Neighborhood Air Toxics Modeling Project
For
Houston and Corpus Christi
Case # 2:11-MC-00044

Phase 1B
Monitoring Network Extension

Annual Progress Report for the Period

October 1, 2012 through September 30, 2013

Submitted to

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

Ms. Kathleen Aisling
United States 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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April 28, 2014

ANNUAL PROGRESS REPORT
TO THE U.S. DISTRICT COURT
FOR THE

Neighborhood Air Toxics Modeling Project for Houston and Corpus Christi: Phase 1B Monitoring Network Extension

October 1, 2012 through September 30, 2013

INTRODUCTION

On February 1, 2008, the United States District Court entered an Order (D.E. 981, Order (pp.1, 7-11)) regarding unclaimed settlement funds in Lease Oil Antitrust Litigation (No.11) Docket No. MDL No. 1206. The Court requested a detailed project proposal from Dr. David Allen, the Gertz Regents Professor in Chemical Engineering and the Director of the Center for Energy and Environmental Resources at The University of Texas at Austin (UT Austin), regarding the use of $9,643,134.80 in the Settlement Fund. The proposal was for a project titled "Neighborhood Air Toxics Modeling Project for Houston and Corpus Christi" (hereinafter "Air Toxics Project"). The Air Toxics Project was proposed in two stages. In Stage 1, UT Austin was to develop, apply, demonstrate and make publicly available, neighborhood-scale air quality modeling tools for toxic air pollutants in Corpus Christi, Texas (Phase 1A) and extend the operating life of the air quality monitoring network in Corpus Christi, Texas (Phase 1B). The ambient monitoring results from Stage 1 Phase 1A were to be used in synergy with the neighborhood-scale models to improve the understanding of emissions and the spatial distribution of air toxics in the region.

On February 21, 2008, the United States District Court for the Southern District of Texas issued an order to the Clerk of the Court to distribute funds in the amount of $4,586,014.92, plus accrued interest, to UT Austin for the purposes of implementing Stage 1 of the Air Toxics Project as described in the detailed proposal submitted to the Court by UT Austin on February 15, 2008 (D.E. 998).

Under the Order to Distribute Funds in MDL No. 1206, on March 3, 2008, at the direction of the Settlement Administrator, $4,602,598.66 was disbursed to UT Austin for Stage 1 of the Project. This amount includes the interest accrued prior to distribution from the MDL No. 1206 Settlement Fund.

In Stage 2, subject to the availability of funds, it was planned that UT Austin would extend the modeling to the Houston, Texas ship channel region, develop a mobile monitoring station that could be deployed in Corpus Christi and in other regions of Texas and/or further extend the operating life of the existing stationary network in the same or a modified spatial configuration. Based on the decision of the U.S. Court of Appeals for the 5th Circuit on June 27, 2011, UT Austin will not be receiving the Stage 2 funding at any point in the future. Further, work on the modeling portion of Stage 1 (Phase 1A) was completed June 30, 2011. Hence, all future progress reports will describe only work on Stage 1 Phase 1B.

The air quality monitoring network was originally authorized on October 1, 2003, when the United States 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 UT Austin to

implement the court ordered condition of probation (COCP) project *Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation* (Project). Those funds have been expended. Funding for the air quality monitoring network originally created for the COCP Project is now provided through Stage 1 Phase 1B of the Air Toxics Project.

A. MONITORING SITES AND EQUIPMENT INSTALLED

The COCP consists of a network of six (6) continuous ambient air monitoring stations (CAMS) as shown in the map below in Figure 1 with air monitoring instruments and surveillance camera equipment as shown in Table 1, on page 4. Sulfur dioxide (SO_2), hydrogen sulfide (H_2S), hydrocarbon species with from one carbon atom to 11 carbon atoms, and meteorological parameters are measured at the CAMS. Each CAMS is identified with a number as shown in Table 1 and often shown on maps with, for example, "CAMS 633" abbreviated as "C633". Speciated hydrocarbon chemicals may be measured either by an automated chromatogram instrument (auto-GC) or sampled in canisters and quantified later in a laboratory. Methane and the total sum of all other common two carbon atom to 11 carbon atom hydrocarbons (unspeciated) – total nonmethane hydrocarbon (TNMHC) – are measured at four sites.

Figure 1. Corpus Christi Monitoring Sites, "X" marks a UT site terminated in 2012

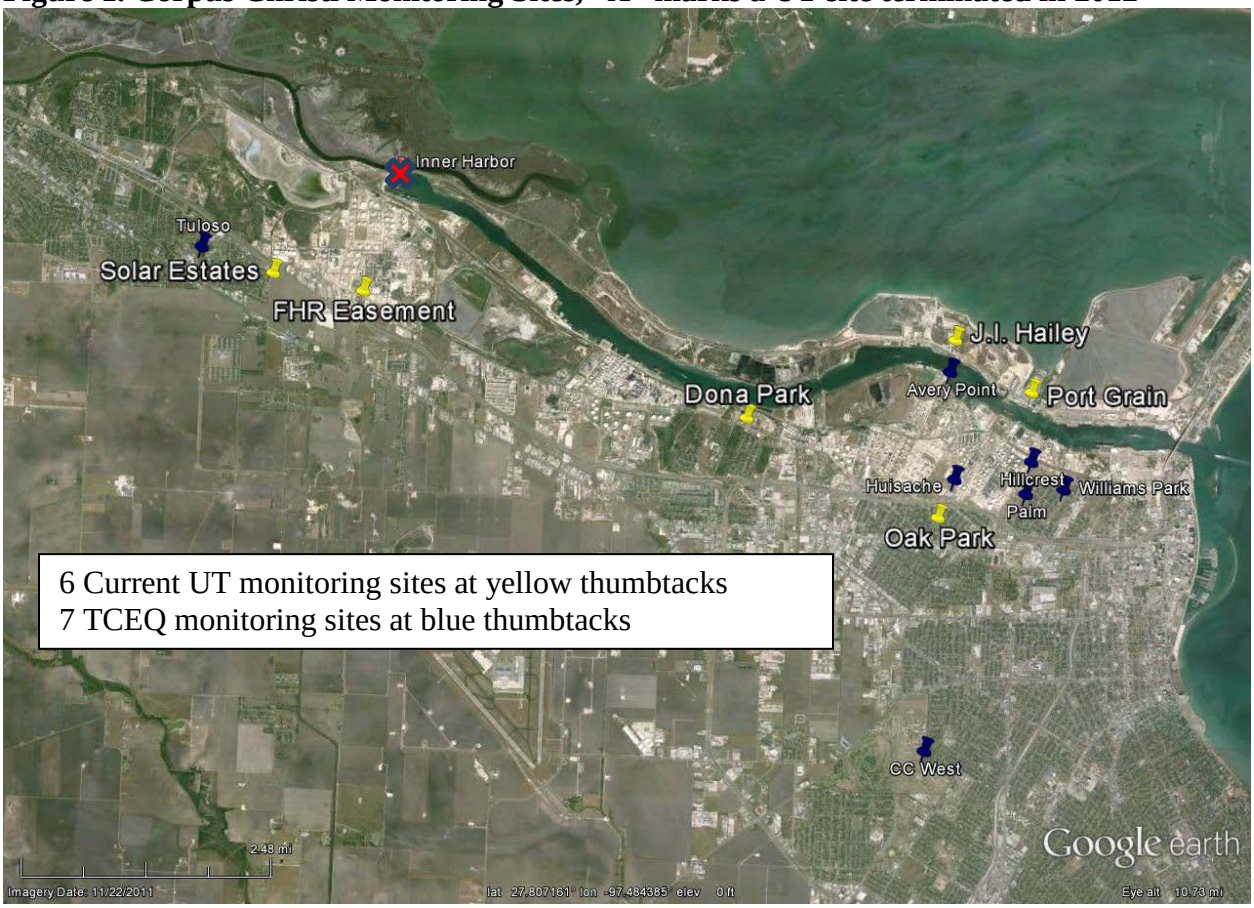

Table 1. Schedule of Air Monitoring Sites, Locations and Major Instrumentation

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**)	Mar 2005 to date	C: Dec 2004 to Feb 2009 T: Dec 2004 to Apr 2012		Dec 2004 to date	
629	Grain Elevator @ Port of Corpus Christi (**CCG**)		T&C: Dec 2004 to date	Dec 2004 to date	Dec 2004 to date	
630	J. I. Hailey Site @ Port of Corpus Christi (**JIH**)		T&C: Dec 2004 to date	Dec 2004 to date	Dec 2004 to date	
635	TCEQ Monitoring Site C199 @ Dona Park (**DPK**)		T&C: Dec 2004 to date	Dec 2004 to date	Dec 2004 to date	Jan 2005 to date
632	Off Up River Road on Flint Hills Resources Easement (**FHR**)		T&C: Dec 2004 to date	Dec 2004 to date	Dec 2004 to date	
633	Solar Estates Park at end of Sunshine Road (**SOE**)	Mar 2005 to date	C: Dec 2004 to Feb 2009 T: Dec 2004 to Apr 2012	Dec 2004 to date	Dec 2004 to date	Jan 2005 to date
631	*Port of Corpus Christi on West End of CC Inner Harbor (**WEH**) (site terminated)*		T&C: Dec 2004 to May 2012	Dec 2004 to May 2012	Dec 2004 to May 2012	

Legend

CAMS	continuous ambient monitoring station
Auto GC	automated gas chromatograph
TNMHC	total non-methane hydrocarbon analyzer (all except CAMS 634 & 633 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

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 FY2013 (October 1, 2012 through September 30, 2013). More details are available in Appendix A, on pages 9 through 33.

Results of Canister Sampling
At four of the six 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 (TNMHC) has been measured, i.e., concentration greater than 2000 parts per billion carbon (ppbC) for longer than 15 minutes. During FY2013, a total of 24 usable canister samples were collected in the Corpus Christi network due to sustained levels of elevated concentrations of TNMHC. At the J. I. Hailey site, a canister can be triggered if sulfur dioxide is measured above 50 parts per billion (ppb), which resulted in 25 canister samples in FY2012; however, because of a decrease in emissions and lower resulting concentrations, none were triggered in FY2013 due to sulfur dioxide concentrations measurements above 50 ppb. 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 (SO_2) in 2010. No exceedances of the State of Texas standards for sulfur dioxide and hydrogen sulfide were measured this fiscal year, nor were any exceedances of the federal SO_2 standard measured. A mid-2012 change in regulations may have resulted in lowered SO_2 emission rates from one source category – ships at dockside in the Ship Channel.

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 four years, compared to the project's first three years. However, several alkane species are showing recent increase in mean concentration trends.

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 FY2013 were similar to the five previous years, and significantly lower than in FY 2005 – FY 2007.

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

Advisory Board (Continued)

Mr. Henry Williams Community Representation

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

November 13, 2012 Meeting

- Dr. Dave Sullivan gave an update on and analysis of monitoring data collected by the Project for the past 7 years. The Project has now collected 7.5 to 8 years of monitoring data.

- In response to a request from the Advisory Board at the last meeting, Mr. Torres gave an update on the relocation of the Inner Harbor monitoring site. Mr. Torres presented the findings from the eight site options and their availability as follows:

Site	**Owner**	**Status**	**Comments**
A(1)	Port of Corpus Christi	Eliminated	Not available
A(2)	Port of Corpus Christi	Not recommended at this time	Lease Term & Conditions not acceptable to Court
B	Port of Corpus Christi	Eliminated	Not available
C(1)	Driscoll Foundation	Eliminated	New owners, not available
C(2)	Port of Corpus Christi	Eliminated	Not available
FHR Pad Site	Flint Hills Resources	Eliminated	Lease Terms & Conditions not acceptable to Court
Closed Landfill East Area	City of Corpus Christi	Under consideration	Engineering challenges with with landfill site preparations
Old Gun Range Area	City of Corpus Christi	Under consideration	Farther away than preferred

- Discussions followed with the Advisory Board on the pros and cons of the various sites including 2 additional sites proposed by Ms. Joyce Jarmon and Ms. Gretchen Arnold. Ms. Jarmon also recommended considering the possibility of the Pollywog site. She thought there was plenty of land there that was not being used and might make a suitable site. Ms. Arnold recommended the USDA site that was shown on the PowerPoint presentation slide by Dr. Sullivan also be explored.

