ppb at Solar Estates and 1.5 ppb at FHR. In both cases, the results show the threshold surpassed around 20 percent of the time in the peak mean concentration directions.

Figure 23. Solar Estates, fraction of times SO_2 exceeds 2 ppb when wind blows in a given 10-degree wind direction bin, May 25 – October 11, 2011

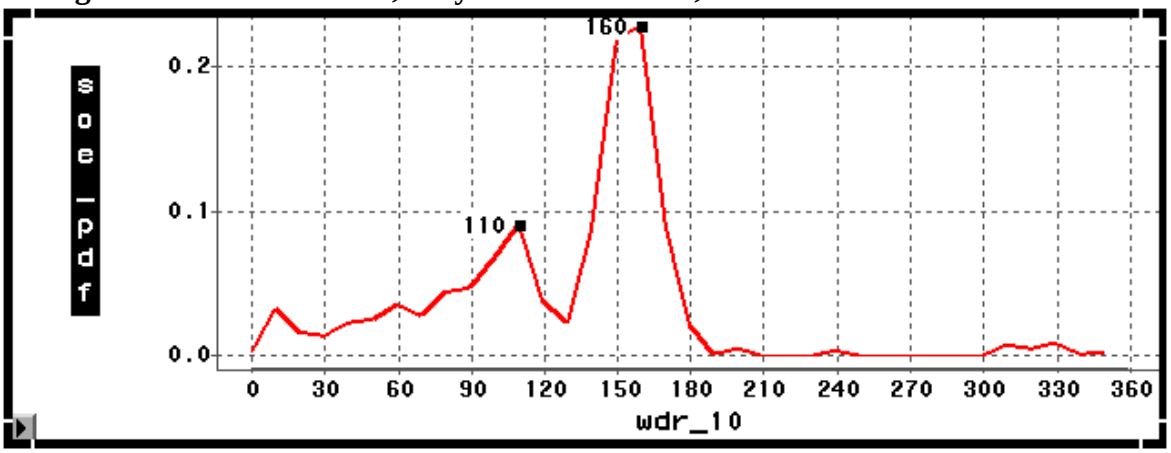


Figure 24. FHR, fraction of times SO_2 exceeds 1.5 ppb when wind blows in a given 10-degree wind direction bin, May 25 – October 11, 2011

