

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

**Quarterly Report for the Period**

**April 1, 2010 through June 30, 2010**

**Submitted to**

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

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

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

**Submitted by**

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**August 30, 2010**

## 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 (UT Austin) 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 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

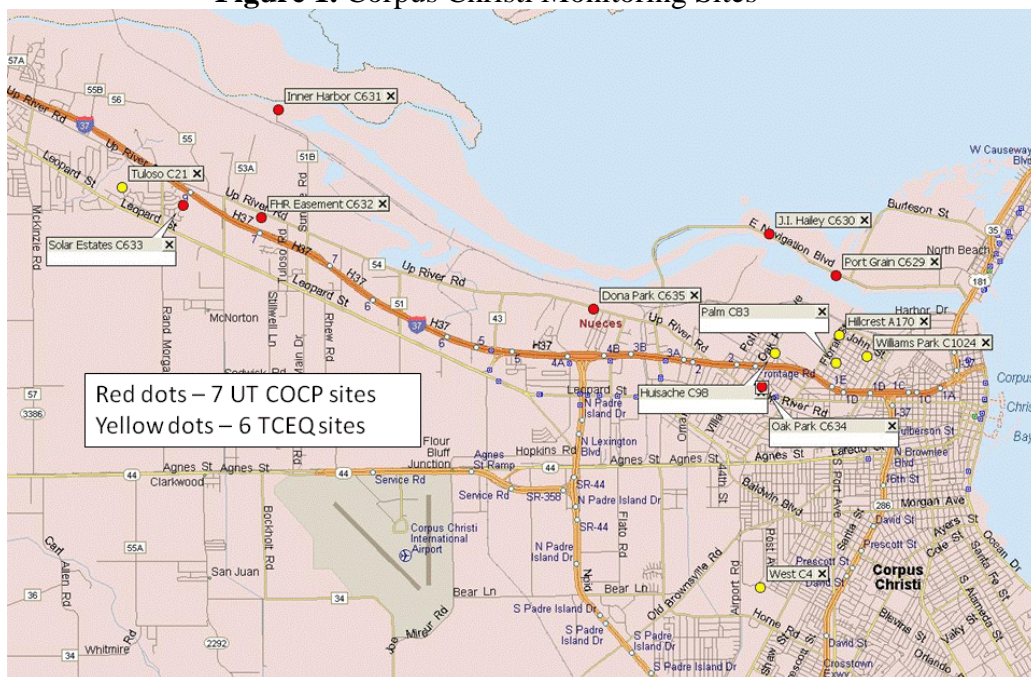
The focus of work during the quarter ending June 30, 2010 has been directed to the following activities.

### A. Operations and Maintenance Phase of the Project

A detailed description of the data analyses for this quarter appears in Appendix A, pages 6 through 20, and a summary of these analyses appear in this section.

The Project consists of a network of seven (7) air monitoring stations with air monitoring instruments and surveillance camera equipment. A map showing locations of COCP Project monitoring sites along with TCEQ sites appears in Figure 1, below. Table 1, page 3, identifies the location and instrumentation found at each of the COCP Project sites. TCEQ sites and also some sites farther from the COCP area operated by Texas A&M at Kingsville (TAMUK) provide some additional data used in analyses.

**Figure 1. Corpus Christi Monitoring Sites**



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

TCEQ CAMS Nos.	Description of Site Location	Monitoring Equipment				
		Auto GC	TNMHC(T) & Canister(C)	H <sub>2</sub> S & SO <sub>2</sub>	Met Station	Camera
634	Oak Park Recreation Center	Yes	T		Yes	
629	Grain Elevator @ Port of Corpus Christi		T&C	Yes	Yes	
630	J. I. Hailey Site @ Port of Corpus Christi		T&C	Yes	Yes	
635	TCEQ Monitoring Site C199 @ Dona Park		T&C	Yes	Yes	Yes
631	Port of Corpus Christi on West End of CC Inner Harbor		T&C	Yes	Yes	
632	Off Up River Road on Flint Hills Resources Easement		T&C	Yes	Yes	
633	Solar Estates Park at end of Sunshine Road	Yes	T	Yes	Yes	Yes

