

**Corpus Christi Air Monitoring and Surveillance Camera
Installation and Operation Project**

Quarterly Report for the Period

April 1, 2006 through June 30, 2006

Submitted to

**Judge 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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August 23, 2006

I. 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 quarterly 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).

II. Project Progress Report

The focus of work during the quarter ending June 30, 2006 has been directed to the following activities.

A. Operations and Maintenance Phase of the Project

1. Data Analysis

A detailed description of some data analyses appear in Appendix A, and a summary of these analyses appears in this section.

The COCP consists of a network of seven (7) air monitoring stations with air monitoring instruments and surveillance camera equipment as shown in Table 1

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° North	97.433889° West	Oak Park Recreation Center	Yes	Yes		Yes	
629	27.817500° North	97.419722° West	Grain Elevator @ Port of Corpus Christi		Yes	Yes	Yes	
630	27.824444° North	97.432500° West	J. I. Hailey Site @ Port of Corpus Christi		Yes	Yes	Yes	
635	27.811389° North	97.465556° West	TCEQ Monitoring Site C199 @ Dona Park		Yes	Yes	Yes	Yes
631	27.845278° North	97.525556° West	Port of Corpus Christi on West End of CC Inner Harbor		Yes	Yes	Yes	
632	27.827222° North	97.528889° West	Off Up River Road on Flint Hills Resources Easement		Yes	Yes	Yes	
633	27.908333° North	97.542222° 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 ₂ S	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

Canister Sampling and Analysis

Because the initial approach for triggering canister sampling was generating more samples than could be accommodated with the analysis budget, the procedure for collecting samples was modified. The canister sampling scheme was modified April 1, 2006 to take one 20-minute sample per episode at four (Grain Elevator, J. I. Hailey, Dona Park, West End of Inner Harbor) of the seven sites, with the canister sampling suspended on Jan. 15, 2006 at the two sites (Oak Park and Solar Estates) with auto-GCs, since the auto G.C.s and the canisters provide redundant information. Canister Sampling has been placed on hold since Jan. 15 at the Off Up River Road on Flint Hills Resources Easement CAMS 632 site until the triggering software can filter out southerly winds, because two small nearby sources to the south appear to be having a large effect on TNMHC measurements, and hence triggering canisters.

During the second quarter of 2006, eight valid canister samples were triggered and analyzed. Seven of the eight cases appear to have captured the same plume that had triggered the samples. The Dona Park May 24 canister sampled after concentrations had dropped to background levels. An analysis of the earlier canister data showed that the majority of samples had concentration mixes suggesting the detection of gasoline refining emissions, with most of the chemical compositions being low molecular weight alkanes. In sampling this quarter, a wider range of results has been produced. Graphs of the canister results appear in the appendix.

The Dona Park CAMS 635 sample on June 1, 2006 was taken during a fire at the Valero plant to the west of the site. All 55 of the target species were measured above the minimum detection level.

The sample at the J. I. Hailey CAMS 630 site on June 5, 2006 is notable because the sample consisted largely of toluene, at a concentration value of 3104 ppbC, or 232 ppbV. The one-hour effects screening level (ESL) for toluene is 500 ppbV.

Auto-GC Data and Effects Screening Level Summary

The appendix contains a comparison between hourly hydrocarbon species concentrations observed in residential areas and the TCEQ's health effects screening levels, both for the second quarter of 2006 and for the most recent rolling four-quarter (annual) period (7/1/05-6/30/06). One benzene measurement at Solar Estates was the only measured concentration over the ESL this quarter. It was measured on May 5, 2006 around 8:00 CST with strong winds (14 mph) from the east-southeast. The data are preliminary, however, since the data for May, 2006 have not yet been validated.

Valero Fire Event

A notable event during the second quarter of 2006 was a fire on the north side of the Valero plant west of Dona Park on June 1. The location and viewing pattern of the camera system at Dona Park C635 proved to be highly valuable in capturing the start of the fire, which could be estimated to within seconds, and in helping to characterize it over time. The UT contractor reviewed the camera images and reported the visible fire extended from 12:04 AM through 3:26 AM CST. However, hydrocarbon emissions from this fire were detected at all seven TNMHC monitors in the network and both auto-GCs over the course of the day. Evidence for this conclusion was provided by the on-line trajectory tool, which showed that a peak in TNMHC was measured at times roughly coincident with the passage of a plume modeled to have originated from the location of the fire. In addition, the composition of the speciated hydrocarbon mix at the two automated auto-GCs in the network showed strong agreement in measuring similar heavier molecular-weight compounds, again roughly coincident with the passage of the modeled plume. As was noted earlier, a canister sample was triggered at the Dona Park site -- roughly coincident with the plume passage -- and it showed similar composition to the auto-GCs. For many heavier molecular-weight species, the values measured during the peak hours on June 1 were the maxima to date. The data are being reviewed by TCEQ toxicologists.

Ambient Methane Analysis

Methane (CH₄), is not a pollutant of concern in the Corpus Christi Air Quality Project (CCAQP), and is not generally an issue in ambient air on a local scale. It is a gas of concern for global climate change, and in some cases it has been a problem on a local scale for accumulating in closed buildings where it can be ignited. It was noticed that a directionality in methane levels measured by the TECO 55c TNMHC analyzers was observable at the two auto-GC sites, and this was reported at the June 14th Voluntary Advisory Board meeting. Normal atmospheric concentrations for methane are around 1750 ppb, and the overall means measured at Solar Estates and Oak Park are 4-8 percent higher. One observes that above-average concentrations tend to come from particular directions at each site, suggesting one or more local sources.

The directionality at Solar Estates is very similar to the directionality of sulfur dioxide data from 2005, suggesting the same nearby industrial source on Leopard St. The TCEQ site, WEH CAMS 631 site is remote relative to the other sites. The remaining five sites, plus the TCEQ site at Williams Park, all show some weak directionality to the south. When the peak direction at each site was estimated using kernel smoothing, and rays were plotted from each site based on the monitor locations and peak directions, several of the rays seem to converge at a location southwest of the city core. It is suggested that if this issue remains of interest, UT and TCEQ be asked to pursue it through additional examination of TECO 55c data, by research into abandoned landfill location and condition, and by hand-held mobile monitoring.

Comparison of Auto-GC Levels One Year Apart

April 2005 and April 2006 offer the first periods a year apart for which data validation has been completed. Thus, a head-to-head comparison across a year may suggest annual changes in emissions. A comparison of the mean concentrations in each month for 47 hydrocarbons at Oak Park leads to two conclusions: the same species appear prominent in 2006 as did in 2005, and concentrations in 2006 are lower for almost all species than in 2005. However, an examination of weather in both months shows that in 2006 there was a lower frequency of winds from the industrial area to the north, and this is a likely explanation for the lower concentrations. As more data are validated, more comparisons will be performed.

B. Scheduled Meetings of the Volunteer Advisory Board

During this quarter the Advisory Board met on June 14, 2006 on the campus of Texas A&M University in Corpus Christi, Texas.

At the June 14th meeting Dr. David Sullivan, UT's Quality Assurance Officer, presented an update and analysis of the monitoring data collected at the seven monitoring sites in the Corpus Christi area. The format for presenting data to the Long Term Health Group was discussed. Information on the replacement Board members was distributed to the attendees.

Appendix B contains a copy of the Briefing Book Materials and a summary of the meeting notes from the June 14, 2006 Advisory Board Meeting.

C. Project Management and Planning

Project Management and Planning during this period has focused on four (4) major activities.

1. Project Schedule

Operations and maintenance of the seven monitoring sites reporting data via the TCEQ LEADS System is on going. The data can be accessed and reviewed at the project website (<http://www.utexas.edu/research/ceer/ccaqp/>)

2. Communication

The status of the Project has been communicated through a meeting of the Advisory Board and the website, which is operational with portions under continual development.

3. Budget Monitoring

Budget monitoring during the period has focused on project costs for Phase II-Sites Operation and Maintenance costs. Financial reports for the quarter are included at Appendix C.

4. **Other Contributions**

A TCEQ Supplemental Environmental Project (SEP) resulting from an enforcement action against CITGO Refining and Chemicals Company, L.P. (Docket No. 2001-1469-AIR-E) was ongoing during this reporting period. The SEP Award authorized two (2) tasks. Task One funded the operation of the Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Program for approximately one year. Task One funds were being closed and final reports prepared during this quarter. Task Two funded the development of modeling tools to enhance the air quality monitoring capabilities of the Program. Activities for Task Two were ongoing during this reporting period.

On June 14, 2006 TCEQ approved funding for a new Supplemental Environmental Project (SEP) as a result of an enforcement action against El Paso Merchant Energy Petroleum Company (Docket No. 2001-1023-AIR-E.) The new SEP will fund the enhancement of the automated trajectory tool, additional canister analysis at each of the seven sites, installation of wind direction filter and a software upgrade to minimize data loss resulting from electrical power interruptions.

III. Financial Report

As required by the project proposal, the following financial summary information is provided. Details supporting this financial summary are included in Appendix C.

A. Total Amount of COCP Funds and Other Funds Received Under the Project

The COCP funds received through June 30, 2006 totals \$7,106,463.43. This total includes interest earned through June 30, 2006.

B. Detailed List of the Actual Expenditures Paid from COCP Funds

Expenditures of COCP funds during this quarter totaled \$178,483.27. The detailed breakdown of the actual expenditures is included in Appendix C. The activities for which these expenditures were used are detailed in Section II of this report.

C. Total Interest Earned on COCP Funds During the Quarter

The interest earned during this quarter totaled \$42,955.01. A report providing detailed calculations of the interest earned on the COCP funds during each month of the quarter is included in Appendix C.

D. Balance as of June 30, 2006 in the COCP Account

The balance in the COCP account, including interest earned totals \$4,839,893.75.