- Ms. Arnold agreed with the recommendation to pursue the USDA property and moved that this property be considered. Dr. Kost second the motion. In response, Mr. Torres said the UT Team will investigate the property that is owned by the USDA. If after UT investigates all of the remaining options and the two added at the meeting fail to provide a suitable site, it was recommended by Ms. Arnold to discontinue the search and use the funds to further extend the project life with only the remaining six sites in the network. The goal of the Advisory Board was to have a decision either on a suitable replacement site or extension of the project and not replace the Inner Harbor monitoring site by the

time UT sends out the Annual Report to the Court. The Advisory Board agreed that this should be the goal.

- Also in response to a previous request of the Advisory Board, Mr. Torres contacted Mr. Omar Valdez to arrange for a presentation at the Advisory Board meeting on 11/13/12 in regards to the testing of the emissions from the demolitions at Dona Park as reported during the last Advisory Board meeting. Unfortunately Mr. Valdez declined the invitation as he was not able to obtain approval from his management to travel to Corpus Christi to make a presentation at the Advisory Board meeting. UT Staff will try and obtain the data and work on a presentation of the data at a future meeting.

May 9, 2013 Meeting

- Mr. Vincent Torres reminded everyone that, as per directions from the Advisory Board at the meeting held on November 13, 2013, no further effort would be made to find a replacement location for the Inner Harbor site, if once all site locations being considered and suggested by the Board were investigated, none proved acceptable. This turned out to be the case. So approval to cease looking for a replacement site and use the funding saved to extend the life of the project was sought and obtained from the court.

- Mr. Torres reported that all of the funds from the original COCP Award have been fully expended. All funding for the project is now coming from the Neighborhood Air Toxics Modeling Project for Houston and Corpus Christi Phase 1B. This funding will allow the project to continue the operation of the six monitoring sites in the network through September 2015.

- Dr. Dave Sullivan gave an update on and analysis of monitoring data collected by the Project for the past 7 years. The Project has now collected 7.5 to 8 years of monitoring data.

- Dr. Sullivan gave a presentation on the Ambient Air Monitoring Program (AAMP) for the Dona Park Neighborhood during the Active Remediation Activities at the former ASARCO/Encycle Facility. Dr. Sullivan reported that the Program had 5 Goals:
  1) Supplement current monitoring with particulate matter sized 10 and 2.5 microns (PM_{10} and $PM_{2.5}$) samplers to evaluate emissions controls, mitigate potential for PM at Dona Park exceeding conservative/protective action levels.
  2) Supplement current monitoring with speciated metals to mitigate potential for ESL exceedances.
  3) Alert TCEQ, WESTON, and Encycle Trustee if real-time PM measurements reach action levels.
  4) Deploy mobile "roving" real-time PM_{10} and $PM_{2.5}$ monitors and speciated metals analytical samplers at least 2 times a week, or when winds favor a northerly component.
  5) Asbestos air sampling to be performed at the discretion of the TCEQ, based on remediation activities.

- Mr. Torres announced to the Advisory Board that Gretchen Arnold has retired from her position at the Corpus Christi Pollution Prevention Partnership at TAMUCC. He asked the

Advisory Board if they would support keeping Gretchen on the Advisory Board because of her expertise in air quality issues. Ms. Joyce Jarmon agreed and thought it was a good idea for Gretchen to remain on the Board. It was also agreed that Gretchen's replacement at TAMUCC, Christina Cisneros be asked if she would like to be on the Advisory Board. All of these actions would be subject to approval by the Court.

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
   As of September 30, 2013 the Project now has eight years and ten months of monitoring 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, page 35)
   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 site 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 36 through 41.

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 the interest earned has totaled $ $41,900.80. All of the SEPs are listed in Appendix D, page 42 through 44.

APPENDIX A

Data Analysis for Corpus Christi Annual Report
October 2012 – September 2013

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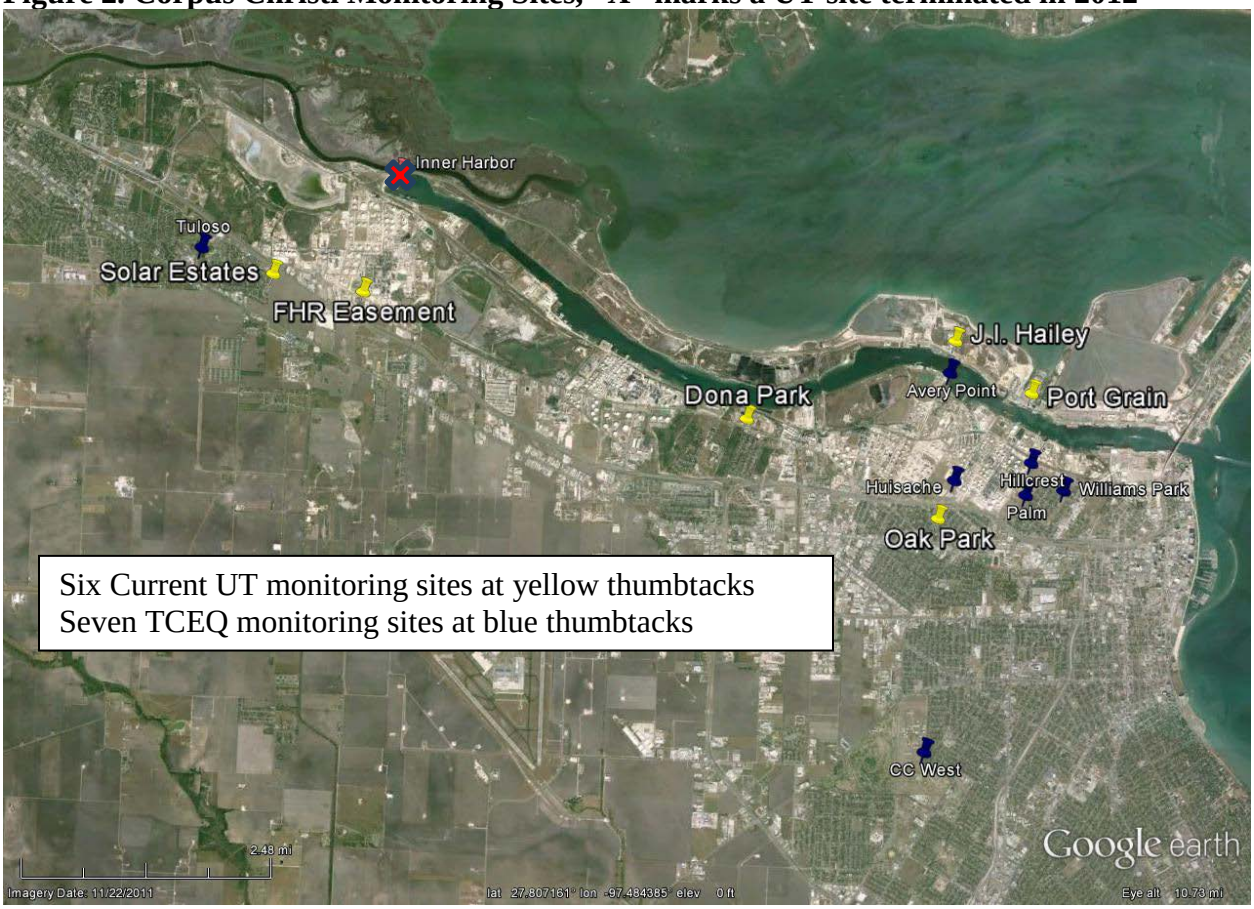
Data Analysis for Corpus Christi Annual Report

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, 2012 through September 30, 2013. The monitoring network is shown in Figure 2, below, and is described in Table 2, on page 11. Note the frequent use of the abbreviation for Continuous Ambient Monitoring Station as "CAMS", or simply as "C", followed by the unique site number, such as "C629".

This report contains the following elements:

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

Figure 2. Corpus Christi Monitoring Sites, "X" marks a UT site terminated in 2012



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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 (pp<u>m</u>V) or ppb-volume (pp<u>b</u>V) 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 the sites that do not take continuous hydrocarbon measurements with auto-GCs (CAMS 629, 630, 632, and 635).

- **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 four active sites that do not take continuous hydrocarbon measurements with auto-GCs (CAMS 629, 630, 632, and 635).

- **Air Monitoring Comparison Values (AMCV) –** The TCEQ uses AMCVs in assessing ambient data. Two valuable online documents ("Fact Sheet" and "Uses of ESLs and AMCVs Document") that explain AMCVs are at http://www.tceq.texas.gov/toxicology/AirToxics.html (accessed March 2014). The following text is an excerpt from the TCEQ "Fact Sheet" document:

> 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 12 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

[1] See http://epa.gov/air/criteria.html accessed March 2014

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 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 EPA's Website at http://www.epa.gov/air/criteria.html (accessed March 2014).

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 99th percentiles of the daily maximum one-hour averages. There is also a secondary SO_2 standard of 0.500 ppm (500 ppb) over three hours, not to be exceeded more than once in any one year.

- **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

Canister sampling is conducted to assess what organic compounds are present in the air when a collocated TNMHC analyzer records 15 minutes of concentrations above 2,000 ppbC. In FY 2013 a total of 24 usable canister samples were collected. A summary of the maximum benzene concentrations appears in Table 3, below. No measured concentration of any species measured in canister sampling exceeded the TCEQ's AMCV in FY 2013. No canisters were triggered at the FHR CAMS 632 site, and canister triggering was removed from the Solar Estates CAMS 633 and Oak Park CAMS 634 sites in 2006 (auto-GC operate at those two sites). The Port Grain CAMS 629 site measured an elevated concentration for benzene on October 23, 2012, shown as 118 ppbV in Table 3, and a description of the conditions associated with this measurement appears beginning on page 16. Figure 3, below, shows a graphical depiction of CAMS site vs when canisters samples were collected. Only one canister was triggered after April 2013. Figure 4, on page 17, is a zoom in on Figure 3 showing the 11 individual canisters sampled during the period January 19 to February 3, 2013 (16 days) with 10 canister samples during the period January 19 to January 23, 2013 (4 days).