**Legend**

- Auto GC            automated gas chromatograph
- TNMHC           total non-methane hydrocarbon analyzer (all except 634 & 633 also have canister hydrocarbon samplers)
- H<sub>2</sub>S                hydrogen sulfide analyzer
- SO<sub>2</sub>                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

A discussion of data findings for the quarter appears in Appendix A, pages 6 though 20. Specifically, the appendix contains the following elements:

- **Auto-GC Data Summary** - In examining the second quarter of 2010 hourly auto-GC data from Oak Park, Solar Estates, and TCEQ's Palm sites, no measurements were found to have exceeded a short-term air monitoring comparison value (AMCV). Also, the quarterly averages of all species were below their respective long-term AMCVs. A summary appears in Appendix A, pages 11 through 13.
- **Benzene Trends at Auto-GC Sites** – As has been discussed in recent reports, benzene concentrations have declined since the start of this project, and now may have leveled off. Results are in Appendix A, page 14.
- **Case Studies of Pollution Events/Canister Sampling Results** – Two canister samples were triggered this quarter. This is not unusual, as there were also only two canisters

taken in each of the second quarters of 2008 and 2009. Results are in Appendix A, pages 14 and 19.

In addition, the results below need no further treatment in this report.

- **SO<sub>2</sub> and H<sub>2</sub>S** – No exceedances of the State’s standards for sulfur species were measured this quarter.

#### B. Scheduled Meetings of the Volunteer Advisory Board

The Corpus Christi Project Advisory Board met on April 29, 2010. The meeting notes from that Advisory Board Meeting are found in Appendix B, pages 21 through 24.

#### C. Project Management and Planning

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

##### 1. **Air Monitoring Operations**

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

##### 2. **Communication and Reporting**

The status of the Project has been communicated through the website, which is operational with portions under continual updating, quarterly and annual reports, meetings of the Project’s Advisory Board on April 29, 2010, and responding to an information request from the Agency for Toxic Substances and Disease Registry (a division of the Centers for Disease Control).

##### 3. **Budget Monitoring**

Budget monitoring during the period has focused on projects costs for Phase II – Sites Operation and Maintenance costs. Financial reports for the quarter are included in Appendix C, pages 25 and 26.

##### 4. **Other Contributions**

There were no other contributions made to the project during this quarter.

### **III. Financial Report**

As required, the following financial summary information is provided. Details supporting this financial summary are included in Appendix C, pages 25 and 26.

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

The COCP funds received through June 30, 2010 totals \$7,528,856.78. This total includes interest earned through June 30, 2010.

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

Expenditures of COCP funds during this quarter totaled \$203,338.08. The detailed breakdown of the actual expenditures is included in Appendix C, page 26. The activities for which these expenditures were used are detailed in Section II, on page 2 of this report.

C. Total Interest Earned on COCP Funds During the Quarter

The interest earned during this quarter totaled \$12,080.29. A report providing detailed calculations of the interest earned on the COCP funds during each month of the quarter is included in Appendix C, pages 25 and 26.

D. Balance as of June 30, 2010, in the COCP Account

The balance in the COCP account, including interest earned totals \$1,791,658.28.

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

The projected expenditures for the funds remaining totals \$1,791,658.28.

**Quarterly Report Distribution List:**

U.S. District Court

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# **APPENDIX A**

## **Data Analysis for Corpus Christi Quarterly Report**

*April 1, 2010 through June 30, 2010*

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## Data Analysis for Corpus Christi Quarterly 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 April 1 through June 30, 2010. The monitoring network is shown in Figure 1, page 2, and is described in Table 2 below. This report contains the following elements:

- A summary of Oak Park, Solar Estates, and Palm (TCEQ) auto-GC data for the 1<sup>st</sup> and 2<sup>nd</sup> quarters of 2010;
- A summary of Oak Park, Solar Estates benzene trends for the 2<sup>nd</sup> quarters of each year 2005 – 2010;
- A description of two pollution events that resulted in canister samples.