E. Expected Expenditures for the Funds Remaining in the COCP Account

The expected expenditures for the funds remaining totals \$4,839,893.75.

Quarterly Report Distribution List:

U.S. District Court

Ms. Shirley Johnson, Assistant Deputy Chief USPO

Mr. James Martinez, Supervising USPO

Texas Commission on Environmental Quality

Ms. Sharon Blue, Litigation Division – Headquarters

Mr. David Brymer, Laboratory and Mobile Monitoring – Headquarters

Ms. Susan Clewis, Director – Region 14

Mr. David Turner, Air Monitoring Section – Region 14

Mr. David Kennebeck, Field Operations – Region 14

Environmental Protection Agency

Ms. Kathleen Aisling, Environmental Engineer, Air Enforcement

Section, Dallas Regional Office

Members of the Advisory Board

APPENDIX A

Comprehensive Report of Data Findings

Appendix A: Data Analysis for Corpus Christi Quarterly Report
April 2006-June 2006

The University of Texas at Austin
 Center for Energy & Environmental Resources
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This technical report describes recent results of monitoring and analysis of data under the Corpus Christi Air Quality Project (CCAQP) over the period from April 1 through June 30, 2006. The monitoring network is shown in Figure 1 and described in Table 1. This report contains the following analyses:

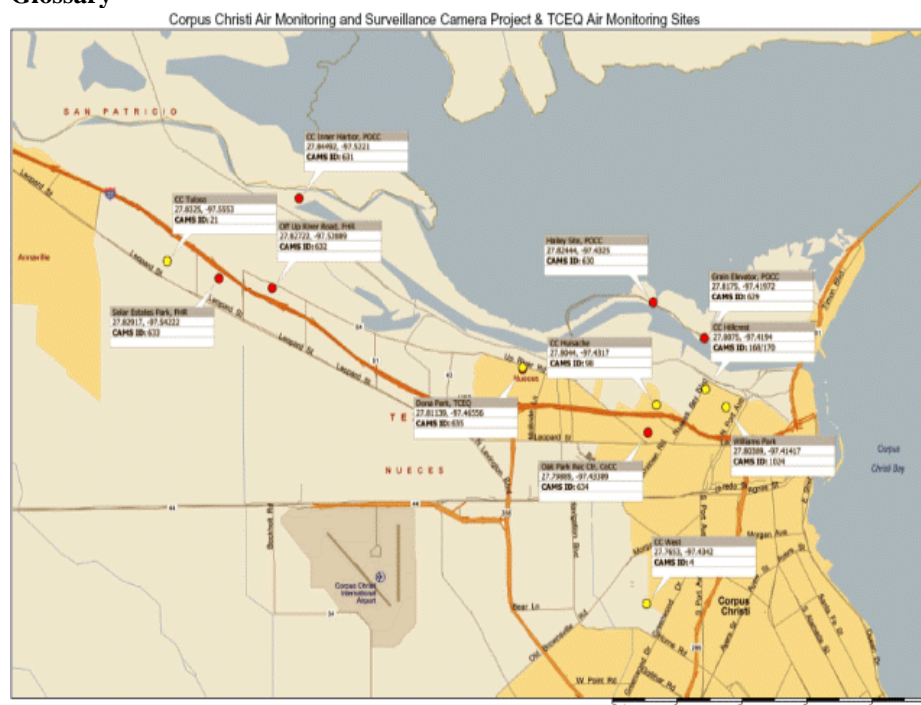
- an update on canister sampling and assessment;
- a summary of hourly speciated hydrocarbon concentrations measured by automated gas chromatographs (auto-GCs) compared with health effects screening levels;
- a description of a notable pollution event associated with a refinery fire on June 1, 2006;
- some additional analysis on the unusual pattern of methane concentrations discussed at the previous board meeting as requested by the Volunteer Advisory Board;
- a comparison of auto-GC data from April 2005 to data from April 2006 as a first step in assessing long-term time series trends.

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

TCEQ CAMS#	Description of Site Location	Monitoring Equipment				
		Auto GC	Canister	H2S&SO2	Met Station	Camera
634	Oak Park Recreation Center	Yes	--		Yes	
629	Grain Elevator @ Port of Corpus Christi		Yes	Yes	Yes	
630	J. I. Hailey Site @ Port of Corpus Christi		Yes	Yes	Yes	
635	TCEQ Monitoring Site C199 @ Dona Park		Yes	Yes	Yes	Yes
631	Port of Corpus Christi on West End of CC Inner Harbor		Yes	Yes	Yes	
632	Off Up River Road on Flint Hills Resources Easement		pending	Yes	Yes	
633	Solar Estates Park at end of Sunshine Road	Yes	--	Yes	Yes	Yes

Figure 1

Glossary



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). 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 (ppbC), 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 it for some 46 hydrocarbon species. These include benzene and 1,3-butadiene, which are air toxics, various butene 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.
- **Total non-methane hydrocarbons (TNMHC)** – TNMHC - also referred to as total non-methane organic compounds - represent a large fraction of the total volatile organic compounds released into the air by human and natural processes. TNMHC is an unspecified 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 CCAQP sites. In general, a sustained monitored level of 2000 ppbC has been used to trigger canister samples.
- **Canister** – Stainless steel canisters are filled with air samples when an independent sensor detects that elevated levels of hydrocarbons (TNMHC) are present. Samples are taken for various lengths of time (generally 20 minutes) to try to capture the chemical make-up of the air. Samples are analyzed in a lab to resolve some 50 – 55 hydrocarbon species. Canister samplers have operated at all seven CCAQP sites, but this quarter only at four.
- **Effects Screening Levels (ESLs)** – From the TCEQ Web site: *“Effects Screening Levels are used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in the air. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, effects on vegetation, and corrosive effects. They are not ambient air standards. If predicted or measured airborne levels of a constituent do not exceed the screening level, adverse health or welfare effects are not expected. **If ambient levels of constituents in air exceed the screening levels, it does not necessarily indicate a problem but rather triggers a review in more depth.**”* (Emphasis added.) (Accessed on July 31, 2006: <http://www.tceq.state.tx.us/implementation/tox/esl/ESLMain.html> .)

Canister Sampling and Analysis

Because the initial approach for triggering canister sampling was generating more samples than could be accommodated with the analysis budget, the procedure for collecting samples was modified. As reported at the June 14, 2006 Voluntary Advisory Board meeting, the sampling scheme for canisters has been modified to take one 20-minute sample per episode at four of the seven sites, (Port Grain, J. I. Hailey, Dona Park, and West End of Inner Harbor) with the canister sampling suspended at the two sites (Oak Park and Solar Estates) with auto-GCs since the auto GCs and th canisters provide redundant information. Sampling is on hold at the Off Up River Road on Flint Hills Resources Easement CAMS 632 site until the triggering software can filter out southerly winds, because two small nearby sources to the south appear to be having a large effect on TNMHC measurements.

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During the second quarter of 2006, valid canister samples were triggered and analyzed at the locations, dates, and times shown in Table 2. The time is shown in “Universal Time Coordinated” or “UTC”, and one must subtract 5 hours for Central Daylight Time (CDT) and 6 hours for Central Standard Time (CST). One date, July 3, is included from early in the third quarter because its results were reported at the same time as the June 29 results. This table shows the total mass from the 55 target chemical species plus the numerous additional unknown peaks found in analysis but not matched to a target species. The total nonmethane hydrocarbon total in ppbC units is comparable to the measurement made by the TNMHC analyzers used to trigger canister samples, and the values in the Total column suggests that on only one (Dona Park on May 24) out of nine cases did a canister fail to analyze the same plume with “greater than 2000 ppbC” concentrations that triggered the sample.

An analysis of the earlier canister data showed that the majority of samples had concentration mixes suggesting the detection of gasoline refining emissions, with most of the chemical compositions being low molecular weight alkanes. On April 17 at West End harbor CAMS 631, the first sample was taken following restart of the canister analyses, and the can showed surprising results not seen before in terms of chemical make-up. This can had most of its material in ethyl-benzene and o-, m-, and p-xylene. The winds during the time of sample collection correspond to air from port operations nearby to the southeast. It is possible that barge loading or unloading operations produced this mix of species. Since then, some other unusual mixes of species have been measured at this site. A road construction project is going on in the vicinity, but for the most part winds have been from the southeast in the direction to shipping operations when triggering has occurred. Six of the nine samples this quarter were taken at this location under similar wind conditions.

The Dona Park CAMS 635 sample on June 1, 2006 was taken during a fire at the Valero plant to the west of the site. The canister analysis detected all 55 of the target species, and for several heavier molecular weight species these were the highest measured values to date at this site.

The sample at the J. I. Hailey CAMS 630 site on June 5, 2006 is notable because of the large toluene value of 3104 ppbC, or 232 ppbV. The one-hour ESL for toluene is 500 ppbV.

The compound beta-pinene is showing up in all samples. Beta-pinene (C₁₀H₁₆) is a marker for emissions from certain trees, and thus it is likely this hydrocarbon is being misidentified. This species is shown in the graphs as a place-holder with the caveat that it may be relabeled.

A collection on bar graphs of the samples appears in Figures 2-10.