Table 3. Summary of canister sample counts and benzene concentrations FY 2013

Sites	Max of benzene ppbV	Number of canister samples
CCG C629	118.3	4
DPK C635	4.3	8
FHR C632	N/A	0
JIH C630	8.4	12

Figure 3. Dates of 24 canister samples in FY 2013

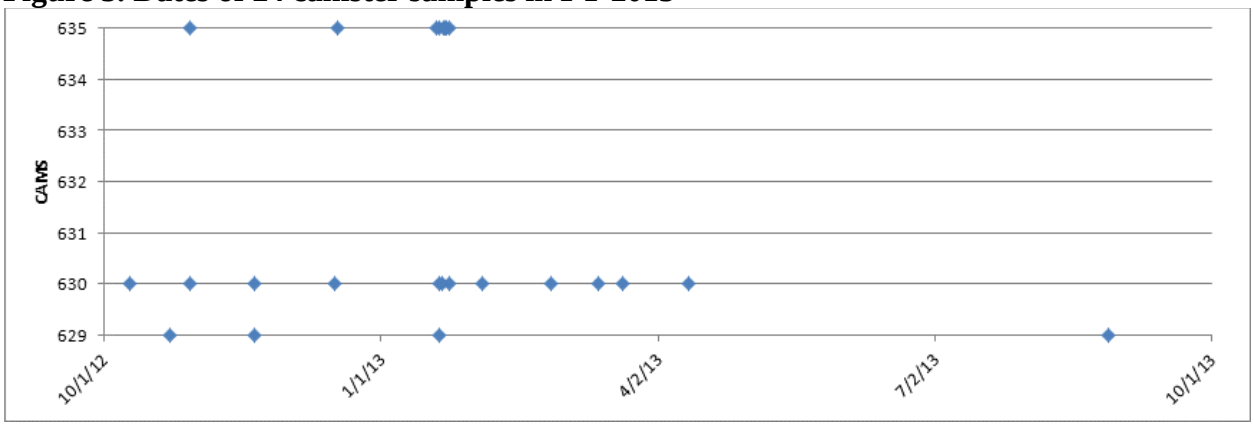
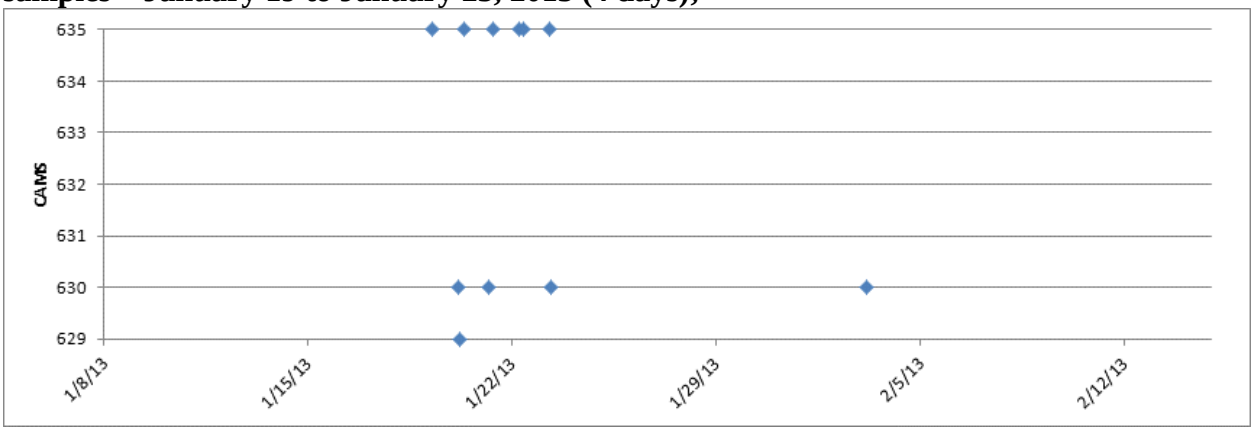


Figure 4. Eleven canister samples − January 19 to February 3, 2013 (16 days); 10 canister samples − January 19 to January 23, 2013 (4 days);



The composition of hydrocarbon concentrations found in the canisters can be roughly classified into three categories. First, the majority of the canister samples are composed of six compounds: ethane, propane, n-butane, iso-butane, n-pentane, and iso-pentane. For 19 of the 24 canisters, these six compounds comprise between 76 and 98 percent of the hydrocarbon mass in each canister in roughly the same relative ratios, with the average at 84 percent alkane composition. Two typical canister compositions are shown in Figures 5 and 6, on page 18.

A second category would be those canisters with one or two specific compounds comprising a large percentage of the total mass. In particular, two canisters were found to have 70 and 82 percent of the canister mass in n-butane, while the 19 mentioned above as having a mix of alkane species would have n-butane comprise only from 10 to 16 percent of the mass.

The third category would include canisters with harder to classify composition descriptions. One example is the canister, taken at Port Grain CAMS 629 on Oct. 23 at 7:00 CST, the contents of which are shown in Figure 7, on page 19. Accompanying Figure 7 is a back trajectory shown in Figure 8, on page 19, created by the Corpus Christi Trajectory Analysis Tool (http://www.utexas.edu/research/ceer/ccaqp/trajectory_tool.htm) associated with the air movement while the canister was filling. In addition, a Google Earth Pro aerial map with the October 23, 7:00 CST back trajectory plotted on it appears in Figure 9, on page 20. This canister was taken under southeast winds, which were sustained for several hours that morning. Several industrial storage tanks and pipelines as well as several docks were upwind. At the time of the sample, there were no simultaneous elevated methane or sulfur species measurements. This canister contained an elevated benzene concentration as shown in Table 3, on page 16, of 118 ppbv (compare to the AMCV=180 ppbV). The total sum of hydrocarbon mass (as ppbC) for this sample was 2,950 ppbC compared to approximately 6,000 ppbC by the collocated TNMHC continuous instrument. This suggests that some unknown species that the laboratory could not quantify may have been present.

Figure 5. Canister composition by volume (ppbV) from JIH CAMS 630, 3:26 CST, 11/20/2012

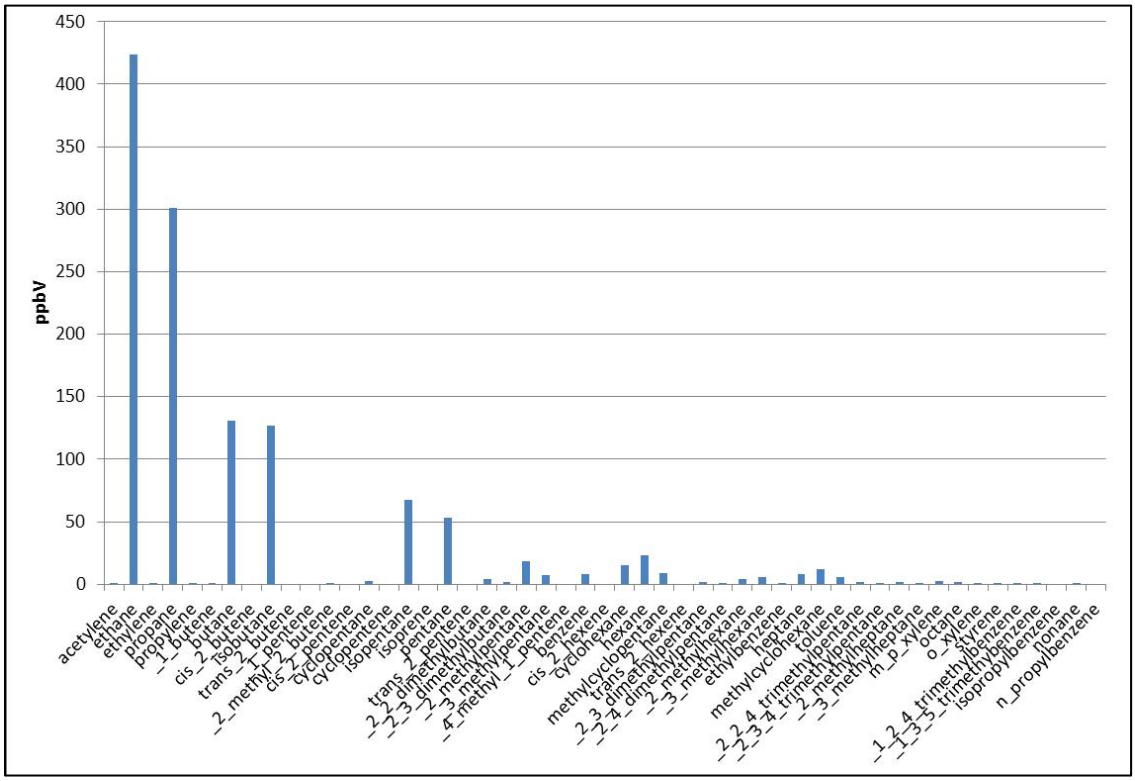


Figure 6. Canister composition by volume (ppbV) from Dona Park CAMS 635, 6:48 CST, 1/19/2013

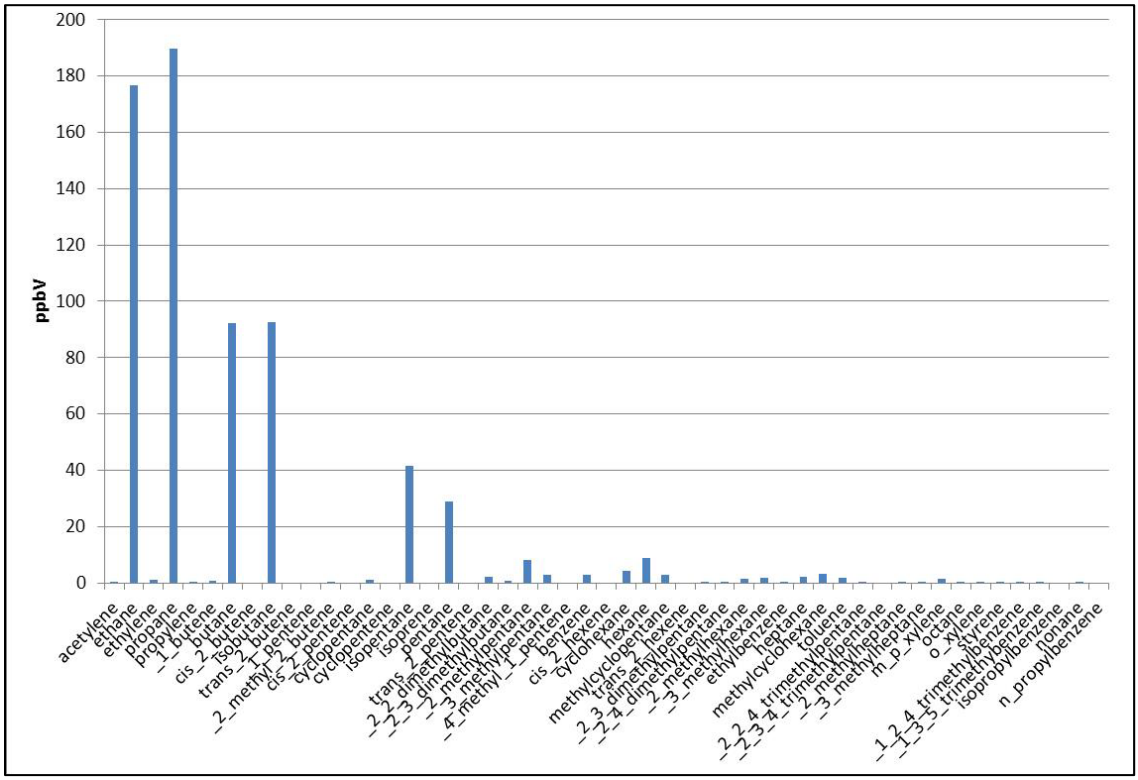


Figure 7. Canister composition by volume (ppbV) from Port Grain CAMS 629, 7:00 CST, 10/23/2012