In the report for the first quarter of 2010, there was a discussion of the apparent linear relationship between measured concentrations of methane and total nonmethane hydrocarbons (TNMHC) in many cases. It was suggested that this was an indicator of natural gas leaks as the source. In subsequent discussions with stakeholders, a promise was made to continue this analysis. More work has been done with the data this quarter but results are not ready for presentation.

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

TCEQ CAMS#	Description of Site Location	Monitoring Equipment				
		Auto GC	TNMHC (T) / Canister (C)	H <sub>2</sub> S & SO <sub>2</sub>	Met Station	Camera
634	Oak Park Recreation Center ( <b>OAK</b> )	Yes	T		Yes	
629	Grain Elevator @ Port of Corpus Christi ( <b>CCG</b> )		T&C	Yes	Yes	
630	J. I. Hailey Site @ Port of Corpus Christi ( <b>JIH</b> )		T&C	Yes	Yes	
635	TCEQ Monitoring Site C199 @ Dona Park ( <b>DPK</b> )		T&C	Yes	Yes	Yes
631	Port of Corpus Christi on West End of CC Inner Harbor ( <b>WEH</b> )		T&C	Yes	Yes	
632	Off Up River Road on Flint Hills Resources Easement ( <b>FHR</b> )		T&C	Yes	Yes	
633	Solar Estates Park at end of Sunshine Road ( <b>SOE</b> )	Yes	T	Yes	Yes	Yes

### **Legend**

Auto GC	automated gas chromatograph
TNMHC	total non-methane hydrocarbon analyzer (all except 633 & 634 also have canister hydrocarbon samplers)
H <sub>2</sub> S	hydrogen sulfide analyzer
SO <sub>2</sub>	sulfur dioxide analyzer
Met Station	meteorology station consisting of measurement instruments for wind speed, wind direction, ambient air temperature and relative humidity
Camera	surveillance camera

### **Glossary of terms**

- **Pollutant concentrations** – Concentrations of most gaseous pollutants are expressed in units denoting their “mixing ratio” in air; i.e., the ratio of the number molecules of the pollutant to the total number of molecules per unit volume of air. Because concentrations for all gases other than molecular oxygen, nitrogen, and argon are very low, the mixing ratios are usually scaled to express a concentration in terms of “parts per million” (ppm) or “parts per billion” (ppb). Sometimes the units are explicitly expressed as ppm-volume (ppmV) or ppb-volume (ppbV) where 1 ppmV indicates that one molecule in one million molecules of ambient air is the compound of interest and 1 ppbV indicates that one molecule in one billion molecules of ambient air is the compound of interest. In general, air pollution standards and health effects screening levels are expressed in ppmV or ppbV units. Because hydrocarbon species may have a chemical reactivity related to the number of carbon atoms in the molecule, mixing ratios for these species are often expressed in ppb-carbon (ppbV times the number of carbon atoms in the molecule), to reflect the ratio of carbon atoms in that species to the total number of molecules in the volume. This is relevant to our measurement of auto-GC species and TNMHC, which are reported in ppbC units. For the purpose of relating hydrocarbons to health effects, this report notes hydrocarbon concentrations in converted ppbV units. However, because TNMHC is a composite of all species with different numbers of carbons, it cannot be converted to ppbV. Pollutant concentration measurements are time-stamped based on the start time of the sample, in Central Standard Time (CST), with sample duration noted.
- **Auto-GC** - The automated gas chromatograph collects a sample for 40 minutes, and then automatically analyzes it for some 47 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 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 UT/CEER sites.
- **Canister** – Electro-polished stainless steel canisters are filled with air samples when an independent sensor detects that *elevated* (see below) levels of hydrocarbons (TNMHC) are present. Samples are taken for 20 minutes to try to capture the chemical make-up of the air. In most cases, the first time on any day that the monitored TNMHC concentration exceeds 2000 ppbC at a site for a continuous period of 15 minutes or more, the system will trigger and a sample will be collected. Samples are sent to UT Austin and are analyzed in a lab to resolve some 60 hydrocarbon and 12 chlorinated species. Canister samplers have operated at all seven UT/CEER sites, but currently only at five (CAMS 629, 630, 631, 632, and 635).
- **Air Monitoring Comparison Values (AMCV)** – TCEQ is now using the AMCV terminology in assessing ambient data. Two valuable online documents (“fact sheet” and “AMCV document”) that explain AMCVs are at <http://www.tceq.state.tx.us/implementation/tox/regmemo/AirMain.html#compare> (accessed May, 2010). The following text is an excerpt from the TCEQ “fact sheet”:
 