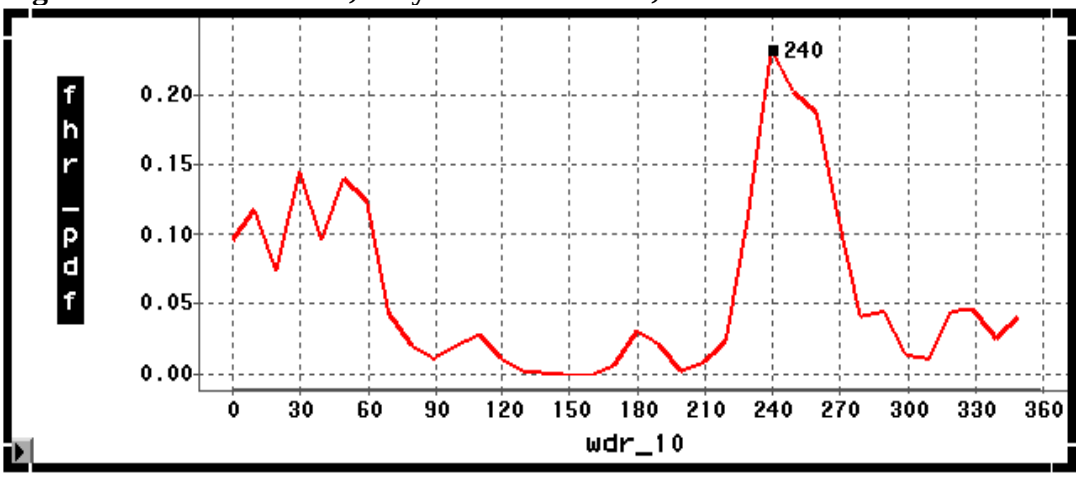
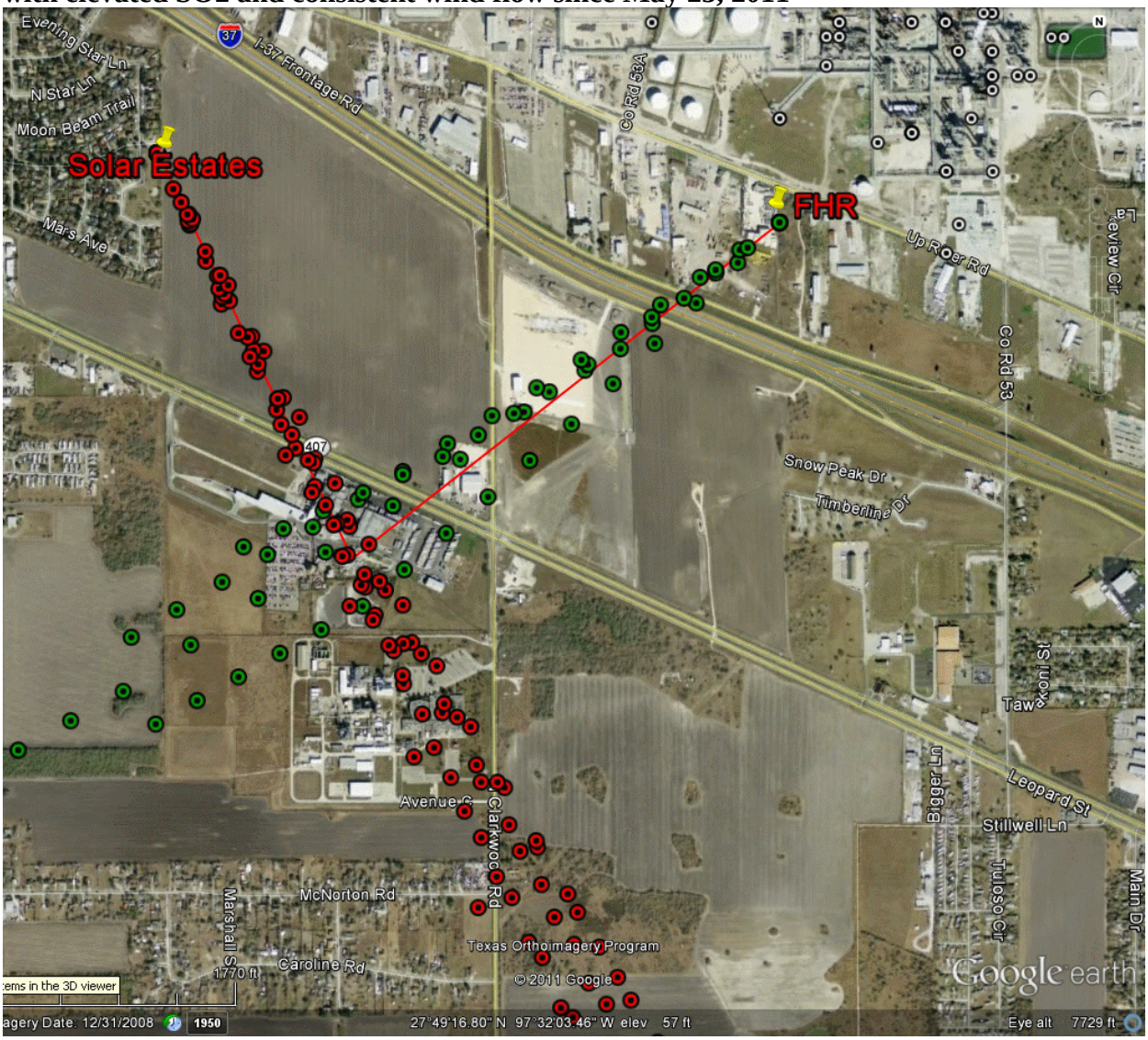