Table 2 Valid Canister Samples, 2Q2006

Site	Date	Time UTC	Total Known ppbC	Total Unknown ppbC	Total ppbC	% Ident	Wind speed / direction
WEH CAMS 631	4/17/06	23:44	3,480.7	728.3	4,209.0	83%	16mph/SE
WEH CAMS 631	5/18/2006	12:09	4,986.5	852.3	5,838.8	85%	12mph/SE
DPK CAMS 635	5/24/2006	11:46	202.5	216.3	418.7	48%	3mph/SE
DPK CAMS 635	6/1/2006	11:49	1,275.8	800.6	2,076.4	61%	4mph/WNW
JIH CAMS 630	6/5/2006	8:19	4,732.7	613.3	5,346.0	89%	7mph/SSW
WEH CAMS 631	6/5/2006	10:52	1,618.4	870.6	2,489.0	65%	4mph/SSE
WEH CAMS 631	6/13/2006	4:40	1,880.2	675.8	2,555.9	74%	8mph/SSE
WEH CAMS 631	6/29/2006	5:33	1,695.8	415.0	2,110.8	80%	8mph/SE
WEH CAMS 631	7/3/2006	5:37	1,708.0	694.1	2,402.1	71%	7mph/SSE

Figure 2

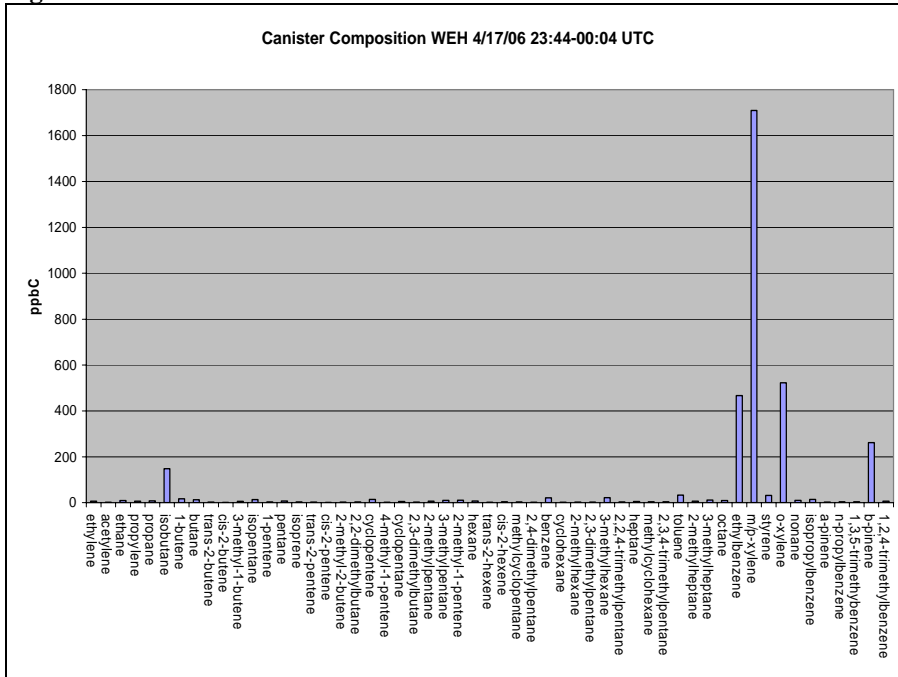


Figure 3

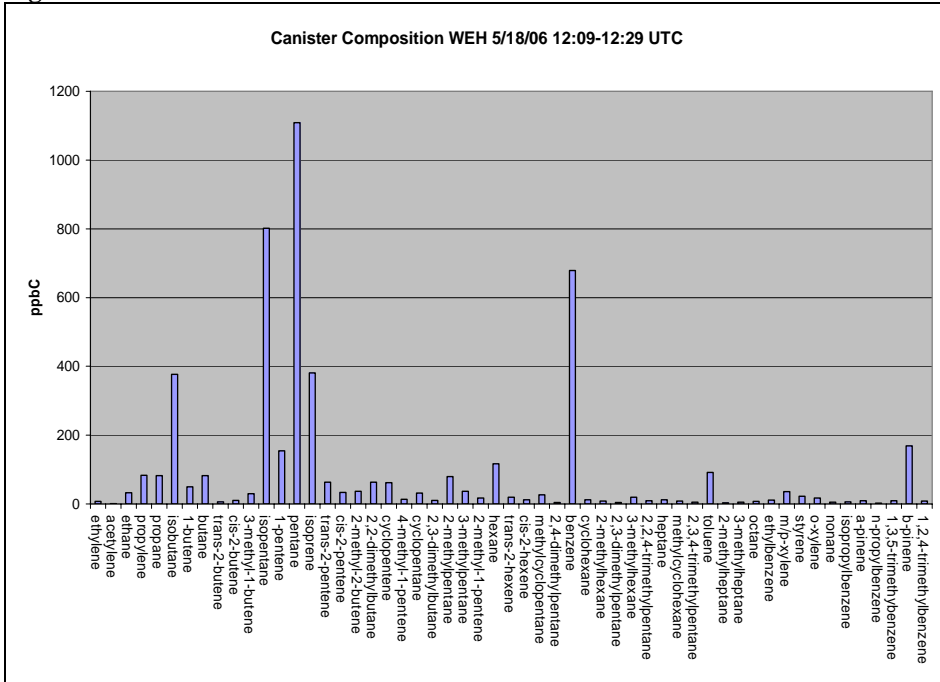


Figure 4

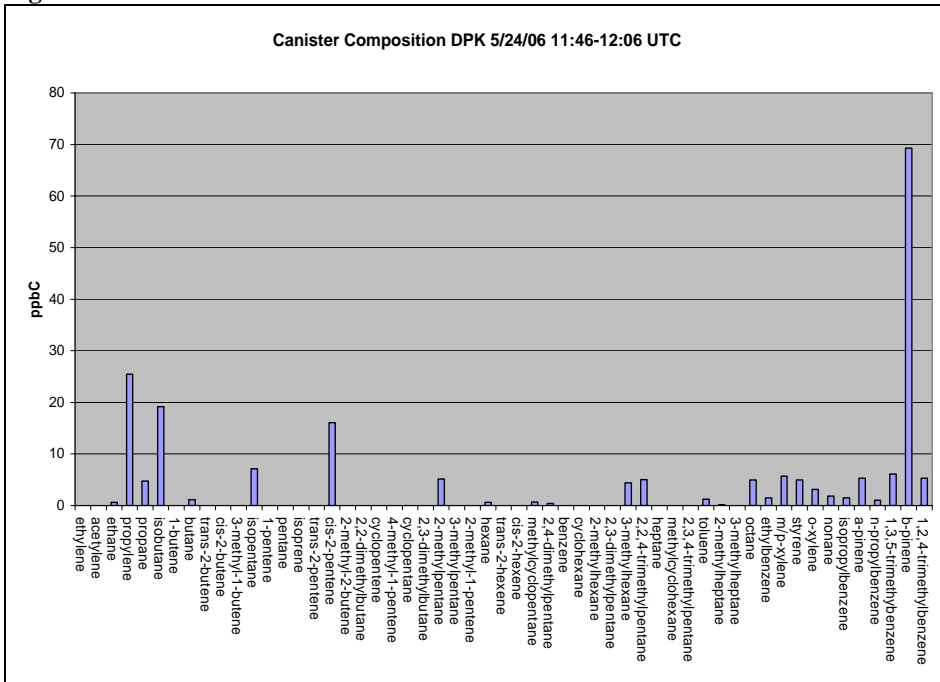


Figure 5

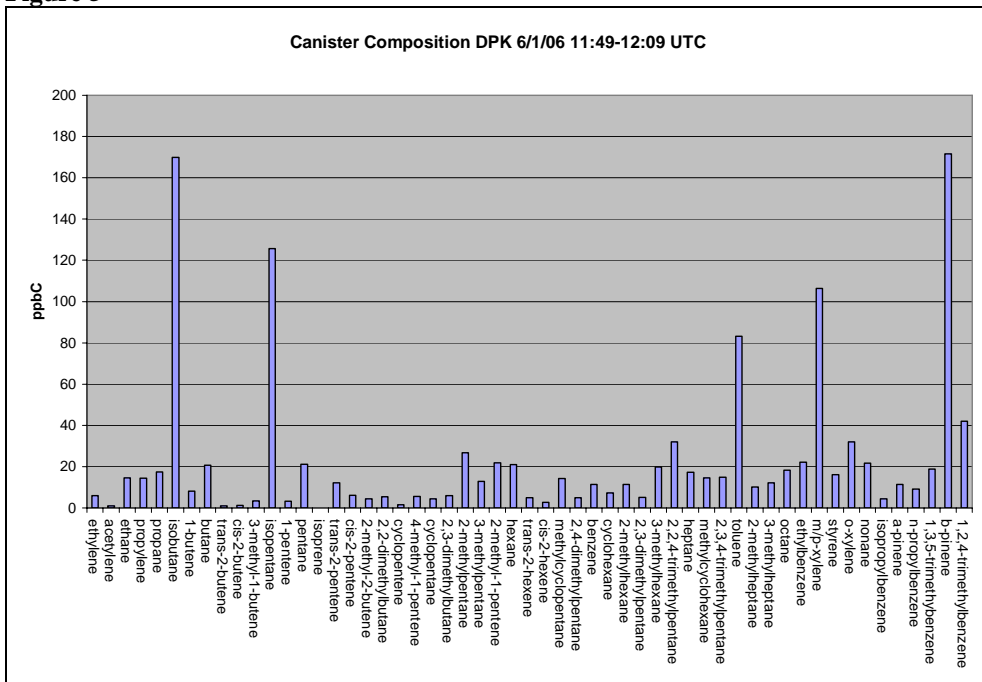


Figure 6

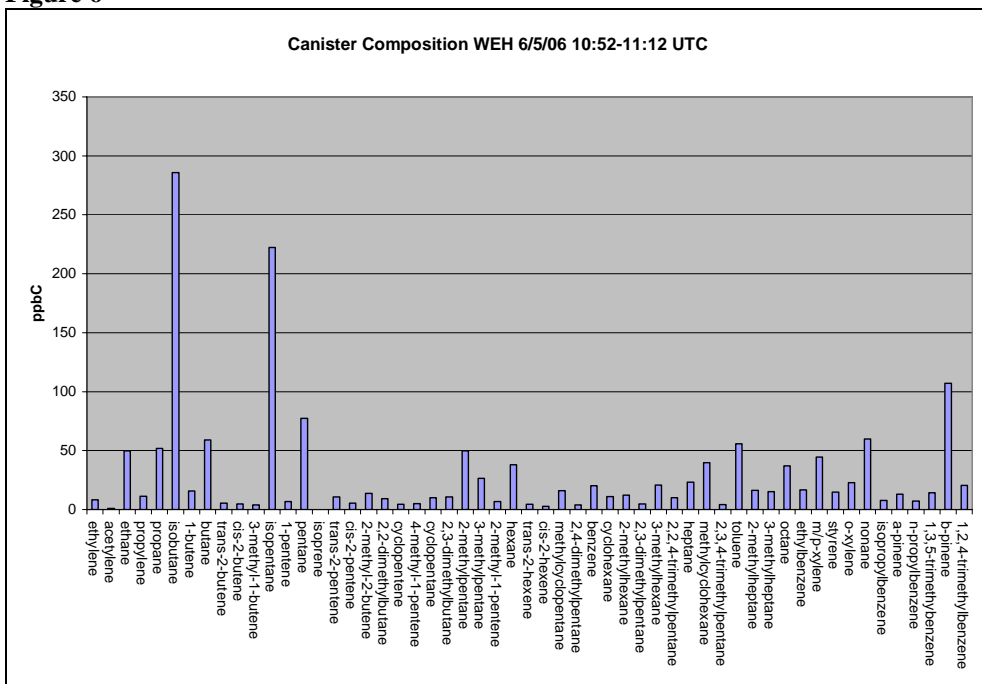


Figure 7

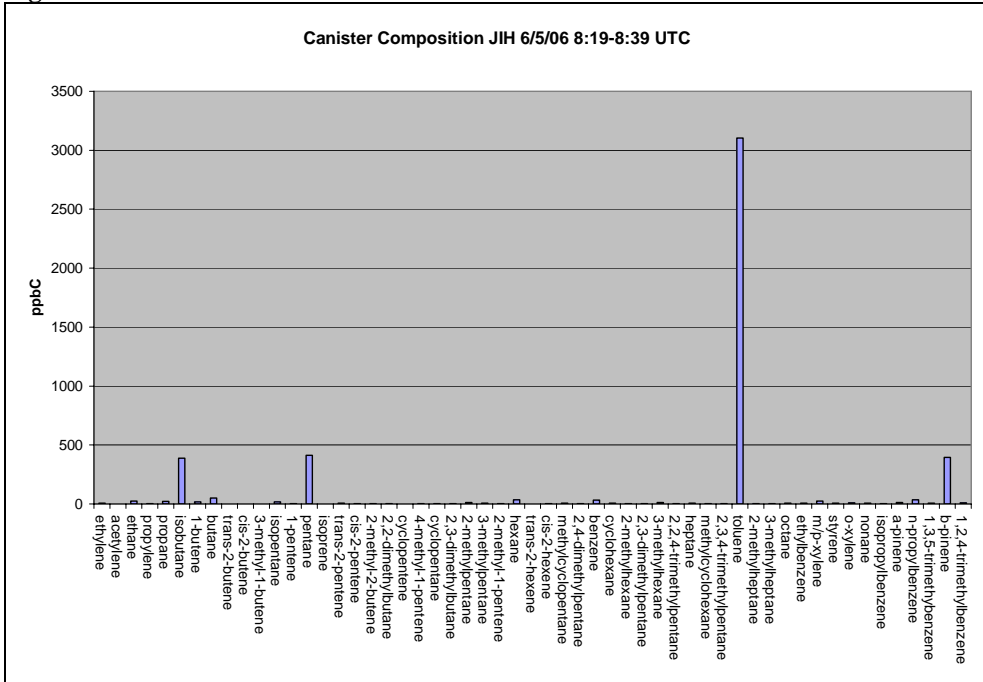


Figure 8

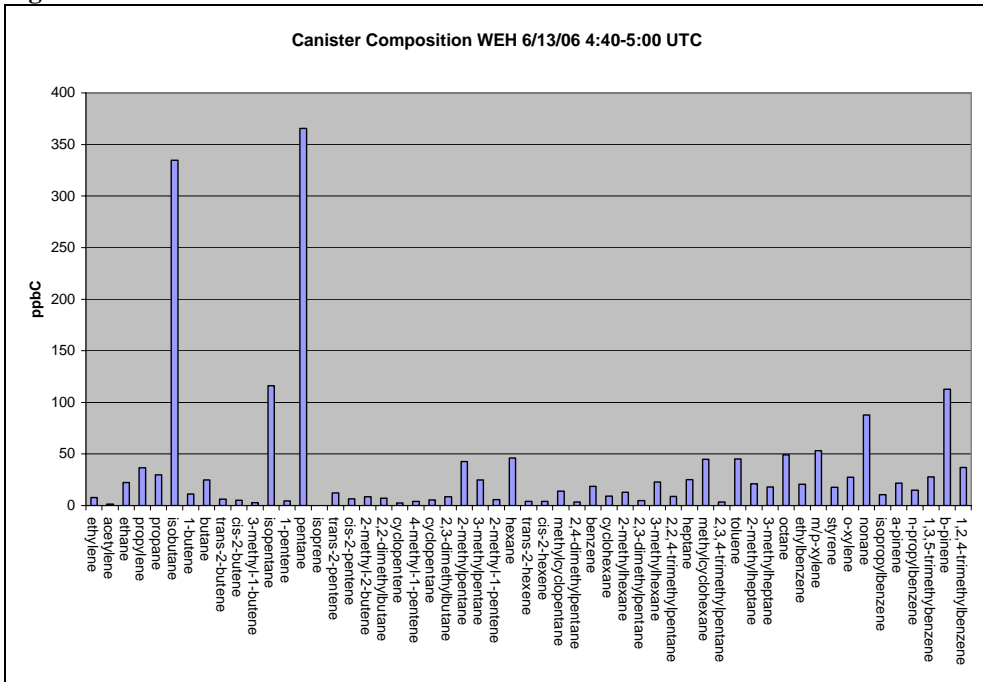


Figure 9

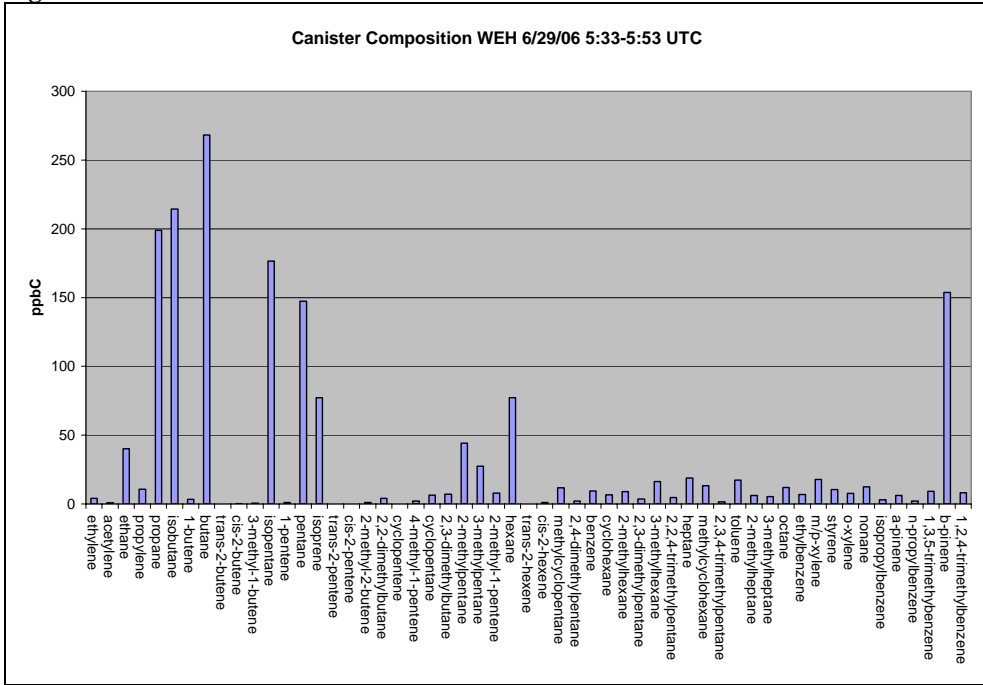
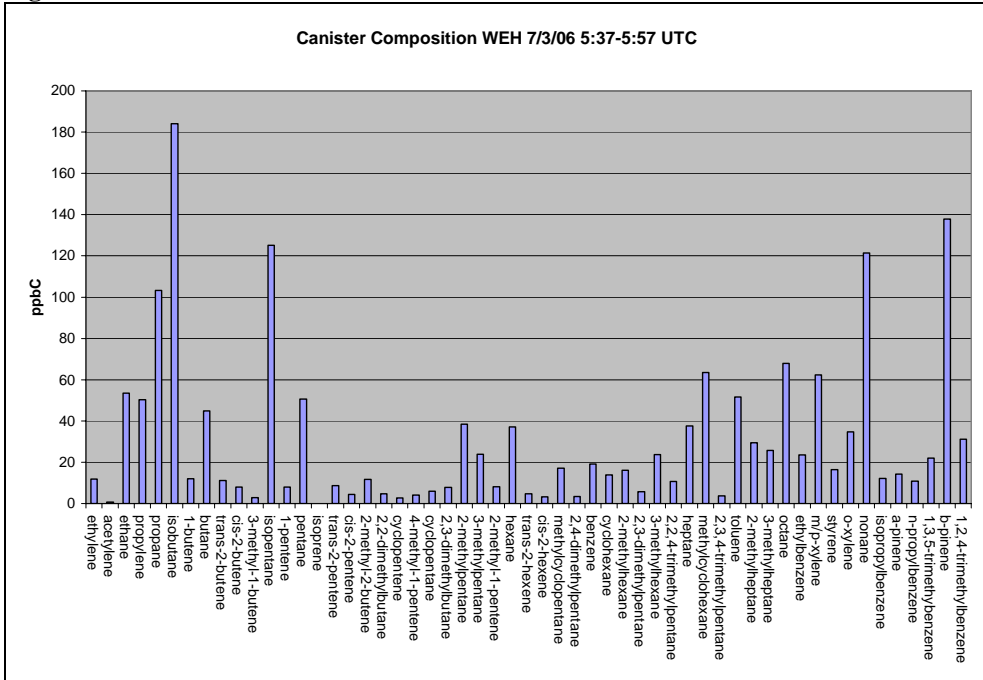