Effects Screening Levels are chemical-specific air concentrations set to protect human health and welfare. Short-term ESLs are based on data concerning acute health effects, the potential for odors to be a nuisance, and effects on vegetation, while long-term ESLs are based on data concerning chronic health and vegetation effects. Health-based ESLs are set below levels where health effects would occur whereas welfare-based ESLs (odor and vegetation) are set based on effect threshold concentrations. The ESLs are screening levels, not ambient air standards. Originally, the same long- and short-term ESLs were used for both air permitting and air monitoring.

There are significant differences between performing health effect reviews of air permits using ESLs, and the various forms of ambient air monitoring data. The Toxicology Division is using the term “air monitoring comparison values” (AMCVs) in evaluations of air monitoring data in order to make more meaningful comparisons. “AMCVs” is a collective term and refers to all odor-, vegetative-, and health-based values used in reviewing air monitoring data. Similar to ESLs, AMCVs are chemical-specific air concentrations set to protect human health and welfare. Different terminology is appropriate because air permitting and air monitoring programs are different.
- **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<sub>2</sub>S or SO<sub>2</sub>, any measured concentration greater than the level of the state residential standards, which are 80 ppb for H<sub>2</sub>S and 400 ppb for SO<sub>2</sub>, is considered “elevated.” Note that the concentrations need not persist long enough to constitute an exceedance of the standard to be so regarded. 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).
- 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<sub>2</sub>S and SO<sub>2</sub>, 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. 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 – Solar Estates C633, Oak Park C634, and TCEQ’s new Palm C83 (on-line June 1, 2010)– 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 between the TCEQ’s Hillcrest and Williams Park sites in Figure 1, on page 2, is generally downwind under northerly and westerly winds. In examining aggregated data one observes similar patterns of hydrocarbons at the all three sites, with concentrations averaging higher at Oak Park than at Solar Estates. Palm has only one month of data, so it is hard to draw conclusions from comparisons to the other two sites’ data.

Table 3, page 12, summarizes data from the second quarter of 2010 and Table 4, page 13, summarizes data from the first quarter of 2010. These tables are available to TCEQ staff at [http://rhone.tceq.state.tx.us/cgi-bin/agc\\_summary.pl](http://rhone.tceq.state.tx.us/cgi-bin/agc_summary.pl) (accessed July 2010). The data summarized in Table 3 have not completed the standard data validation process, and the data in Table 4 are the most recent quarterly summary of validated data. Generally, very few changes occur during the standard validation process.

Tables 3 and 4 show the average concentrations along with the maximum one-hour and 24-hour average concentrations for 27 hydrocarbon species of interest for the quarter. All concentration values in the tables are in ppbV units. No concentrations or averages of concentrations were greater than TCEQ’s air monitoring comparison values (AMCV) during the first or second quarters of 2010. In Tables 3 and 4, the “Num Samples” column includes all ambient samples. The “Mean” is calculated as an average of daily averages and takes into account the number of samples flagged *ambient* for each day.

The rows for **benzene** are bold-faced in Tables 3 and 4 owing to the concern that the concentrations for this species tend to be closer to the air monitoring comparison value (AMCV) than are other species. The benzene short-term AMCV is 180 ppbV and the benzene long-term AMCV is 1.4 ppbV. This quarter the highest quarterly benzene average is only 10 percent (0.14 ppbV) of the AMCV.