Figure 25, on page 34, shows a map made from surface back trajectories from Solar Estates and FHR associated with select elevated SO_2 measurements. Eight surface back-trajectories from Solar Estates using the time of the peak five-minute value within hours with mean SO_2 greater than 37.5 ppb (one-half the level of the NAAQS) and three from FHR with statistically-significantly elevated concentrations based on its lower range of concentrations taken under "good" wind conditions. As was mentioned earlier, when FHR measures SO_2 from the southwest, winds are generally light and variable and thus less amenable for back trajectory analysis. Thus, cases were selected with winds showing little variation over 20 minutes. The white and black dots in Figure 25 situated north of the FHR C632 site are points corresponding

to SO_2 emission sources from the TCEQ's 2009 emission inventory provided in October 2011 by the TCEQ Chief Engineer's Office. Based on the 2009 emission inventory, there are no reported SO_2 industrial sources on Leopard St. in this area.

Figure 25. Surface back-trajectories from Solar Estates and FHR corresponding to periods with elevated SO2 and consistent wind flow since May 25, 2011



Conclusions from the FY 2011 Data

In this year's report, several findings have been presented:

- Periodic air pollution events continue to be measured on a routine basis, but values of hydrocarbons above the TCEQ's air monitoring comparison values (AMCVs) are rarely observed. One measurement exceeded an odor AMCV this year in the auto-GC data.
- Hydrocarbons measured by the two project auto-GC continued to exhibit a downward trend in mean concentration in the recent year. This included benzene.
- Total nonmethane hydrocarbons measured at all seven sites appear to be continuing a long term decline in mean concentration and in the frequency of elevated concentration measurements.
- Oil & gas extraction in the area produces concentrations measurable by the monitoring network, in particular at the Dona Park C635 site.
- Under EPA's NAAQS for SO_2, the JIH C630 site appears to be noncompliant. The State of Texas and EPA would have to consider several issues before actually designating the area nonattainment. The Solar Estates C633 site has had extended periods during which SO_2 exceedances have been measured, but not to the extent of noncompliance.

Further analyses will be provided upon request.

APPENDIX B

Web Site Statistics

Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Project
Web Site Statistics

	Calendar Year 2005			Calendar Year 2006			Calendar Year 2007			Calendar Year 2008			Calendar Year 2009			Calendar Year 2010		
	Hits	Views	Visits	Hits	Views	Visits	Hits	Views	Visits	Hits	Views	Visits	Hits	Views	Visits	Hits	Views	Visits
The University of Texas at Austin Corpus Christi Web Sites:																		
Main Web Site (All Pages)	44,572	16,122		50,825	25,903		45,492	25,223		61,930	37,496		64,482	***		45,469	***	
Trajectory Tool Web Site ("user_trajectory" directory)	288		21	387		230	39,425		4,385	56,513		9,495	48,078		9,939	39,388		9,292
SubTotal - UT Web Sites	**44,860**	**16,122**	**21**	**50,990**	**25,903**	**230**	**84,917**	**25,223**	**4,385**	**118,443**	**37,496**	**9,495**	**112,560**	**0**	**9,939**	**84,857**	**0**	**9,292**
TCEQ Web Sites:																		
Monitoring Operations Corpus Christi AutoGC Page								342			1,176			1,338			1,324	
SubTotal - TCEQ Web Sites	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**342**	**0**	**0**	**1,176**	**0**	**0**	**1,338**	**0**	**0**	**1,324**	**0**
Total - Both Institutions	**44,860**	**16,122**	**21**	**50,990**	**25,903**	**230**	**84,917**	**25,565**	**4,385**	**118,443**	**38,672**	**9,495**	**112,560**	**1,338**	**9,939**	**84,857**	**1,324**	**9,292**