Figure 10



Auto-GC Effects Screening Level Summary

The contents of this paragraph are a summary of a TCEQ Web page on Effects Screening Levels (ESLs) accessed at http://www.tceq.state.tx.us/implementation/tox/esl/list_main.html on July 30, 2006. The TCEQ establishes ESLs to evaluate potential for effects to occur as a result of exposure to concentrations of constituents in the air. The ESLs are based on data concerning health effects, potential for odors to be a nuisance, effects on vegetation, and corrosive effects, but ESLs are not ambient air standards. If predicted or measured airborne levels of a constituent do not exceed ESL, adverse health or welfare effects are not expected. If ambient levels of constituents in air exceed ESL, it does not necessarily indicate a problem but rather triggers a review in more depth.

Tables 3 – 6 summarize the both the 2nd quarter of 2006 and the most recent rolling four-quarter (annual) period (7/1/05-6/30/06). Each table shows the number of one hour measurements during the period. Normally, 22 ambient samples per day lead to 2,002 maximum possible observations for the 2nd Q06, with 8,030 as the maximum possible for one year. The table shows the arithmetic mean of all observations, the annual ESL, the 90th and 99th percentiles for observed values, the maximum measured value, the odor ESL (if one exists), and the one-hour ESL. Note that not all data have been validated and are thus subject to change. All values in the following tables are in ppbV units.

Table 3 Oak Park 2Q06 Auto-GC Summary ppbV units

species	num	Qtr	Annual			Odor	1-Hour	
		'mean	ESL	p90	p99	max	ESL	ESL
Ethane	1910	4.20		8.58	32.07	73.16		10000
Ethylene	1910	0.54		0.94	6.39	30.69		1022
Propane	1910	2.70	1000	6.20	31.52	118.12		10000
Propylene	1910	0.46		0.63	8.19	21.38		68120
n_Hexane	1913	0.30	50	0.58	3.80	33.23		500
Isobutane	1910	1.18	800	2.17	14.30	39.51	2042	8000
_13_Butadiene	1910	0.03	5	0.05	0.15	1.45		50
_1_Butene	1910	0.07	740	0.08	1.27	3.88	69	7400
c_2_Butene	1910	0.06	740	0.06	1.05	3.71	600	7400
t_2_Butene	1910	0.08	740	0.08	1.38	4.76	600	7400
o_Xylene	1913	0.07	100	0.12	0.65	8.61	1795	1000
Isopentane	1910	1.20	120	2.36	14.32	51.02		1200
_1_Pentene	1909	0.04	800	0.08	0.39	1.02	30	8000
c_2_Pentene	1910	0.03	800	0.05	0.29	0.63	30	8000
t_2_Pentene	1910	0.05	800	0.09	0.49	1.18	30	8000
Benzene	1913	0.31	1	0.43	5.12	19.99		25
Cyclohexane	1913	0.12	100	0.24	1.78	22.43	415	1000
n_Pentane	1910	0.71	120	1.23	10.30	49.06		1200
Toluene	1913	0.38	50	0.79	3.99	25.26		500
n_Butane	1910	1.41	800	2.96	16.87	62.25		8000
p_Xylene_m_Xylene	1913	0.15	100	0.27	1.56	7.46	480	1000
EthylBenzene	1913	0.04	100	0.08	0.45	5.45	461	1000
Cumene	1913	0.01	50	0.01	0.32	1.00	100	500
_124_Trimethylbenzene	1913	0.06	25	0.10	0.81	10.33		250

Table 4 Oak Park Rolling 1-Yr (Jul 05-Jun 06) Auto-GC Summary ppbV units

species	num	Annual				Odor	1-Hour	
		mean	ESL	p90	p99	max	ESL	ESL
Ethane	7491	8.36		21.68	62.97	307.16		10000
Ethylene	7491	1.04		2.35	9.80	73.05		1022
Propane	7491	6.77	1000	17.94	67.25	334.96		10000
Propylene	7491	0.99		2.37	12.74	27.07		68120
n_Hexane	7494	0.62	50	1.59	7.40	35.06		500
Isobutane	7491	2.74	800	7.15	25.71	226.36	2042	8000
_13_Butadiene	7491	0.04	5	0.08	0.32	7.96		50
_1_Butene	7491	0.15	740	0.29	2.32	5.94	69	7400
c_2_Butene	7491	0.12	740	0.23	2.08	4.53	600	7400
t_2_Butene	7491	0.17	740	0.29	2.75	5.98	600	7400
o_Xylene	7494	0.10	100	0.21	0.70	27.31	1795	1000
Isopentane	7491	2.87	120	7.15	30.55	106.77		1200
_1_Pentene	7490	0.05	800	0.12	0.49	3.51	30	8000
c_2_Pentene	7491	0.05	800	0.11	0.43	2.35	30	8000
t_2_Pentene	7491	0.09	800	0.21	0.83	5.04	30	8000
Benzene	7494	0.69	1	1.53	9.09	48.17		25
Cyclohexane	7494	0.27	100	0.76	2.85	36.86	415	1000
n_Pentane	7491	1.89	120	4.06	25.70	172.44		1200
Toluene	7492	0.73	50	1.62	7.23	69.31		500
n_Butane	7491	3.69	800	10.22	35.56	158.02		8000
p_Xylene_m_Xylene	7471	0.24	100	0.59	2.10	36.73	480	1000
EthylBenzene	7494	0.07	100	0.16	0.55	5.45	461	1000
Cumene	7494	0.04	50	0.06	0.54	19.69	100	500
_124_Trimethylbenzene	7494	0.09	25	0.18	0.76	10.33		250

Table 5 Solar Estates 2Q06 Auto-GC Summary ppbV units

species	num	Qtr	Annual				Odor	1-Hour
		'mean	ESL	p90	p99	max	ESL	ESL
Ethane	1719	4.95		10.10	33.89	130.46		10000
Ethylene	1719	0.22		0.57	1.26	3.95		1022
Propane	1719	3.20	1000	6.66	30.74	74.71		10000
Propylene	1532	0.88		3.62	5.29	9.87		68120
n_Hexane	1548	0.29	50	0.56	2.58	30.10		500
Isobutane	1719	1.36	800	2.66	10.77	26.11	2042	8000
_13_Butadiene	1719	0.09	5	0.07	0.72	35.35		50
_1_Butene	1719	0.02	740	0.05	0.14	1.87	69	7400
c_2_Butene	1719	0.04	740	0.08	0.23	2.21	600	7400
t_2_Butene	1719	0.09	740	0.22	0.31	0.60	600	7400
o_Xylene	1548	0.04	100	0.09	0.32	2.34	1795	1000
Isopentane	1719	0.99	120	2.46	7.79	17.69		1200
_1_Pentene	1719	0.01	800	0.03	0.10	0.36	30	8000
c_2_Pentene	1719	0.01	800	0.02	0.09	0.63	30	8000
t_2_Pentene	1719	0.02	800	0.04	0.19	1.22	30	8000
Benzene	1548	0.20	1	0.42	1.42	29.02		25
Cyclohexane	1548	0.13	100	0.33	1.31	3.34	415	1000
n_Pentane	1719	0.64	120	1.50	5.22	36.93		1200
Toluene	1548	0.27	50	0.50	1.38	29.96		500
n_Butane	1719	1.32	800	3.02	10.21	35.50		8000
p_Xylene_m_Xylene	1548	0.16	100	0.28	2.32	31.55	480	1000
EthylBenzene	1548	0.03	100	0.06	0.24	3.02	461	1000
Cumene	1548	0.01	50	0.01	0.10	0.37	100	500
_124_Trimethylbenzene	1548	0.06	25	0.07	0.34	30.12		250

The 29 ppbV maximum for Benzene at Solar Estates was the only measured concentration over the ESL this quarter. It was measured on May 5, 2006 around 8:00 CST from the east-southeast under a strong 14 mph wind. The data have not been validated.

Table 6 Solar Estates Rolling 1-Yr (Jul 05-Jun 06) Auto-GC Summary ppbV units

species	num	mean	Annual			Odor		1-Hour
			ESL	p90	p99	max	ESL	ESL
Ethane	7054	8.68		19.61	58.49	163.93		10000
Ethylene	7054	0.40		0.96	2.38	8.56		1022
Propane	7054	5.63	1000	12.98	39.42	163.43		10000
Propylene	6867	0.46		0.96	4.67	39.67		68120
n_Hexane	6709	0.43	50	0.93	2.67	101.84		500
Isobutane	7054	2.29	800	4.94	15.73	54.36	2042	8000
_13_Butadiene	7054	0.09	5	0.07	0.62	115.73		50
_1_Butene	7054	0.05	740	0.11	0.41	4.26	69	7400
c_2_Butene	7054	0.06	740	0.12	0.49	12.47	600	7400
t_2_Butene	7054	0.14	740	0.24	0.64	7.20	600	7400
o_Xylene	6709	0.06	100	0.14	0.41	2.34	1795	1000
Isopentane	7054	2.07	120	4.63	12.45	55.85		1200
_1_Pentene	7054	0.02	800	0.04	0.18	0.81	30	8000
c_2_Pentene	6628	0.01	800	0.04	0.18	0.74	30	8000
t_2_Pentene	7054	0.03	800	0.08	0.40	1.82	30	8000
Benzene	6709	0.32	1	0.69	2.12	51.23		25
Cyclohexane	6709	0.24	100	0.61	1.78	9.05	415	1000
n_Pentane	7052	1.19	120	2.64	7.73	141.88		1200
Toluene	6706	0.38	50	0.82	2.18	74.82		500
n_Butane	7054	2.88	800	6.94	21.62	153.42		8000
p_Xylene_m_Xylene	6709	0.33	100	0.52	4.47	76.60	480	1000
EthylBenzene	6709	0.05	100	0.12	0.32	3.02	461	1000
Cumene	6709	0.01	50	0.03	0.14	0.85	100	500
_124_Trimethylbenzene	6708	0.07	25	0.12	0.35	30.12		250

The 115 ppbV 1,3-Butadiene concentration measured at Solar Estates has not been validated.