Table 3. Auto-GC statistics 2<sup>nd</sup> quarter 2010

Units ppbV	Oak 2Q10			Solar 2Q10			Palm 2Q10 (June only)		
Species	Peak 1hr	Peak 24hr	Mean	Peak 1hr	Peak 24hr	Mean	Peak 1hr	Peak 24hr	Mean
Ethane	103.66	13.53	3.14	44.36	19.47	4.31	54.31	11.80	2.99
Ethylene	10.07	1.28	0.29	199.89	11.27	0.37	7.24	0.96	0.29
Propane	436.6	29.49	1.99	40.91	14.10	2.59	117.36	13.83	1.56
Propylene	9.58	1.34	0.16	1.63	0.39	0.11	2.83	0.58	0.16
Isobutane	15.73	3.61	0.62	16.56	5.68	0.95	43.05	5.96	0.76
n-Butane	24.76	4.97	0.88	16.24	6.85	1.16	27.86	5.11	0.75
t-2-Butene	0.48	0.11	0.04	0.99	0.13	0.03	1.88	0.22	0.06
1-Butene	0.43	0.09	0.03	3.79	0.40	0.02	1.98	0.23	0.06
c-2-Butene	0.40	0.09	0.02	0.55	0.08	0.01	1.43	0.16	0.04
Isopentane	14.31	3.19	0.74	9.78	4.57	0.7	12.14	3.21	0.75
n-Pentane	12.47	2.35	0.41	6.16	2.96	0.44	6.61	2.04	0.37
1,3-Butadiene	0.51	0.07	0.02	5.52	0.56	0.02	0.20	0.04	0.02
t-2-Pentene	0.54	0.14	0.03	0.55	0.11	0.01	0.43	0.11	0.05
1-Pentene	0.24	0.07	0.01	0.21	0.04	0.01	0.26	0.06	0.03
c-2-Pentene	0.21	0.05	0.01	0.25	0.05	0	0.24	0.06	0.03
n-Hexane	4.63	0.84	0.14	2.48	1.13	0.16	2.62	0.73	0.15
Benzene	<b>4.43</b>	<b>1.35</b>	<b>0.14</b>	<b>4.02</b>	<b>0.69</b>	<b>0.14</b>	<b>3.00</b>	<b>0.56</b>	<b>0.10</b>
Cyclohexane	2.98	0.74	0.07	1.83	0.85	0.10	1.75	0.28	0.04
Toluene	15.88	2.86	0.27	2.56	0.84	0.16	2.90	0.52	0.21
Ethyl Benzene	0.42	0.05	0.01	0.5	0.13	0.02	0.29	0.07	0.02
m/p-Xylene	1.46	0.22	0.05	4.56	0.77	0.08	0.97	0.22	0.08
o-Xylene	0.47	0.08	0.01	0.55	0.16	0.02	0.33	0.08	0.03
Isopropyl Benzene-Cumene	0.55	0.17	0.01	0.80	0.11	0.01	0.30	0.02	0
1,3,5-TMB	0.34	0.05	0	0.74	0.16	0.01	0.25	0.04	0.02
1,2,4-TMB	0.67	0.11	0.02	0.86	0.21	0.02	0.46	0.10	0.05
n-Decane	0.24	0.05	0.01	2.18	0.40	0.03	0.40	0.07	0.02
1,2,3-TMB	0.26	0.04	0.01	0.52	0.15	0.02	0.27	0.06	0.03

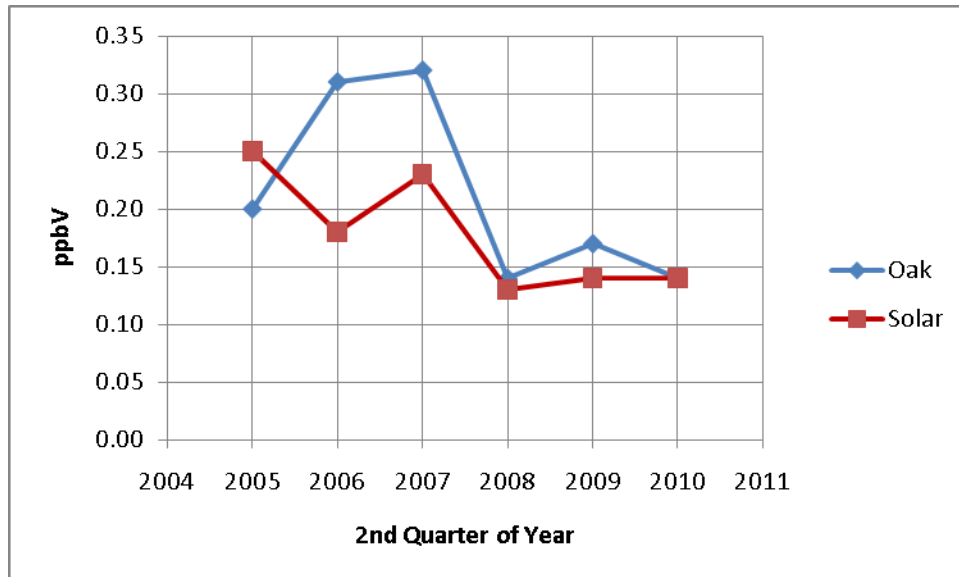
**Table 4. Validated auto-GC statistics 1<sup>st</sup> quarter 2010**