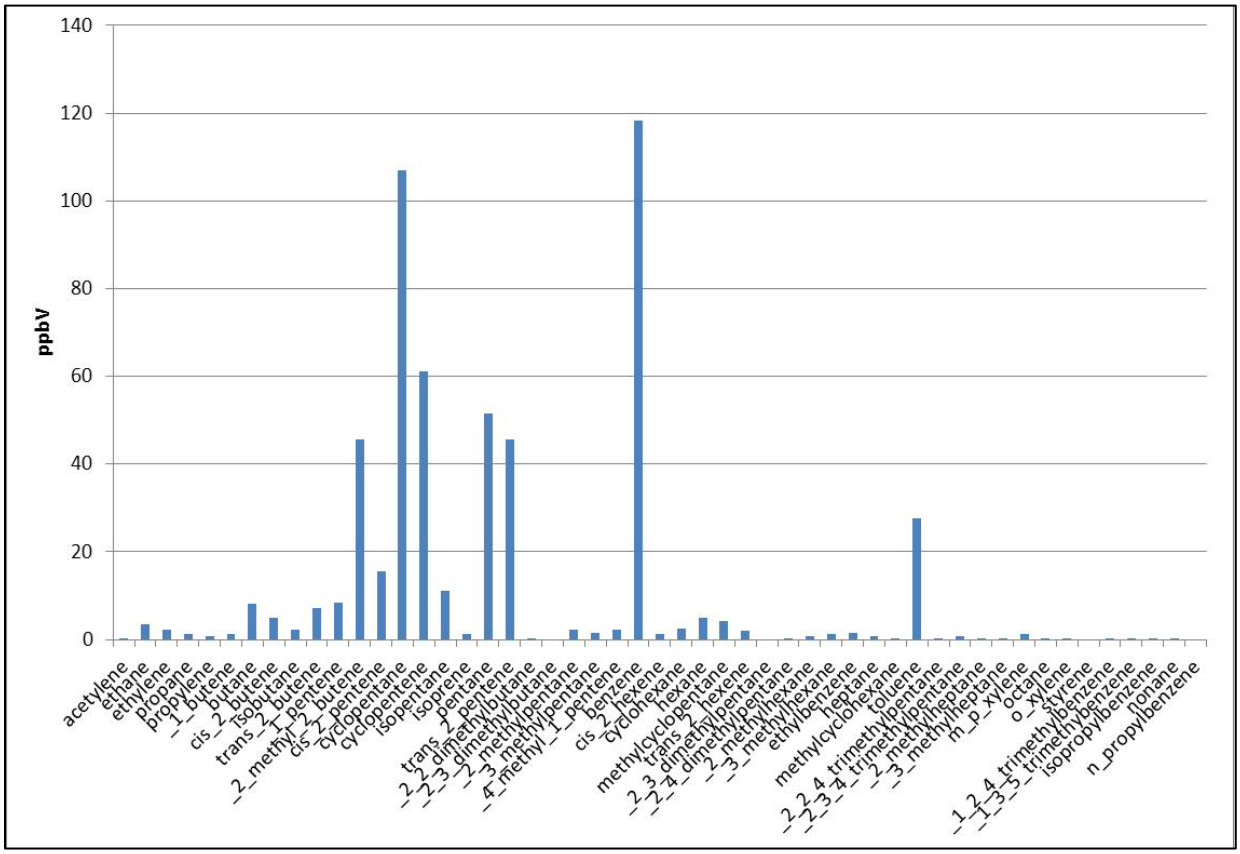
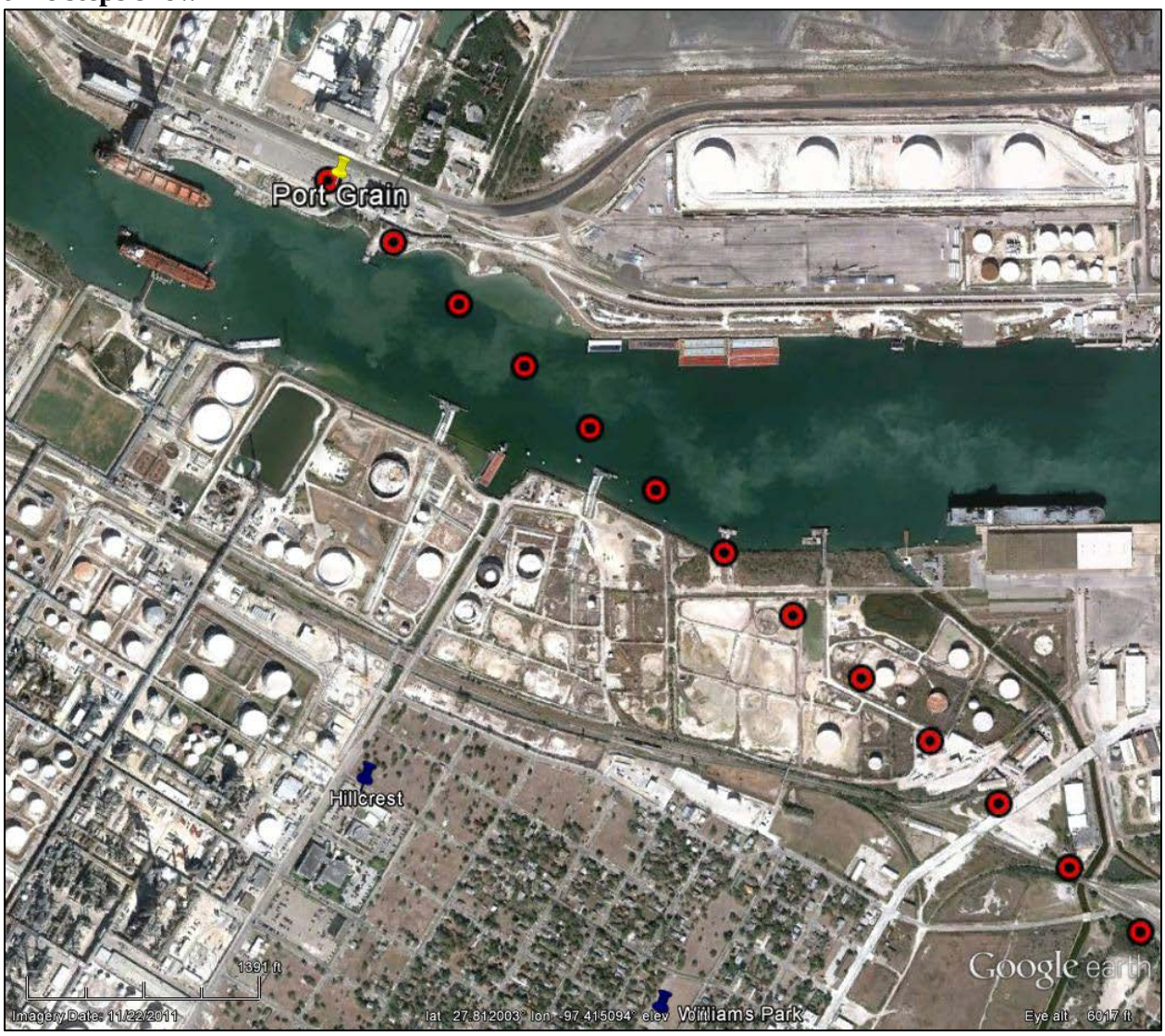


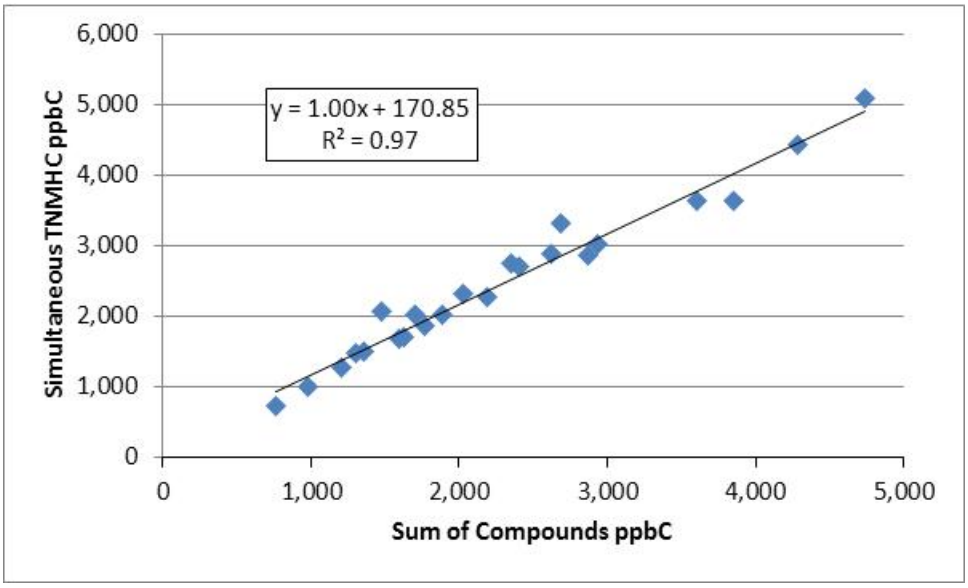
Figure 8. Surface 20-minute back-trajectory from Port Grain C629 7:00 CST, 10/23/2012

Figure 9. Surface 20-minute back-trajectory generated by UT Corpus Christi Trajectory Tool from Port Grain C629 7:00 CST, 10/23/2012 on a Google Earth Pro map, 1-minute time steps shown



One method of quality assurance is to compare the measurements made simultaneously by two different instruments. A more intense intercomparison is to compare measurements by two different analysis methods. Figure 10, on page 21, shows the results of comparing the sum of all individually measured hydrocarbon species for each canister derived by the UT Laboratory, with the simultaneously measured total nonmethane hydrocarbon concentration from the TNMHC analyzer quantified in real time. In Figure 10, only 23 canisters are used in the comparison, because one, the canister from October 23, 2012 at the Port Grain CAMS 629 site appears to be a serious outlier in which some unknown hydrocarbon species may also have been present. However, using 23 canister/TNMHC matches, the data fall in a straight line with a near one-to-one match up.

Figure 10. Comparison between the continuous TNMHC measurements with simultaneously collected total mass of known canister hydrocarbons, 23 canister samples, FY13



2. Summary of Total Nonmethane Hydrocarbon Monitoring at Seven Sites

In this section, trends in total nonmethane hydrocarbon (TNMHC) concentrations at five UT CAMS sites – CCG C629, JIH C630, WEH C631, FHR C632, and DPK C635 – are discussed. The data from each site, over each month from January 2005 through September 2013, are compared 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. Sites can measure elevated concentrations throughout the year, owing to exposure to industrial sources and natural gas extraction, as well as urban area emissions. Several 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. Wind direction also plays an important role.

Because of concern about the frequency of elevated concentrations, the frequency (percent of measurements) of such events has been graphed in Figures 11 through 15, on pages 22 through 24. The frequency is determined by counting the number of observations at or above 2000 ppbC (5 minute average) and then dividing by the large number of valid five-minute observations per month (approximately 8,700). 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, and was discontinued in 2012. The Dona Park C635 site has shown dramatic changes from year to year, and realized an increase in frequency of elevated TNMHC concentrations 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.

Figure 11. Frequency of >2000 ppbC TNMHC at Port Grain C629, by month 2005 - 2013

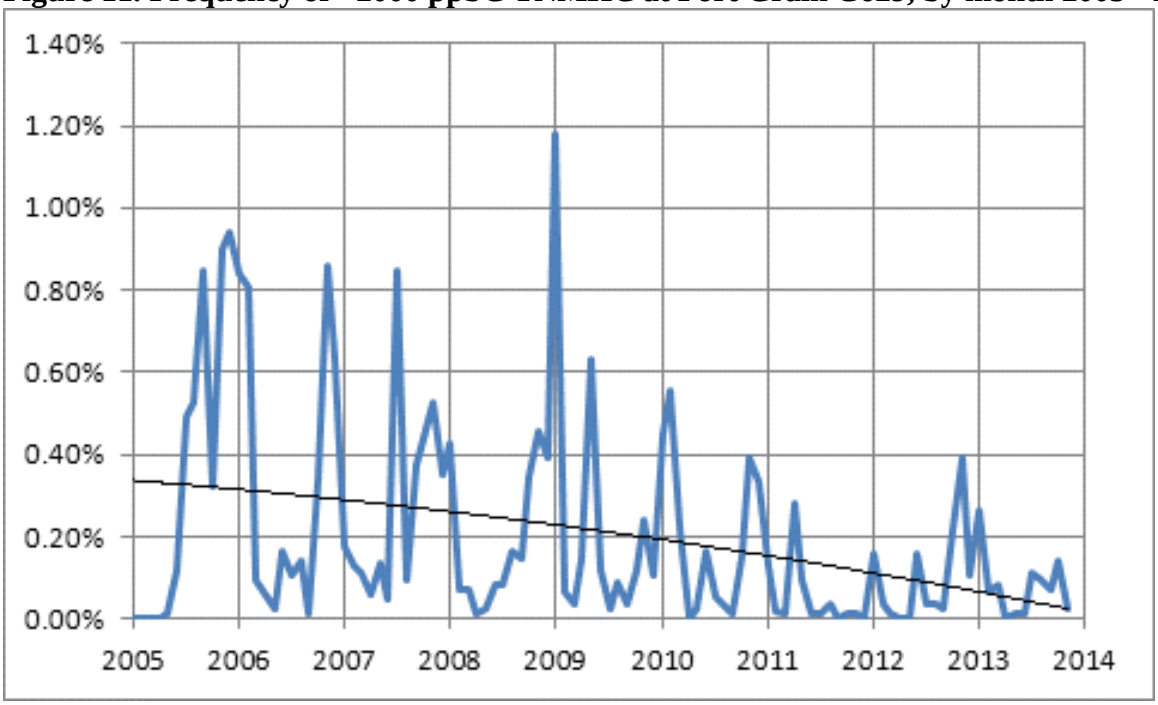


Figure 12. Frequency of >2000 ppbC) TNMHC at J.I. Hailey C630, by month 2005 - 2013