The list of months for which data validation has been completed appears in Figure 11. Note that site “32” is Oak Park, and site “33” is Solar Estates. The red cells in March and April 2006 indicate the site failed to meet the target 75 percent data completion in those months. This is a result of the data validation process.

Figure 11 Auto-GC Data Validation as of 7/26/06

Address http://dsr/cgi-bin/lsr/agc_recovery.pl

Google Go

AutoGC Data Recovery Report

Percent Data Recovery		
Date Range: 03/2005 - 06/2006		
Date	32	33
Mar 2005		
Apr 2005	94	77
May 2005	98	81
Jun 2005		
Jul 2005		
Aug 2005		
Sep 2005	81	80
Oct 2005		
Nov 2005		
Dec 2005		
Jan 2006	85	98
Feb 2006	92	96
Mar 2006	97	56
Apr 2006	91	72
May 2006		
Jun 2006		
Average	91	80
Date	32	33

Valero Fire Event

A notable event during the 2nd quarter of 2006 was a fire on the north side of the Valero plant west of Dona Park on June 1. The location and viewing pattern of the camera system at Dona Park C635 proved to be highly valuable in capturing the start of the fire, which could be estimated to within seconds, and in helping to characterize it over time. The UT contractor reviewed the camera images, and reported the visible fire extended from 12:04 AM through 3:26 AM CST. However, hydrocarbon emissions from this fire were detected at all seven TNMHC monitors in the network and both auto-GCs over the course of the day. Evidence for this conclusion was provided by the on-line trajectory tool, which showed that a peak in TNMHC was measured at times roughly coincident with the passage of a plume modeled to have originated from the location of the fire. In addition, the composition of the speciated hydrocarbon mix at the two auto-GCs in the network showed strong agreement in measuring similar heavier molecular-weight compounds, again roughly coincident with the passage of the modeled plume. A canister sample was triggered at the Dona Park site -- roughly coincident with the modeled plume passage -- and it showed similar composition to the auto-GCs.

Figure 12 shows the camera view from Dona Park. The fire occurred in the right-hand one-third of the photo. Figure 13 shows on a log-scale the auto-GC data for Oak Park around 6:00 AM CST, and Figure 14 shows the same for Solar Estates around 1:00 PM CST. The high values at Solar Estates actually extended over two hours, some species having their peak an hour later. These two figures show the historic mean and the mean plus two standard deviations, to give a sense of the extreme nature of these hourly readings. All units are in ppbC, to allow summation to a total carbon-mass. For many heavier molecular weight species, the values measured during the peak hours were the maxima to date. The data are being reviewed by TCEQ toxicologists.

Figure 12 Dona Park Westerly Camera View

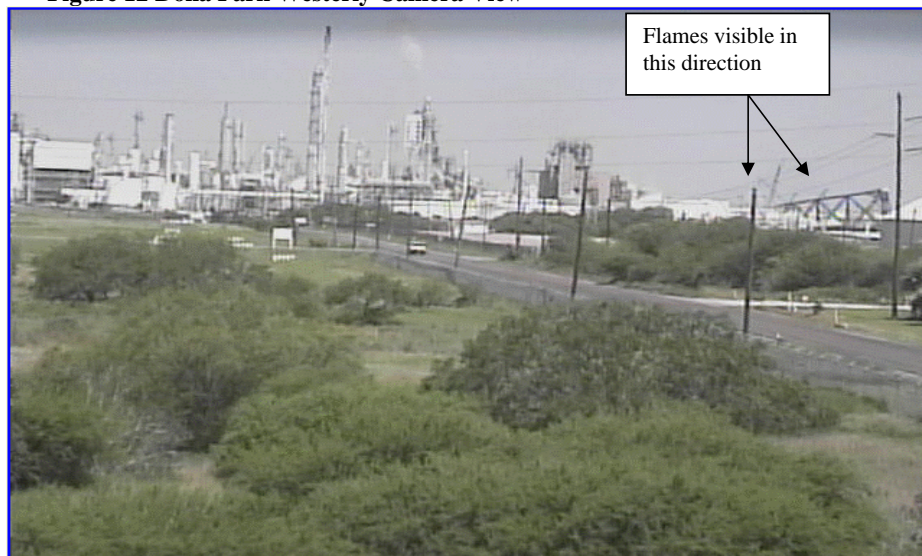


Figure 13

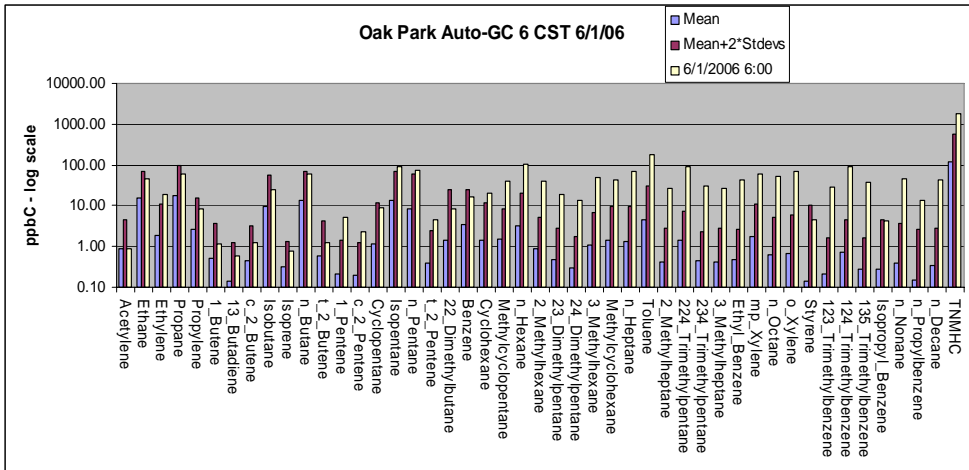
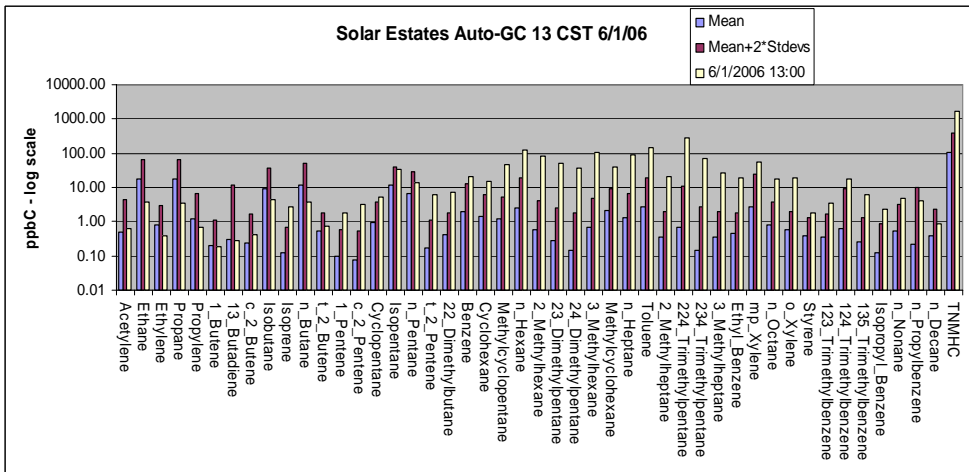


Figure 14



In Figures 15 and 16 are shown the modeled back-trajectories from the two auto-GCs to demonstrate the corroboration between winds and concentration data. Each shows a one-hour surface back-trajectory from the monitoring site during the peak hour and depicts the air parcel passing over the Valero plant.