Units ppbV	Oak 1Q10			Solar 1Q10		
Species	Peak 1hr	Peak 24hr	Mean	Peak 1hr	Peak 24hr	Mean
Ethane	150.2	25.21	9.38	143.36	22.7	9.11
Ethylene	52.72	4.93	0.90	15.02	2.27	0.52
Propane	159.17	21.57	6.16	89.1	16.25	5.62
Propylene	38.44	3.39	0.43	6.97	0.74	0.24
Isobutane	70.11	6.07	2.11	23.48	5.60	1.75
n-Butane	57.07	8.29	3.55	32.5	7.87	2.77
t-2-Butene	1.01	0.34	0.1	2.43	0.29	0.07
1-Butene	3.52	0.40	0.08	2.23	0.29	0.06
c-2-Butene	0.86	0.27	0.06	1.91	0.23	0.05
Isopentane	34.62	7.25	2.14	18.82	3.88	1.34
n-Pentane	16.9	6.16	1.41	14.54	2.67	0.86
1,3-Butadiene	0.74	0.12	0.04	1.38	0.19	0.03
t-2-Pentene	2.27	0.35	0.07	0.99	0.11	0.03
1-Pentene	0.70	0.16	0.03	0.52	0.07	0.02
c-2-Pentene	0.91	0.15	0.02	0.48	0.05	0.01
n-Hexane	8.86	2.11	0.5	4.71	0.84	0.3
Benzene	7.02	1.60	0.48	5.70	0.91	0.29
Cyclohexane	3.60	0.70	0.22	3.97	0.51	0.18
Toluene	62.62	3.91	0.7	4.55	0.69	0.29
Ethyl Benzene	0.88	0.10	0.03	1.44	0.15	0.03
m/p-Xylene	2.55	0.42	0.13	7.63	1.34	0.25
o-Xylene	1.00	0.12	0.04	1.53	0.17	0.05
Isopropyl Benzene-Cumene	1.16	0.29	0.03	1.65	0.15	0.02
1,3,5-TMB	0.48	0.05	0.01	1.30	0.10	0.02
1,2,4-TMB	1.46	0.12	0.03	1.53	0.12	0.04
n-Decane	0.62	0.09	0.02	3.69	0.25	0.05
1,2,3-TMB	0.39	0.04	0.01	0.66	0.05	0.01

## 2. Benzene Trends and Comparisons

Figure 2, below shows the trend for the second quarter mean concentrations for benzene in ppbV units at the Solar Estates and Oak Park auto-GCs for 2005 – 2010. Note that this is the first quarter for which the project has six years of data. As has been stated in past reports, the second and third quarters of the year have the lowest average benzene concentrations at these sites because of a higher frequency of southerly winds in Corpus Christi during spring-summer months. As was stated earlier in this report, the TCEQ's long-term AMCV for benzene is 1.4 ppbV. Figure 2, shows that concentrations have declined since the first three years of UT monitoring, but concentrations have remained relatively flat over the most recent three years. A similar pattern was reported for the 1<sup>st</sup> quarter trends in the previous report.