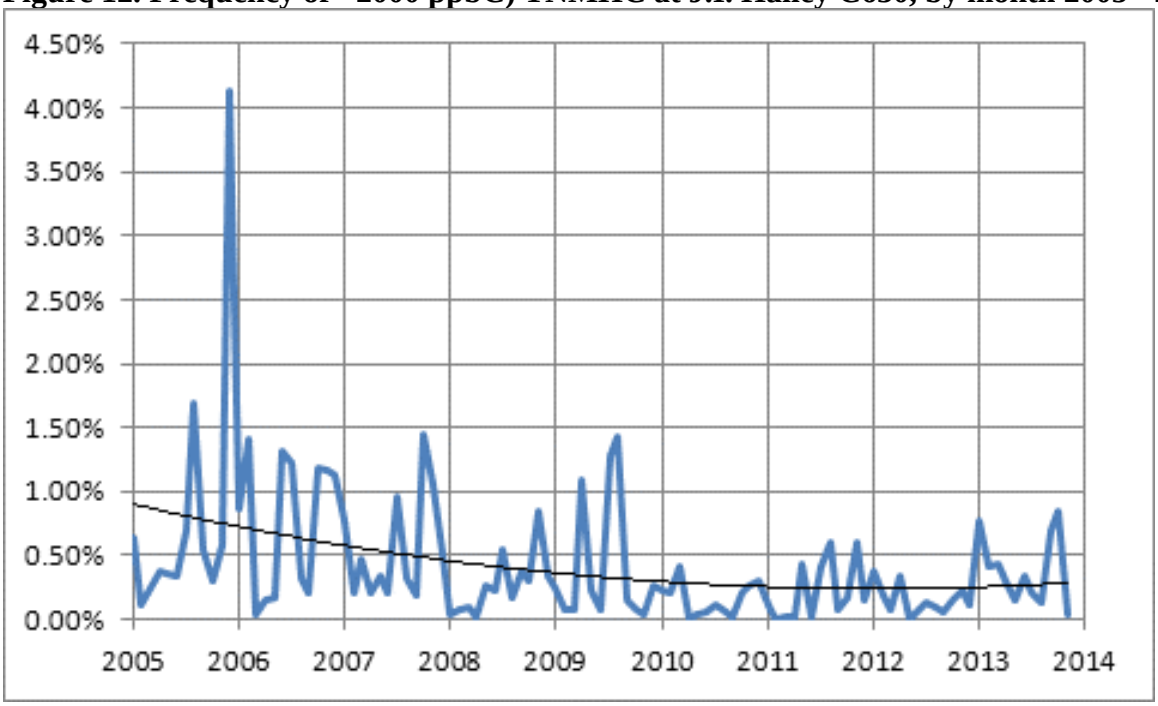


Figure 13. Frequency of >2000 ppbC TNMHC at West End Harbor C631, by month 2005 - 2012

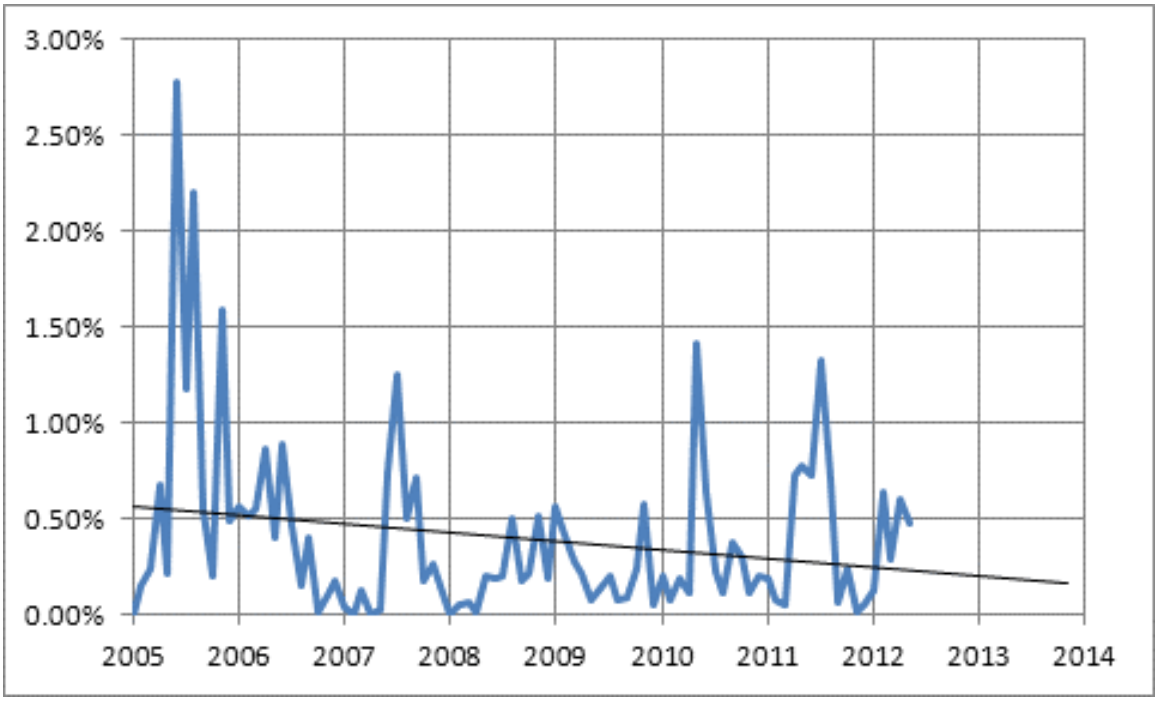


Figure 14. Frequency of >2000 ppbC TNMHC at Flint Hills Resources C632, by month 2005 - 2013

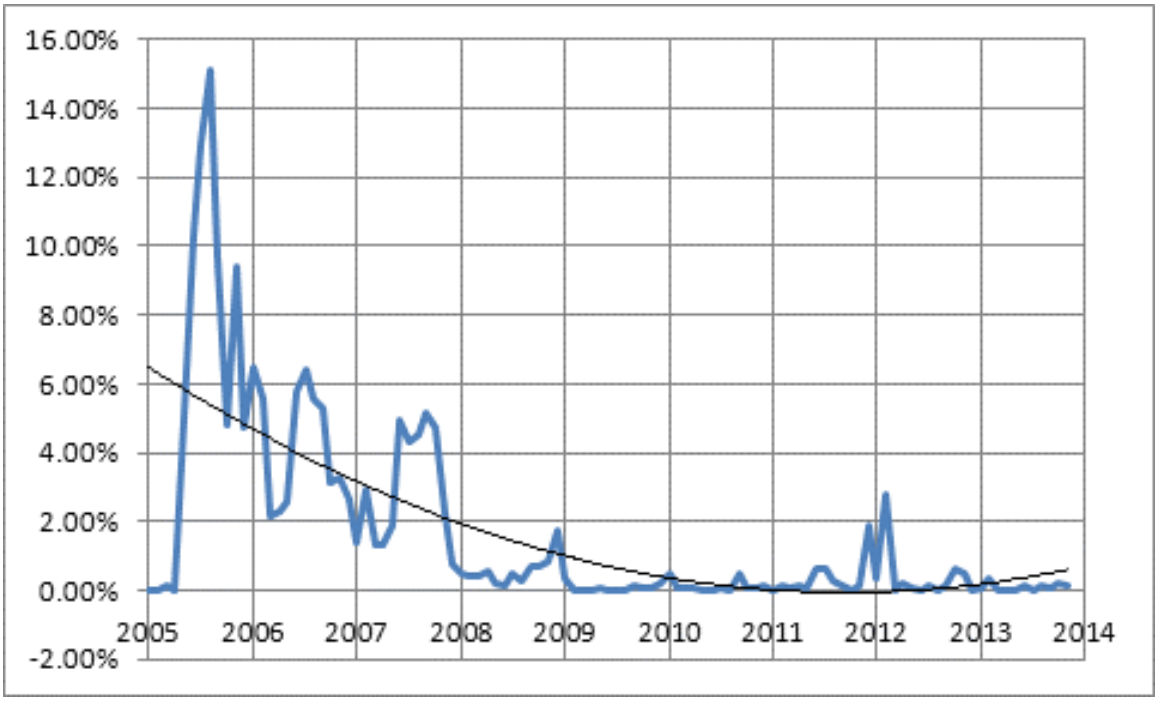
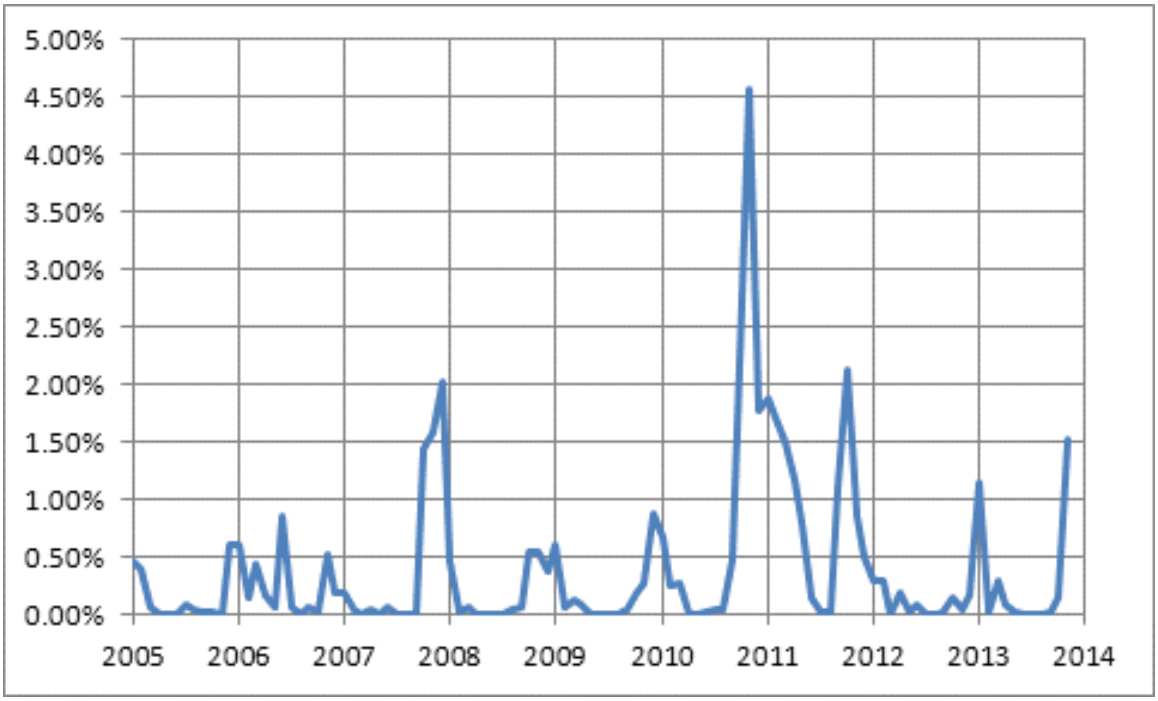


Figure 15. Frequency of elevated (>2000 ppbC) TNMHC at Dona Park CAMS 635, by month 2005 - 2013



3. Auto-GC Data Summaries in Residential Areas

In this section the results of semi-continuous sampling for hydrocarbons at the three Corpus Christi auto-GC sites – UT's Solar Estates CAMS 633, UT's Oak Park CAMS 634, and TCEQ's Palm CAMS 83 – are presented. These three sites are located in residential areas. Solar Estates and Oak Park are generally downwind of industrial emissions under northerly winds. Palm, located near the TCEQ's Hillcrest and Williams Park sites in Figure 1, on page 3, is generally downwind under northerly and westerly winds. In examining aggregated data one observes similar patterns of hydrocarbons at all three sites. The TCEQ Palm C83 site's concentration statistics are similar to those at Oak Park and Solar Estates.