Figure 15 Surface Back-trajectory Oak Park 6:30 AM CST

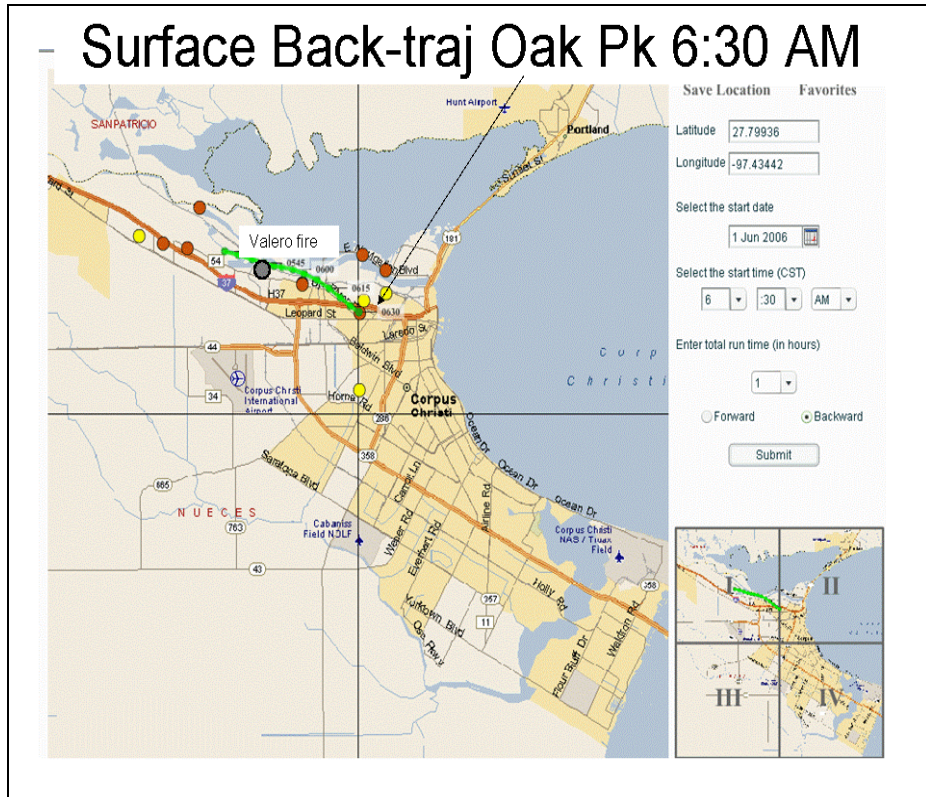
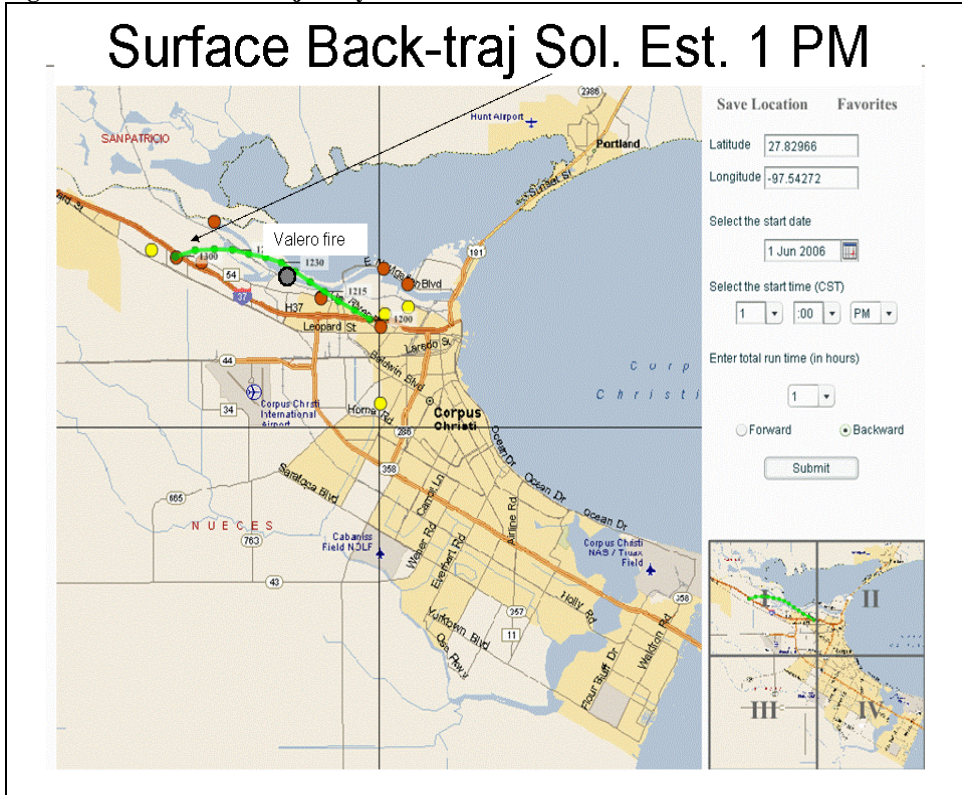


Figure 16 Surface Back-trajectory Solar Estates 1 PM



Ambient Methane Analysis

Methane (CH₄), has not been a pollutant of concern in the CCAQP, and is not generally an issue in ambient air on a local scale. It is a gas of concern for global climate change, and in some cases it has been a problem on a local scale for accumulating in closed buildings where it can be ignited. See <http://www.epa.gov/methane/scientific.html> for more details.

It was noticed that a directionality in methane levels measured by the TECO 55c TNMHC analyzer was observable at the two auto-GC sites, and this was reported at the June 14th Advisory Board meeting. Normal atmospheric concentrations for methane are around 1750 ppb. (For methane, ppbC and ppbV are the same, methane having only one carbon atom.) The overall means measured at Solar Estates and Oak Park are somewhat higher, and are shown in Table 7. The fact that the medians are slightly less than the means suggest a more or less symmetrical distribution, slightly skewed by some values significantly greater than the mean.

Table 7 Methane Statistics at Two Sites

	Mean	Median	Std Dev
Oak	1886	1822	300
Solar	1892	1818	305
Worldwide background concentration	1750		

After having looked into the Oak Park and Solar Estates data in closer detail, and also after having examined data from the other six sites with TNMHC analyzers, the issue is still cloudy. The directionality at Solar Estates is very similar to the directionality of sulfur dioxide data from 2005, suggesting the same nearby industrial source on Leopard St. The TCEQ site WEH CAMS 631 is remote relative to the other sites, and its directionality may be unrelated to the others. The remaining four sites, plus the TCEQ site at Williams Park, all show some weak directionality to the south. The map in Figure 17 shows the rays drawn from each site in the direction suggested by the kernel smoothing. Several of the rays seem to converge at a location southwest of the city core. The map notes the location of the current active landfill. Aerial photos of the area north of the current landfill show largely undeveloped farmland. It is suggested that if this issue remains of interest, UT and TCEQ be asked to pursue it through additional examination of TECO 55C data, by research into abandoned landfill location and condition, and by hand-held mobile monitoring.

Figure 17 Rays Drawn from Peak CH4 Directionality Assessment



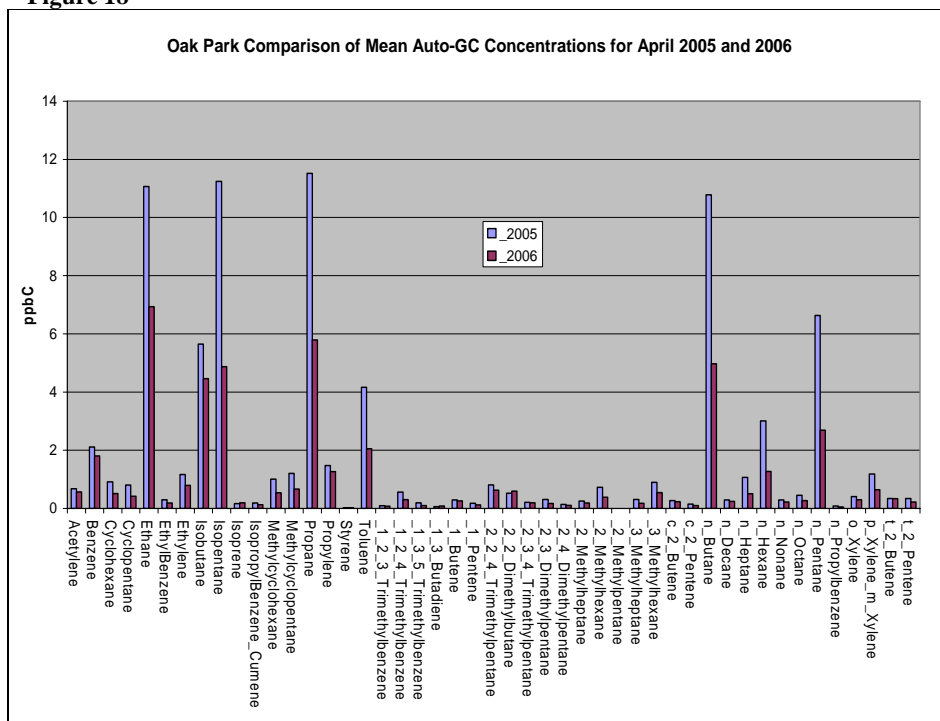
Regarding abandoned landfills, apparently Texas State University and TCEQ have a database. According to the Web sites <http://www.geo.txstate.edu/labs/research/ela327.html>, and www.dot.state.tx.us/publications/environmental_affairs/descriptions.pdf, accessed on July 31, 2006,

“Commissioned by TCEQ, Texas State University has researched abandoned landfills using both geographic information system (GIS) and remote sensing. The results of the research found 4,165 abandoned and permitted landfills. The closed landfill information has been provided to the local councils of government for their use regarding land development and future planning. Information from the closed landfill inventory is available at any local council of government. Hardcopy information can also be obtained, by mail or in person from TCEQ Records Services, phone 512/239-6204, fax 512/239-0888. Electronic data can be obtained by mail from TCEQ Customer Reports and Services, phone 512/239-3282, fax 512/239-0888.

Comparison of Auto-GC Levels One Year Apart

April 2005 and April 2006 offer the first periods a year apart for which data validation has been completed. Thus, a head-to-head comparison across a year may suggest annual changes. Figure 18 shows a comparison of the mean concentrations in each month for 47 hydrocarbons at Oak Park. One observes two points: concentrations in 2006 are lower for almost all species than in 2005, and the same species appear prominent in 2006 as did in 2005.

Figure 18



Before drawing a conclusion as to whether the change in concentrations may be related to changes in emissions, one must first examine the meteorology in each year, as it has been demonstrated that wind speed and direction play significant roles in resulting concentrations. In particular, Oak Park measures its highest concentrations when winds are from the north.