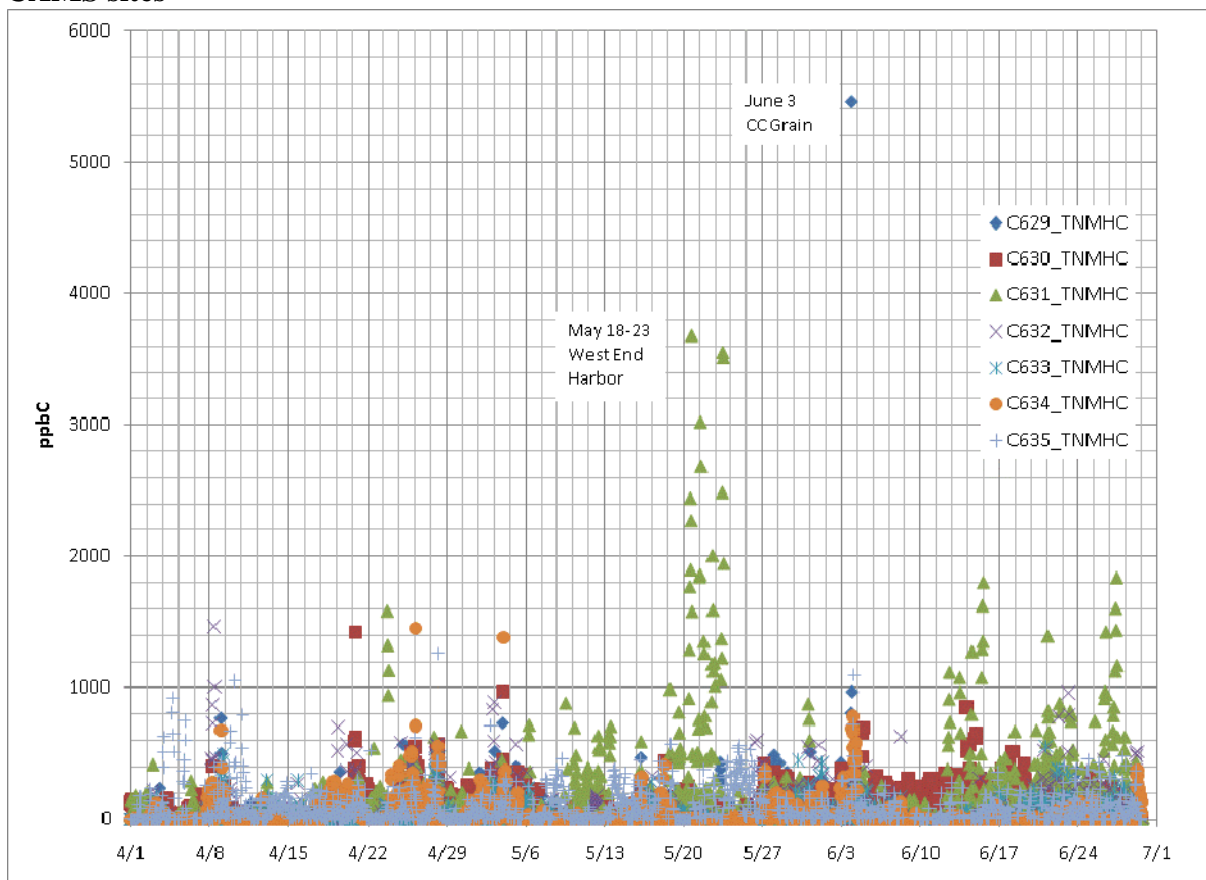
**Figure 2. Trends in mean benzene concentration for the 2<sup>nd</sup> quarter of each year, 2005 – 2010**



## 3. Case Studies of Two Events

The time series graph for hourly average TNMHC concentrations at the seven UT monitoring sites appears in Figure 3, on page 15. Two periods of elevated TNMHC are noted. One is a multi-day period in mid-May with hourly average TNMHC concentrations at WEH CAMS 631 ranging up to 3,600 ppbC. The other is a single one hour high value around 5,400 ppbC at CCG CAMS 629 around 11 p.m. CST on June 3. Further descriptions and explanations appear below.