Table 4, below, lists the data completeness from the project auto-GCs from January 2011 through 2013 for months for which data validation has been completed. When data are missing the reason is generally owing to quality assurance steps or maintenance procedures. The project regularly exceeds the 75 percent data recovery goal.

Table 4. Percent data recovery by month, 2011-2013, validated data only

Date	Oak Park	Solar Est.	Date	Oak Park	Solar Est.	Date	Oak Park	Solar Est.
Jan 2011	100	96	Jan 2012	94	99	Jan 2013	100	100
Feb 2011	84	77	Feb 2012	90	98	Feb 2013	94	99
Mar 2011	100	95	Mar 2012	97	100	Mar 2013	97	100
Apr 2011	100	80*	Apr 2012	94	100	Apr 2013	100	100
May 2011	78	100	May 2012	77*	96	May 2013	99	99
Jun 2011	69*	93	Jun 2012	65	97	Jun 2013	75*	91*
Jul 2011	95	96	Jul 2012	98	93*	Jul 2013	98	99
Aug 2011	56	95	Aug 2012	99	93*	Aug 2013	87	98
Sep 2011	92	78	Sep 2012	99	100	Sep 2013	82	99
Oct 2011	99	83	Oct 2012	98	93	Oct 2013	99	99
Nov 2011	97	94	Nov 2012	99	88	Nov 2013	91	100
Dec 2011	100	100	Dec 2012	97	99	Dec 2013		
* Months with planned preventive maintenance						**Average 2011-13**	**91**	**95**

Table 5, on page 26, summarizes the average data values and one-hour and 24-hour maximum values from FY 2013 for the 27 hydrocarbon species tracked in this project. Data in this table are available to TCEQ staff at http://rhone3.tceq.texas.gov/cgi-bin/agc_summary.pl (accessed January 2014). All concentration values in the tables are in ppbV units. No concentrations or averages of concentrations from the 27 species were greater than TCEQ's air monitoring comparison values (AMCV). The average data columns in Table 5 are shown graphically in

Figure 16, on page 27. Although one year's worth of data are shown in Table 5 and Figure 16, throughout the year the mean concentrations by month or by quarter change based on several factors. Mean concentrations for species that measured consistently above their respective method detection limits are generally lower in the third quarter than in the fourth quarter of the year. More frequent maritime southerly flow in the spring and summer is a contributor to lower concentrations in the second and third quarters. Higher mean concentrations are generally measured in the cooler first and fourth quarters, when lower wind speeds and more northerly winds contribute to higher concentrations. More frequent northerly winds in the winter months can also affect concentrations measured at the two UT auto-GC sites, as both are south of the industrial area along the Ship Channel.

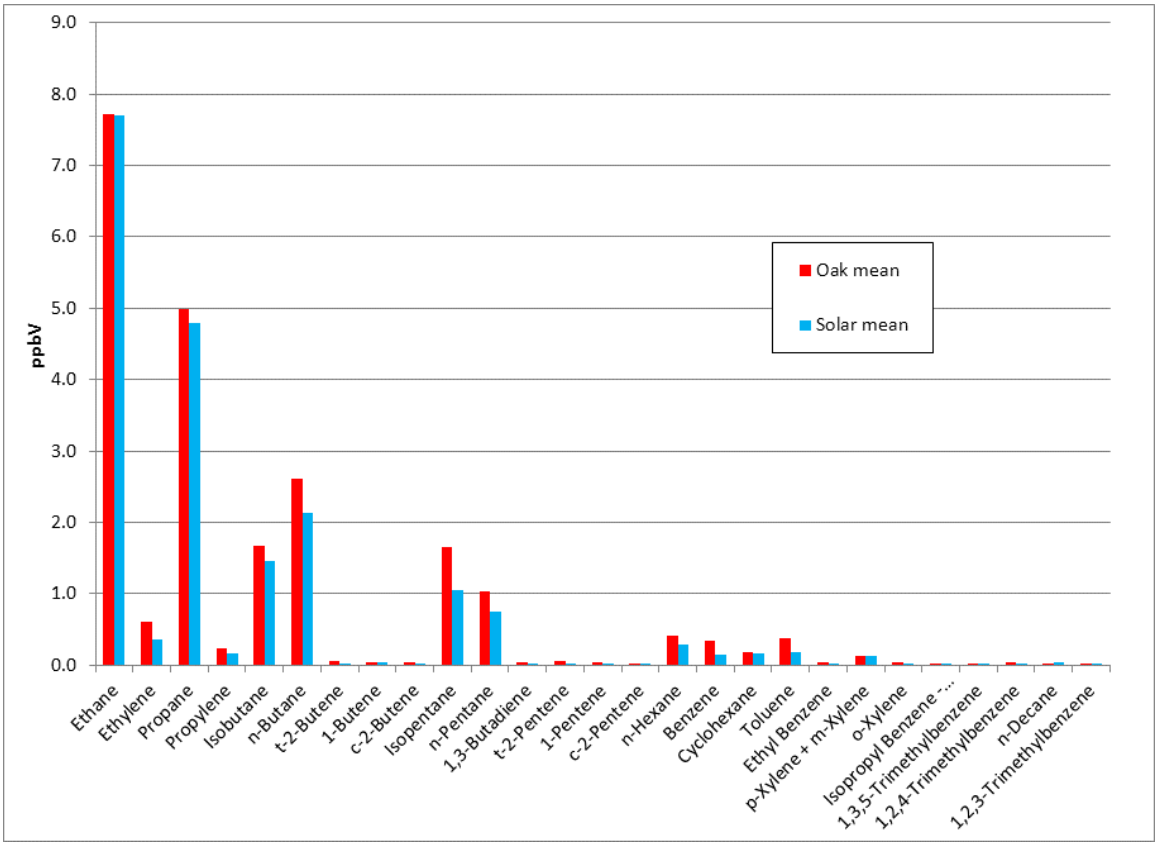
The rows for ***benzene*** are bold-faced in Tables 5 owing to the concern that the concentrations for this species tend to be closer to the AMCV than are concentrations of other species. The benzene short-term AMCV is 180 ppbV and the benzene long-term AMCV is 1.4 ppbV.

Table 5. Auto-GC statistics for FY 2013

	Oak Park FY13			Solar Estates FY13		
Species	**1-Hour**	**24-Hour**	**Mean**	**1-Hour**	**24-Hour**	**Mean**
Ethane	291.87	39.64	7.72	144.87	34.94	7.708
Ethylene	84.267	7.386	0.6	52.205	7.109	0.358
Propane	387.66	45.47	4.983	82.966	25.53	4.786
Propylene	40.777	2.51	0.239	9.775	0.787	0.169
Isobutane	102.55	14.24	1.674	25.814	6.122	1.466
n-Butane	198.86	29.7	2.61	59.049	10.89	2.14
t-2-Butene	6.411	0.482	0.055	1.945	0.183	0.019
1-Butene	14.309	0.809	0.044	8.48	0.539	0.035
c-2-Butene	4.76	0.382	0.04	1.579	0.184	0.013
Isopentane	148.23	19.62	1.663	25.523	3.569	1.055
n-Pentane	78.226	10.96	1.04	17.448	3.019	0.753
1,3-Butadiene	0.501	0.089	0.035	25.445	1.41	0.02
t-2-Pentene	7.414	0.5	0.058	1.481	0.15	0.01
1-Pentene	4.629	0.251	0.032	0.886	0.1	0.008
c-2-Pentene	3.785	0.245	0.027	0.786	0.066	0.004
n-Hexane	16.142	2.985	0.414	4.977	1.046	0.293
Benzene	**35.883**	**3.172**	**0.336**	**3.219**	**0.659**	**0.153**
Cyclohexane	16.34	1.615	0.185	82.726	5.201	0.162
Toluene	11.287	2.951	0.378	2.523	0.675	0.178
Ethyl Benzene	5.92	0.385	0.041	0.396	0.096	0.02
p-Xylene + m-Xylene	8.529	0.757	0.131	13.843	2.446	0.129
o-Xylene	1.09	0.19	0.041	1.129	0.184	0.025
Isopropyl Benzene &Cumene	4.32	0.475	0.023	1.36	0.105	0.006
1,3,5-TMB*	0.422	0.08	0.012	0.645	0.108	0.012
1,2,4-TMB*	1.036	0.18	0.038	0.555	0.131	0.023
n-Decane	1.604	0.243	0.03	2.142	0.245	0.033
1,2,3-TMB*	0.396	0.212	0.013	0.291	0.046	0.005

* TMB= trimethylbenzene

Figure 16. Average concentrations of 27 hydrocarbon species at auto-GCs at Oak Park and Solar Estates for FY 2013



Although the Long Term Health Work Group only asks for reports on the 27 species in Table 5, on page 26, the auto-GC measure 46 species. No measured species had a value above its AMCV in FY 2013.

In examining the annual means from Solar Estates and Oak Park since the beginning of the project in 2005, one finds that concentrations are higher over the last two years for ethane and propane and other alkane species than in the preceding three years (2009-2011). Total nonmethane hydrocarbon measurements from the auto-GCs December 2013 (calculated during data validation) are not available yet, so one cannot assess the 2013 means for composite total hydrocarbon mass. A preliminary hypothesis is that natural gas emissions are a possible assignable cause for the higher mean concentrations. Figure 17, on page 28, and Figure 18, on page 29, shows the average concentrations of 27 hydrocarbon species for each year in the project from 2006 – 2013 at Oak Park and Solar Estates, respectively. Note that 2005 is not included in the graphs because it was an “incomplete” year, and note that data from 2013 are not fully validated.

Figure 17. Mean concentrations of 27 hydrocarbon species by year at Oak Park (2013 data not fully validated)