Denotes this count not collected

*** Views are no longer available on UT's Urchin Weblog system

TCEQ opened all 21 AQC site's to the public on 1-1-10, since there are 2 Corpus Christi AQC sites, we use this formula ((Total Daily Views / 21) * 2) to estimate the Views for this report

Definition of Terms:

Hit - A request for a file from the web server. Available only in log analysis. The number of hits received by a website is frequently cited to assert its popularity, but this number is extremely misleading and dramatically over-estimates popularity. A single web-page typically consists of multiple (often dozens) of discrete files, each of which is counted as a hit as the page is downloaded, so the number of hits is really an arbitrary number more reflective of the complexity of individual pages on the website than the website's actual popularity. The total number of visitors or page views provides a more realistic and accurate assessment of popularity.

Page View - A request for a file whose type is defined as a page in log analysis. An occurrence of the script being run in page tagging. In log analysis, a single page view may generate multiple hits as all the resources required to view the page (images, .js and .css files) are also requested from the web server.

Visit / Session - A series of requests from the same uniquely identified client with a set timeout. A visit is expected to contain multiple hits (in log analysis) and page views.

Prepared by Denzil Smith 1/6/2012

APPENDIX C

Financial Reports

ANNUAL PROGRESS REPORT
TO THE U.S. DISTRICT COURT
FOR THE
CORPUS CHRISTI AIR MONITORING AND SURVEILLANCE CAMERA PROJECT

Financial Summary

A. PROJECT EXPENDITURES

First Year Paid Expenditures	(10/2/03 - 9/30/04)	$ 663,448.81
Second Year Paid Expenditures	(10/1/04 - 9/30/05)	$1,291,272.21
Third Year Paid Expenditures	(10/1/05 - 9/30/06)	$ 461,868.36
Fourth Year Paid Expenditures	(10/1/06 – 9/30/07)	$ 688,645.02
Fifth Year Paid Expenditures	(10/1/07 – 9/30/08)	$ 997,731.32
Sixth Year Paid Expenditures	(10/1/08 - 9/30/09)	$ 896,094.86
Current Year Expenditures	(10/1/09 - 9/30/10)	$ 969,694.76
Current Year Expenditures	(10/1/10 - 9/30/11)	$ 701,436.96
Current Year Encumbrances*	(10/1/09 - 9/30/11)	$ 19,292.75
Total Project Expenditures (including Current Year Encumbrances)	(10/2/03 - 9/30/11)	$6,689,485.05

Note: Summary of Expenditures found in *Exhibit A*, page 38.

B COCP FUNDS REMAINING

Initial deposit on 10/2/03	$6,761,718.02
Less expenditures through 9/30/11	($6,670,192.30)
Less encumbrances through 9/30/11*	($ 19,292.75)
Plus interest earned as of 9/30/11	$ 803,133.83
Total	$ 875,366.80
COCP FUNDS REMAINING AS OF 9/30/11	**$ 875,366.80**

* Some expenses incurred during Year 8 of the Project have not been billed by University vendors or subcontractors and/or approved for payment so those charges were not posted to the general ledger as of 9/30/11. Those encumbered charges are estimated to be $19,292.75