A comparison of April 2005 and 2006 winds (plus temperature) appears in Table 8. The mean concentration from the Oak Park TNMHC analyzer is shown, with assessments of the partitioning of wind directions greater than 270 degrees and less than 90 degrees in each year categorized as “northerly”. Also shown are the mean wind speed and temperature. Overall, 2006 had fewer northerly winds, slightly higher wind speeds, and warmer mean temperature. In looking at the concentrations broken into two sets based on northerly vs.

southerly winds, TNMHC mean concentration was lower both for northerly (206 ppbC vs 310 ppbC) and southerly (27 ppbC vs 47 ppbC) categories in 2006.

All else held equal, a warmer temperature could affect evaporation rates of some liquid hydrocarbons thus increasing air concentration, but this small temperature difference may not have a measurable effect. On the other hand, the effects of fewer northerly winds and higher wind speeds overall are likely to have contributed to the lower concentrations in the second year. The fact that concentrations are lower both from the north and the south is reason to suspect emissions have dropped somewhat. However, with only one month of data in each year, it is recommended that more data be examined before drawing conclusions as to significant changes in emissions. Future reports will expand on temporal comparisons as more validated data are available.

Table 8

Results	2005	2006
TNMOC ppbC	125.69	60.3
WSR mph	7.22	8.21
WDR % northerly	28.9%	18.1%
Outside temperature	74.04	77.21
WDR	2005	2006
Southerly (ppbC)	46.98	27.15
Northerly (ppbC)	310.35	205.87
Grand Total	125.69	60.34
Ration N/S	6.61	7.58

APPENDIX B

**June 14, 2006 Advisory Board Meeting
Briefing Book Materials**

and

**June 14, 2006 Advisory Board Meeting
Meeting Notes**

ADVISORY BOARD MEETING
**Corpus Christi Air Monitoring and Surveillance Camera Installation
and Operation Project**

Texas A&M University - Corpus Christi
Room 2010, NRC Building
1:30 pm – 3:30 pm
June 14, 2006

Advisory Board Members Present:

Ms. Gretchen Arnold	Corpus Christi Pollution Prevention Partnership – TAMUCC
Mr. Ron Barnard	City of Corpus Christi
Dr. Glen Kost	Public Health Awareness
Ms. Pat Suter	Coastal Bend Sierra Club

Project Personnel Present:

Dr. David Allen	Principal Investigator, UT Austin
Mr. Vince Torres	UT Austin
Mr. David Sullivan	UT-Austin
Mr. Lee Smith*	Legal Affairs, UT Austin
Mr. David Brymer	TCEQ Headquarters – Austin
Ms. Susan Clewis	TCEQ – Region 14
Mr. David Kennebeck	TCEQ – Region 14
Mr. David Turner	TCEQ – Region 14
Mr. James Martinez	US. Probation Officer- US District Court
Mr. Ken Rozacky	TCEQ Headquarters – Austin
Mr. Roger Ramon	AQSI/Air Quality Solutions, Inc.
Mr. Mitchell Hines	AQSI/Air Quality Solutions, Inc.

I. Call to Order and Welcome

Vince Torres called the meeting to order at 1:35 pm. He introduced three visitors: Lee Smith, Roger Ramon, and Mitchell Hines.

II. Project Overview and Status - Presented by Dave Sullivan (1:40 – 2:40 pm)

Dave Sullivan announced that the Flint Hills canister sampler was down temporarily to change programming to sample only when winds are from the north. Dave gave a presentation on the mid-January case study – H₂S episode demonstrating the usefulness of the tools (cameras and auto GC instruments). Whenever there is a value over 80 ppb – TCEQ is contacted indicating a possible exceedance. This measurement was made just after midnight.

Pat Sutter questioned the time of day that you would usually see the higher values.

Sullivan replied usually at night or early morning. Turner gets a page during early morning usually between 6-9am and then again 5-9pm. Pollutants being higher at night and early morning could be due to combined human activity and nighttime low-level inversions. This was not meant to point fingers and that users shouldn't jump to conclusions. He also commented that summary evidence is not the same as proof.

David Turner supported the evidence presented by Dave Sullivan and Dave Kennebeck supported both of them.

Dr. Kost asked if this is making the companies come forward & discuss this more openly with the public – more so now than before. Hopefully, moving in a direction to resolve these issues. Dr. Kost sees an improvement in relations between agencies.

Methane – the Leopard Street residents were very concerned about the meat packing site near the neighborhood. Dr. Kost is happy to know that methane is a possible emission cause. David Turner noted that methane is not a pollutant but possibly an accumulation of methane can be a safety concern. It is not environmentally regulated at this time. Dr. Kost requested that Dave Sullivan look at data from other sites as well.

David Turner noted that there are no regulations for analyzing landfills.

Dave Sullivan did a case study of the 6/1/06 Valero Fire and will give a full report at the next meeting. In regards to the Valero fire, the camera at Dona Park pinpoints to within a few a seconds when the fire was visible. The alert system worked well - all the tools were in use: cameras , trajectory tools, canisters, auto-GCs, and met gear.

Vince Torres commented that the cameras are set up for real time events. He commended AQSI for assisting in retrieving archived data from the camera.

III. Related Matters

III-A A sample format that the Project might use to present the data to the Long Term Health Work Group was introduced to the Board. Dave Allen asked the Board members what data was needed for the Rolling Annual Summaries.

Gretchen Arnold asked for more basic information given on a printed page. The group's concerns were as follows - How many events – from which direction - when did they occur (what time -what day – length in hours) - whether or not there is a health concern. - what species.

Vince Torres will send an electronic file to the Board to be used for the Long Term Health Group presentations.

III-B Vince Torres provided an overview of the Auto GC system and how the chemical speciation measurements are made. This background was provided to address a question from the previous meeting of the Advisory Board about changing the sampling time and compounds analyzed for the Auto GC Systems at the Oak Park and Solar Estates Sites.

Dr. Allen gave the pros and cons on changing the time and scale of the analytical system.

Ron Barnard did not want to replace analytical system but possibly look into additional system if not the same are there other comparable systems? David Turner suggested perhaps adding a second system.

David Brymer commented that a less expensive limited system could be added later in the project when funds become available. This will be considered at a later date.

III-C SEP approval for the second SEP proposed at the last Board meeting was received today from David Brymer (TCEQ). This project will start in July 2006.

III-E The next presentation of an annual report, before the US District Court, will be in November-2006.

IV. Advisory Board –

IV Advisory Board Replacements
Packets with information on the three new advisory board members, Ms. Joyce Jarmon, Ms. Charlotte M. Knesek, and -William Burgin, Jr, M.D. were distributed to the meeting attendees.

NEXT BOARD MEETING: David Turner suggested early October so that the EPA representative could attend.

Vince asked for any additional discussion from the audience.

David Turner had documentation of an emission event that occurred this morning – but unfortunately the computer disk containing the data could not be read and thus could not be shared with the meeting attendees.

David Turner asked if it was possible to install a camera at the Inner Harbor site. Even a fixed-position camera that could be moved from site to site would be another good investigative tool. Possibly a fixed camera versus a panning and/or scanning camera. This additional equipment will be considered should funding under another SEP become available.

The meeting adjourned at 3:30 pm.

APPENDIX C

**Financial Report of Expenditures
Financial Report of Interest Earned**

Corpus Christi Air Monitoring and Surveillance Camera Installation and Operation Project

**Accounting Report for the Quarter
04/01/06-06/30/06**

A. Total Amount of COCP Funds and Other Funds Received Under This Proposal

Total Grant Amount: \$6,761,718.02
 Total Interest Earned: \$344,745.41
 Total Funds Received: \$7,106,463.43

B. Summary of Expenditures Paid by COCP Funds

	Year 3 Budget	Year 3 Adjustments	Adjusted Budget	Prior Activity	Current Activity 04/01/06-06/30/06	Encumbrances	Remaining Balance 6/30/2006
Salaries-Prof 12	\$240,935.00	(24,806.37)	\$216,128.63	(\$81,997.90)	(\$29,716.80)	(\$28,569.27)	\$75,844.66
Salaries-CEER 15	\$4,800.00	14,806.37	\$19,606.37	(\$6,959.75)	(\$6,483.79)	(\$4,329.07)	\$1,833.76
Fringe 14	\$47,984.00	0.00	\$47,984.00	(\$18,394.05)	(\$6,313.95)	(\$6,774.30)	\$16,501.70
Supplies 47/68	\$10,000.00	50,474.00	\$60,474.00	(\$19,040.00)	(\$3,180.00)	\$0.00	\$38,254.00
Other 50	\$126,044.00	(39,200.00)	\$86,844.00	(\$36,703.56)	(\$6,855.40)	(\$2,785.66)	\$40,499.38
Subcontract 62-64	\$1,827,563.00	138,130.00	\$1,965,693.00	(\$1,651,333.07)	(\$110,264.90)	\$0.00	\$204,095.03
Travel 75	\$2,000.00	300.00	\$2,300.00	(\$1,700.81)	\$180.65	(\$250.05)	\$529.79
Equipment 80	\$45,000.00	(45,000.00)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Indirect Costs 90	\$345,649.00	14,206.00	\$359,855.00	(\$271,957.27)	(\$15,849.08)	\$0.00	\$72,048.65
TOTALS	\$2,649,975.00	108,910.00	\$2,758,885.00	(\$2,088,086.41)	(\$178,483.27)	(\$42,708.35)	\$449,606.97

C. Interest Earned by COCP Funds as of 6/30/06

Prior Interest Earned: \$301,790.40
 Interest Earned This Quarter: \$42,955.01
 Total Interest Earned to Date: \$344,745.41

D. Balance of COCP Funds as of 6/30/06

Total Grant Amount: \$6,761,718.02
 Total Interest Earned: \$344,745.41
 Total Expenditures: (\$2,266,569.68)
 Remaining Balance: \$4,839,893.75 *includes interest

I certify that the numbers are accurate
 and reflect actual expenditures
 for the quarter


 Accounting Certification