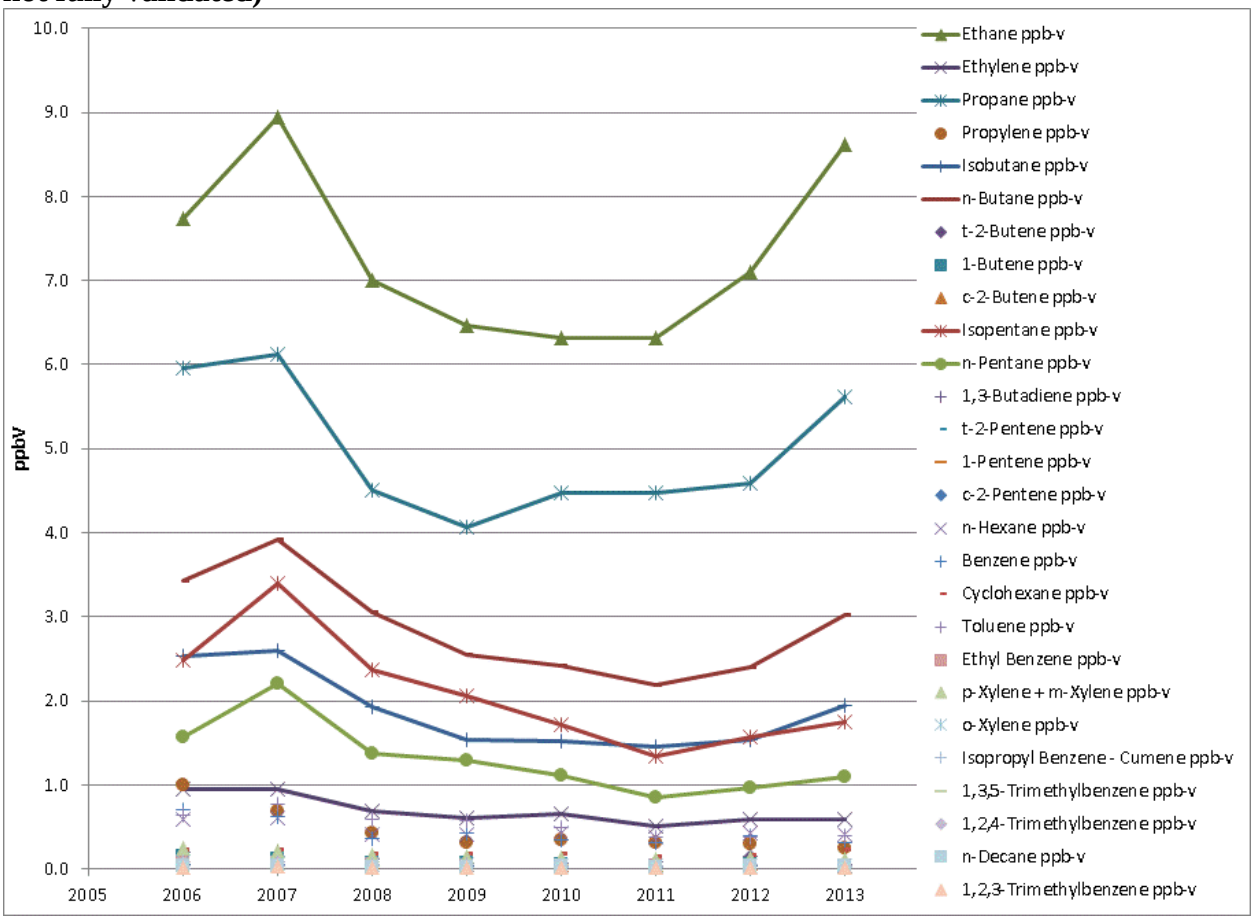
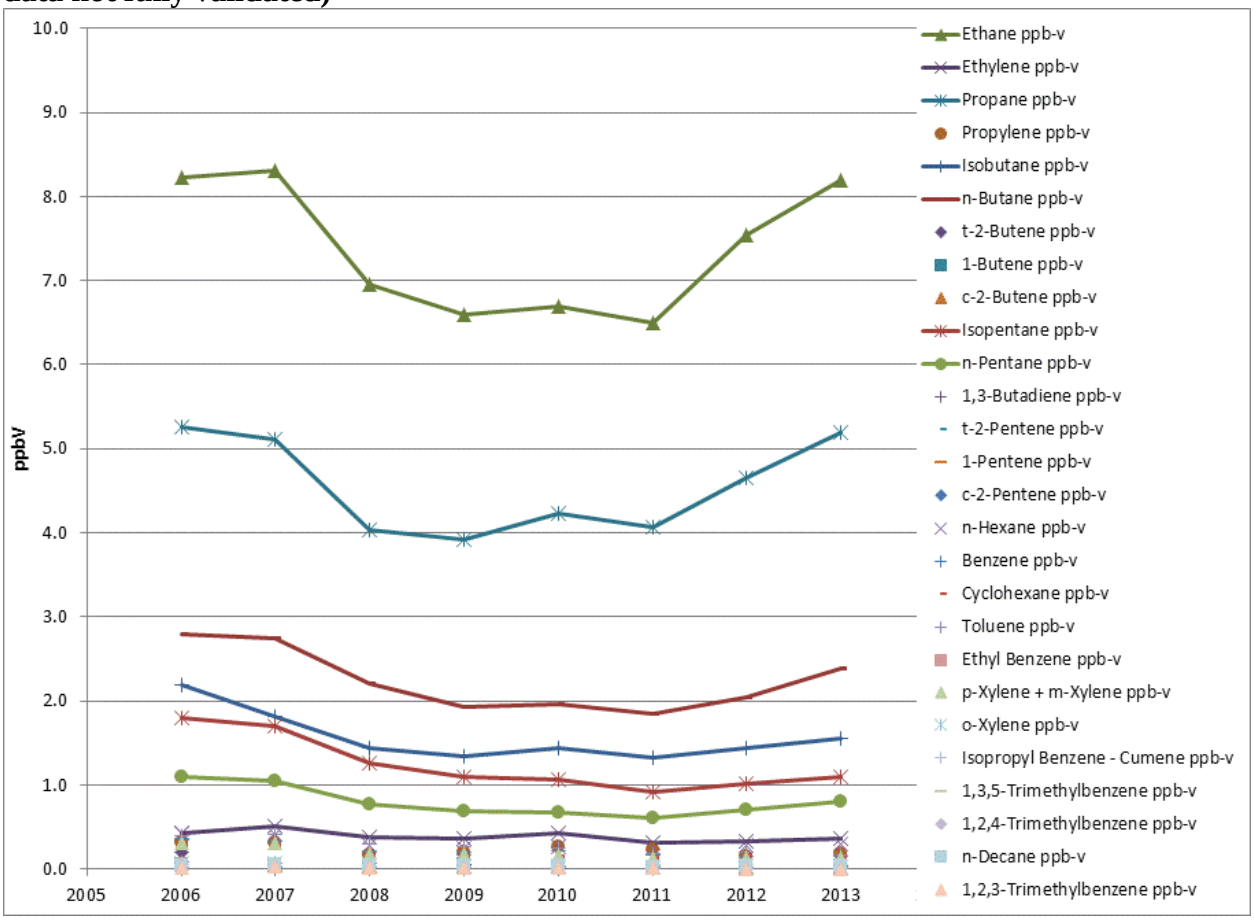
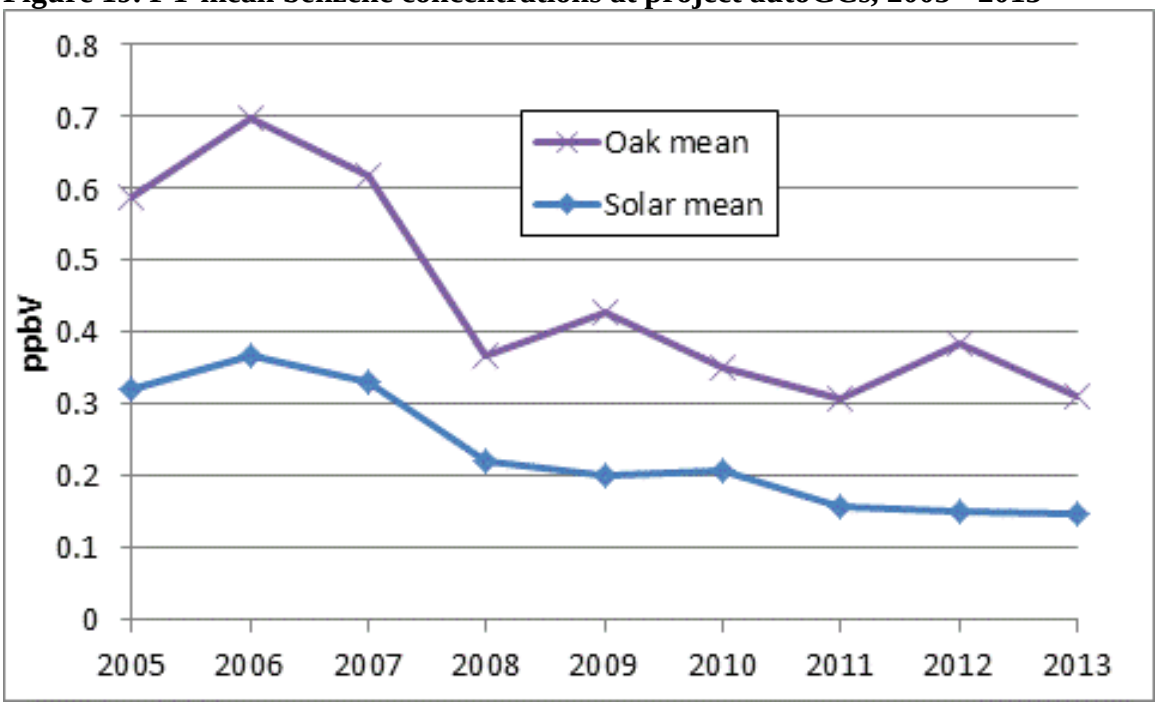


Figure 18. Mean concentrations of 27 hydrocarbon species by year at Solar Estates (2013 data not fully validated)



As was noted above, benzene tends to be a species of concern because measurements and averages can be a sizable fraction of 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. A graph of the mean benzene concentration by calendar year appears in Figure 19, below.

Figure 19. FY mean benzene concentrations at project autoGCs, 2005 - 2013



4. Sulfur Dioxide Concentrations around Corpus Christi

J. I. Hailey CAMS 630

One hour SO_2 concentrations above 75 ppb are considered to be individual exceedances of the level of the NAAQS. The maximum one hour value for each day at a site is logged, and at the end of the year the 99th percentile daily maximum is selected. This value is averaged with the same statistic from the previous two years, and the resulting three-year average is compared with 75 ppb to determine compliance. If a site collects a full year of data, then the 99th percentile value would be the 4th highest daily maximum for the year. The resulting statistic is called the *design value* for a monitoring site. Table 6, below, contains the design values for Corpus Christi monitors (TCEQ and UT) for three-year periods since the UT monitoring begin. The JIH C630 site showed noncompliance in each three-year period up until the most recent calendar year 2011 – 2013 periods.

Concentrations declined over the course of 2012 at JIH C630, and lower concentrations have persisted through CY 2013.

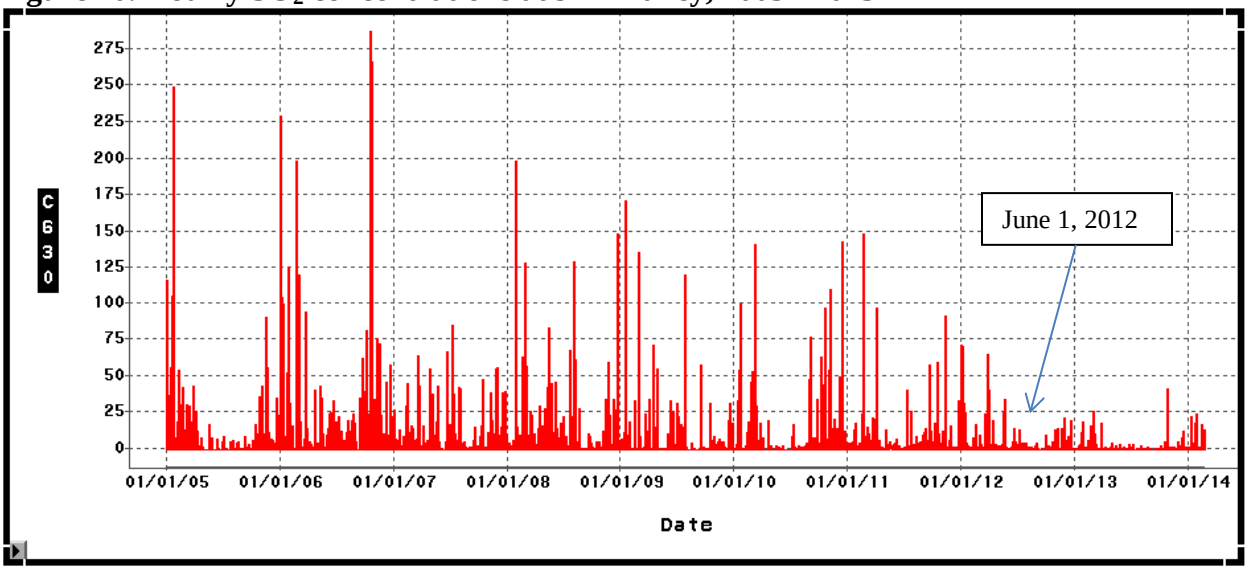
Table 6. SO_2 NAAQS design values for Corpus Christi area sites, ppb units, values greater than 75 ppb represent noncompliance

Years (CY)	Tuloso C21	West C4	Port Grain C629	JIH C630	Inner Har-bor C631	Oak Park C632	Solar Estates C633	Dona Park C635	Hui-sache C98
2005-2007	8	24	34	**119**	38	21	51	34	36
2006-2008	8	21	31	**131**	33	19	31	31	32
2007-2009	9	18	30	**89**	32	17	21	23	28
2008-2010	9	17	26	**103**	21	13	11	22	33
2009-2011	9	12	19	**80**	15	13	30	20	27
2010-2012	8	10	15	**76**		12	40	12	23
2011-2013	6	7	11	47		12	51	8	10

Research to date has concluded that emissions from ships operating in the Corpus Christi ship channel and docked along the shores had been major contributors to elevated SO_2 concentrations at JIH and to some extent at other sites. The main source of SO_2 is believed to be the result of emissions from diesel engines used in dockside ships' auxiliary engines running on high-sulfur diesel fuel. Over the course of 2012, SO_2 concentrations at JIH have been steadily declining. This is reflected in Figure 20, on page 32. In Figure 20 there is a note to indicate the date June 1, 2012. The significance of this date comes from Title 40 of the Code of Federal Regulations (40CFR). This is the codification of federal law related to protection of the natural environment, and Part 80 of 40CFR deals with the regulation of fuels and fuel additives. Part 80, Subpart I is titled Motor Vehicle Diesel Fuel; Nonroad, Locomotive, and Marine Diesel Fuel; and ECA Marine Fuel, and specifies a schedule for reducing sulfur content in diesel fuel used by smaller boats and ships and for reducing sulfur content in fuel used by larger "Emission Control Area" ships, those large vessels operating within 200 nautical miles (230 miles) of the coast. The requirements in 40CFR Part 80.510 specify that by June 1, 2012, sulfur content in marine diesel

fuel must drop from the 500 ppm limit set in 2007 to a new 15 ppm limit. A provision in an international treaty to which the U.S. is party will require additional reduction in sulfur content in the larger ocean going vessel (OGV) fuel in 2015. However, the OGVs generally operate smaller diesel motors while at dock, and it is very likely that the fuel employed for these smaller motors now has lower sulfur content. Thus, both small ships motoring in the ship channel and large ships docked in the ship channel may now be producing lower emissions of SO_2.