EXHIBIT A

Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Project

Expenditure Summary for the Project Period 10/2/03 through 9/30/11

DESCRIPTION	Budget Allocation through Year 7	Prior Year paid Expenditures	Current Year paid Expenditures	*TOTAL EXPENDITURES	*BALANCE AVAILABLE
SALARIES & WAGES	1,218,732.94	(1,129,800.18)	(54,025.84)	(1,183,826.02)	*34,906.92*
CEER ADMIN SALARIES	162,071.37	(129,192.24)	(32,773.14)	(161,965.38)	*105.99*
FRINGE BENEFITS	285,059.91	(253,983.44)	(22,166.92)	(276,150.36)	*8,909.55*
Canister and Other Analysis	114,455.00	(86,264.00)	(28,191.00)	(114,455.00)	*0.00*
Supplies and Utilities	528,818.19	(436,510.49)	(85,932.65)	(522,443.14)	*6,375.05*
Cell Phone Allowance	1,845.00	(855.00)	(630.00)	(1,485.00)	*360.00*
SUBCONTRACT	3,538,580.91	(3,158,338.98)	(272,403.14)	(3,430,742.12)	*107,838.79*
Interest Program Expenditures	0.00	(0.00)	(126,995.29)	(126,995.29)	*(126,995.29)*
TRAVEL	30,191.00	(26,584.43)	(3,391.82)	(29,976.25)	*214.75*
EQUIPMENT	0.00	0.00	0.00	0.00	*0.00*
TOTAL DIRECT COSTS	5,879,754.32	(5,221,528.76)	(626,509.80)	(5,848,038.56)	*31,715.76*
INDIRECT COSTS **/15% TDC**	881,963.70	(747,226.58)	(74,927.16)	(822,153.74)	*59,809.96*
TOTAL EXPENDITURES	$6,761,718.02	($5,968,755.34)	(701,436.96)	(6,670,192.30)	91,525.72

* Some expenses incurred during Year 8 of the Project have not been billed by University vendors or subcontractors and/or approved for payment so those charges were not posted to the general ledger as of 9/30/11. Those encumbered charges are estimated to be $19,272.75. When received and approved, those charges will be paid from the available balance.

CORPUS CHRISTI AIR MONITORING AND SURVEILLANCE CAMERA PROJECT

University of Texas at Austin
Annual Audit Report Results

The University's Annual Reports and Audit Statements are made available for public review at the following website:

http://www.sao.state.tx.us/Reports/report.cfm/report/10-339

Attached is a copy of The University of Texas at Austin's Certification Statement for the Office of Management and Budget (OMB) Circular A-133 Audit conducted during the 2009/2010 fiscal year. The OMB Circular A-133 Audit for the 2009/2010 fiscal year is currently being conducted. The results of the 2008/2009 Audit will be made available at the above website. It is anticipated the audit results will be posted in late Spring 2012.

SUBRECIPIENT AUDIT FORM

(including financial reports and internal controls)

FOR FISCAL YEAR ENDING AUGUST 31, 2010

SUBRECIPIENT'S LEGAL ENTITY NAME AND ADDRESS

The University of Texas at Austin
Office of Sponsor Projects
The University of Texas at Austin
P.O. Box 7726
Austin, TX 78713

☒ Our audit report for the subject fiscal year has been completed. Findings at The University of Texas at Austin were noted; however, there were no questioned costs.

The A-133 Audit for The University of Texas at Austin is issued as part of the statewide audit conducted by the State Auditor's Office. A complete copy of the audit report is available at:

http://www.sao.state.tx.us/reports/main/11-318.pdf Federal Portion

Or at http://www.sao.state.tx.us/reports/; select the Statewide Reports link.

Items related to the Research and Development cluster for The University of Texas at Austin are outlined beginning on page number 386. The report contains the finding, corrective action plan and anticipated implementation dates. Prior year findings have been resolved and are addressed beginning on page 665.

Authorizing Signature: _____ **Date:** 2/28/11

Jason Richter
Associate Director, Office of Sponsored Projects

APPENDIX D

Supplemental Environmental Projects

SEP Project List

APPENDIX D

Supplemental Environmental Projects (SEP) awarded to The University of Texas at Austin