Figure 20. Hourly SO_2 concentrations at JIH Hailey, 2005 - 2013



Conclusions from the FY 2013 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) were not observed.
- Hydrocarbons measured by the two project auto-GC have been lower in the past five years than in the first three years of the project. However, some alkane species are higher in the past two years than the previous two years.
- Total nonmethane hydrocarbons measured at most sites appear to be continuing a long term decline in mean concentration and in the frequency of elevated concentration measurements. The Dona Park site appears to have had significant fluctuations in concentrations and no clear trend.
- Under EPA's NAAQS for SO_2, the JIH C630 site appears to have come into compliance in 2013.

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			Calendar Year 2011			Calendar Year 2012			Calendar Year 2013		
	Hits	Views	Visits	Hits	Views	Visits	Hits	Views	Visits	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		50,623	25,903		45,492	25,223		61,930	37,496		64,482	***		45,469	***		115,823	***		189,526	***		336,946	***	
Trajectory Tool Web Site ("ceer_trajectory" directory)	288		21	367		230	39,425		4,385	56,513		9,495	48,078		9,939	39,388		9,292	29,154		9,285	26,083		9,179	22,321		8,815
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**	**144,977**	**0**	**9,285**	**215,609**	**0**	**9,179**	**359,267**	**0**	**8,815**
TCEQ Web Sites:																											
Monitoring Operations Corpus Christi AutoGC Page								342			1,176			1,338			1,324			2,015			1,077			1,051	
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**	**0**	**2,015**	**0**	**0**	**1,077**	**0**	**0**	**1,051**	**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**	**144,977**	**2,015**	**9,285**	**215,609**	**1,077**	**9,179**	**359,267**	**1,051**	**8,815**

	Denotes this count not collected
***	Views are no longer available on UT's Urchin Weblog system
	TCEQ opened all 21 AGC site's to the public on 1-1-10, since there are 2 Corpus Christi AGC 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

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.

APPENDIX C

Financial Summaries

ANNUAL PROGRESS REPORT
TO THE U.S. DISTRICT COURT
FOR THE
CORPUS CHRISTI NEIGHBORHOOD AIR TOXICS PROJECT

Financial Summary

As of September 30, 2013

Total of Settlement Fund Allocation & Interest Earned **$9,665,572.78**

Stage 1 – Settlement Fund Allocation	$4,586,014.92
Interest earned by the U.S. District Court	$ 16,583.74
Additional interest earned by U.S. District Court	$ 5,854.24
(Distributed by the Garden City Group in May 2010)	
Stage 1 Funds Total	**$4,608,452.90**

Stage 2 Funds - Undistributed pending appeal **($5,057,119.88)**
(UT was notified by the Court on June 27, 2011 that due to the outcome of the appeal, these funds would not be distributed to UT.)

Total Interest Earned at UT-Austin as of 9/30/2013 **$ 390,022.33**

Project Expenditures (3/3/2008 to 9/30/2013)

Stage 1, Phase 1A - Modeling		
First Year Paid Expenditures	(3/3/2008 – 12/31/2008)	$ 489,853.15
Second Year Paid Expenditures	(1/1/2009 – 12/31/2009)	$ 786,455.98
Third Year Paid Expenditures	(1/1/2010 – 12/31/2010)	$ 516,101.84
Fourth Year Paid Expenditures	(1/1/2011 – 12/31/2011)	$ 70,670.25
Total Project Expenditures	(3/3/2008 – 12/31/2011)	$1,863,081.22
Stage 1, Phase 1B – Air Monitoring Project Extension		
First Year Paid Expenditures	(1/1/2012 – 9/30/2012)	$ 9,480.44
Second Year Paid Expenditures	(10/1/2012 – 9/30/2013)	$ 610,512.57
Total Project Expenditures	(1/1/2012 – 9/30/2013)	$ 619,993.01

($2,483,074.23)

Balance remaining as of 9/30/2013 **$2,515,401.00**

Exhibit A

Stage 1 Phase 1A – Modeling Funding Allocation and Expenditure Summary

March 3, 2008 through December 31, 2011

Total Funding Allocated	$2,277,564.00
Project Expenditures through 12/31/2011	($1,863,081.22)
Stage1 Phase 1A Funds Balance 12/31/2011	$ 414,482.78
Stage 1 Phase 1A Funds Transferred to Stage1 Phase 1B	($ 414,482.78)
Stage 1 Phase 1A Funds Remaining 12/31/2011	$ 0.00

Stage 1 Phase 1A – Modeling Expenditure Detail
March 3, 2008 through December 31, 2011

Description	Original * Budget Allocation Stage 1 Phase 1A Years 1 - 4	Years 1- 3 paid Expenditures	Year 4 paid Expenditures	Total Expenditures	Balance Available
Salaries and Wages	$845,390.00	($745,502.74)	($3,984.00)	($749,486.74)	$95,903.26
Fringe Benefits	$205,037.00	($180,836.43)	($1,531.47)	($182,367.90)	$22,669.10
CEER Admin Salaries	$90,825.00	($76,373.30)	($3,015.89)	($79,389.19)	$11,435.81
Supplies	$56,160.00	($34,370.63)	($156.01)	($34,526.64)	$21,633.36
Contingency	$34,551.00	$0.00	$0.00	$0.00	$34,551.00
Consultants	$25,000.00	$0.00	$0.00	$0.00	$25,000.00
Subcontract					
Environ Corp.	$400,000.00	($319,985.42)	($40,980.38)	($360,965.80)	$39,034.20
Texas A&M Univ.	$195,763.00	($172,305.78)	($11,784.64)	($184,090.42)	$11,672.58
Holding	$4,237.00	$0.00	$0.00	$0.00	$4,237.00
Modeling/Computer Services	$59,000.00	$0.00	$0.00	$0.00	$59,000.00
Computation Center	$1,800.00	($1,800.00)	$0.00	($1,800.00)	$0.00
Tuition	$17,727.00	($17,602.00)	$0.00	($17,602.00)	$125.00
Travel	$20,000.00	($2,596.97)	$0.00	($2,596.97)	$17,403.03
Equipment	$25,000.00	($7,245.00)	$0.00	($7,245.00)	$17,755.00
Total Direct Costs	$1,980,490.00	($1,558,618.27)	($61,452.39)	($1,620,070.66)	$360,419.34
Indirect Costs-(15% TDC)	$297,074.00	($233,792.70)	($9,217.86)	($243,010.56)	$54,063.44
Total	**$2,277,564.00**	**($1,792,410.97)**	**($70,670.25)**	**($1,863,081.22)**	**$414,482.78**

*In October 2011, all Phase 1A budget categories were rebudgeted to match total expenditures and leave a $0.00 balance. The remaining funds of $414, 482.78 were reallocated to Phase 1B.

Stage 1 Phase 1B – Air Monitoring Project Extension Funding Allocation and Expenditure Summary

January 1, 2012 through September 30, 2013

Total Funding Allocated	$2,330,888.90
Funds Transferred from Stage 1 Phase 1A	$ 414,482.78
Funding Allocated Plus Transferred Funds	$2,745,371.68
Interest Earned through 9/30/2013	$ 390,022.33
Total Funding Available	$3,135,394.01
Project Expenditures through 9/30/2013	($ 619,993.01)
Stage 1 Phase 1B Balance Remaining 9/30/2013	$2,515,401.00

Stage 1 Phase 1B – Air Monitoring Project Extension Expenditure Detail
January 1, 2012 through September 30, 2013

Description	Year 1 1/1/12-9/30/12 Expenditures	Year 2 10/1/12-9/30/13 Expenditures	Total Expenditures as of 9/30/13
Salaries and Wages	($6,408.25)	($42,844.68)	($49,252.93)
Fringe Benefits	($1,243.22)	($13,826.77)	($15,069.99)
CEER Admin Salaries	$0.00	($13,387.58)	($13,387.58)
Salary Holding	$0.00	$0.00	$0.00
Quality Assurance	$0.00	$0.00	$0.00
Cell Phone Allowance	$0.00	($360.00)	($360.00)
SEP Reserve	$0.00	$0.00	$0.00
Contingency	$0.00	$0.00	$0.00
Monthly M&O	($169.50)	($21,922.10)	($22,091.60)
Equip. & Spare Parts	$0.00	($24,323.29)	($24,323.29)
Communications	($359.87)	($8,347.60)	($8,707.47)
Electric	$0.00	($23,086.69)	($23,086.69)
Gases	($63.02)	($10,331.64)	($10,394.66)
Consultant-Holding	$0.00	$0.00	$0.00
Consultant Services	$0.00	$0.00	$0.00
ORSAT	$0.00	($173,964.06)	($173,964.06)
TMSI	$0.00	($169,927.45)	($169,927.45)
Analytical	$0.00	($27,258.00)	($27,258.00)
Travel	$0.00	($1,300.62)	($1,300.62)
Equipment	$0.00	$0.00	$0.00
Total Direct Costs	($8,243.86)	($530,880.48)	($539,124.34)
Indirect Costs (15% TDC)	($1,236.58)	($79,632.09)	($80,868.67)
Total	**($9,480.44)**	**($610,512.57)**	**($619,993.01)**

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/main/13-322.pdf

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 2011/2012 fiscal year. The OMB Circular A-133 Audit for the 2011/2012 fiscal year is currently being conducted. The results of the 2010/2011 Audit will be made available at the above website. It is anticipated the audit results will be posted in late Spring 2014.

SUBRECIPIENT AUDIT FORM

(including financial reports and internal controls)

FOR FISCAL YEAR
ENDING AUGUST 31, 2012

SUBRECIPIENT'S LEGAL ENTITY NAME AND ADDRESS

The University of Texas at Austin
Office of Sponsor Projects, Suite 4.300
101 E. 27th Street, Stop A9000
Austin, TX 78712-1539

☒ Our audit report for the subject fiscal year has been completed.

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/13-322.pdf Federal Portion

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

The report contains the finding, corrective action plan and anticipated implementation dates. Findings for The University of Texas at Austin begin on page 363. Prior year findings are addressed beginning on page 593.

Authorizing Signature:_____ **Date:** 3/8/13

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 9/30/12	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	$6,119.69	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	5/2012-5/2013 **See note below	$150,000.00	$114.56	26-7701-70	Funds will be used to extend and enhance the life of the Project Network. ** See note below
	TOTAL			$1,239,379.00	$41,900.80		

* 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.

3/21/2014

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 would 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. A contract for this new SEP Agreement was received on April 29, 2013 and was fully executed on July 10, 2013.	