No.	SEP (Name)	Docket No.	Period of Performance	Award Amount	Interest Earned as of 9/30/11	UT Account Number	Project Description - Notes
1	CITGO Regfining and Chemicals Company, L.P.	2001-1469-AIR-E	7/2004-7/2006	$680,000.00	$19,978.03	26-7690-94	Task 1 - Extend the operation of the air monitoring network in Corpus Christi for an additional year.
				$190,000.00	$7,956.39	26-7690-95	Task 2 - Development of the Trajectory Tool
2	Duke Energy Field Services	2003-1122-AIR-E	2/2005-8/2005	$5,187.00	$100.15	26-4254-75	Purchase additional canisters for the Corpus Christi monitoring sites.
3	El Paso Merchant Energy Petroleum Company	2001-1023-AIR-E	2/2006-6/2008	$46,004.00	$1,264.83	26-7693-36	Task 1 - Enchancement to the Automated Trajectory Tool.
				$90,044.00	$5,810.15	26-7692-88	Task 2 - Additional Canister Analysis, Power Loss Hardware and Software and Wind Direction Filter.
4	Sherwin Aluminia	2004-1982-IR-E	10/2007-12/2009	$10,244.00	$557.00	26-7695-56	Used for canister analyses.
5	Texas Molecular Corpus Christi Services, Limited	D1-GV-07-001054	2/2009-9/2011	$67,900.00	$6,119.41	26-7697-82	Used for the repair and refurbishment of ageing equipment at the active Project sites. Items purchased include 8 computers and 3 multi-gas calibrators. Also, the Auto GC systems at Oak Park and Solar Estates were refurbished. * See note below.
6	Equistar Chemicals, LP	D1-GV-06-002509	**See note below	$150,000.00	$0.00	To be assigned	Funds will be used to extend and enhance the life of the Project Network. ** See note below
	TOTAL			**$1,239,379.00**	**$41,785.96**		

* Originally the Texas Molecular and Equistar funds were to be used to purchase a FLIR ThermaCAM GasFindIR-HS (IR camera) and accessories, to train subcontractor personnel in use of camera,and to conduct video taping recording in the Corpus Christi refinery row area. When the Equistar funds were reduced (see note below) it was determined that the funding necessary for the camera was not available, and there were other ways the funds could be put to use to benefit the extension of the life of the network.

12/19/2011

APPENDIX D

Supplemental Environmental Projects (SEP) awarded to The University of Texas at Austin

** A check in the amount of $400,000 was received by UT Austin 12/08/08 and was deposited in a holding account pending approval by the TCEQ of a UT Austin SEP Proposal. Subsequent to the March 31, 2009 Quarterly Report to the Court, the TCEQ notified UT Austin that Equistar Chemicals (a subsidiary of LyondellBasell Industries and US affiliate Loyondell Chemical Co.), filed for Chapter 11 bankruptcy on January 6, 2009 and that the $400,000 ordered to be paid by Equistar for this project might be subject to a collection effort in that proceeding on behalf of the creditors. As a consequence, the funding for the Equistar SEP award was placed on indefinite hold. Subsequently the Bankruptcy Trustee filed a lawsuit against UT to recover the $400,000 as a "preferential transfer" which can void transfers that take place within certain time limits of filing for bankruptcy.	
The Texas Attorney General represented UT in that lawsuit. On February 7, 2011, UT was notified that the Assistant Attorney General handling the case, with the agreement of the TCEQ, succeeded in getting an agreed settlement under the terms of which UT paid $250,000 to the Bankruptcy Trustee and UT retained the remaining balance free and clear. On February 14, 2011, a payment in the amount of $250,000 was mailed to the Bankruptcy Trustee.	
Due to the reduction of the award amount and that a notice to proceed was never issued for the Equistar funds, UT contacted the TCEQ to determine the procedures UT should follow to move forward in utilizing the funds. On March 18, 2011, UT was asked to submit a new Third-Party Application to the SEP Program by June 1, 2011. This will allow UT to transition the Equistar funds to a new SEP Agreement, as the term of the older agreement has ended. UT submitted a new Third-Party Application to receive SEP funding on June 1, 2011. As of the writing of this report, that Application is still under review.	