**Figure 3. Hourly TNMHC concentrations during the 2<sup>nd</sup> quarter 2010 at seven UT CAMS sites**



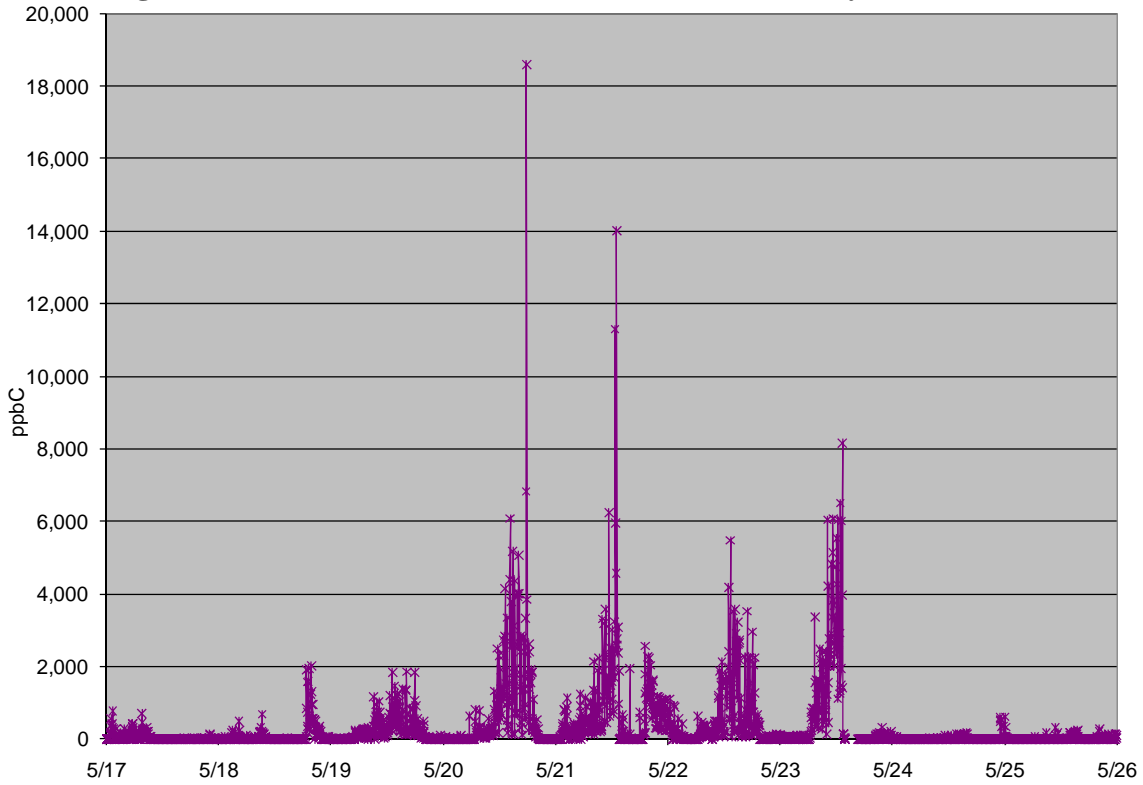
### May 20 – 23 at West End Harbor C631

At the West End Harbor (WEH) CAMS 631 site from May 20 to May 23, some 120 TNMHC hourly measurements above 2000 ppbC were made. The mean wind direction for all values above 2000 ppbC was 140 degrees, and the mean wind speed during these hours was 16 mph, compared to 12 mph during the entire 5 day period. The southeast direction corresponds to a common sector associated with TNMHC readings high enough to trigger canisters at this site, however, 140 degrees is east of the peak 165 degree direction typically associated with triggering canisters. Channeling of winds occurs at this site owing to the presence of large piles of earth used for construction. This leads to additional uncertainty as to the actual upwind direction. The time series for five-minute TNMHC concentrations appears in Figure 4, on page 16. An examination of other pollutants measured at the site shows none were correlated with TNMHC.

A canister was triggered toward the end of the period at 11:17 a.m. CST on May 23. Winds were around 143 degrees, 20 mph. A surface back-trajectory begun at 11:20 a.m. CST is shown in Figure 5, on page 16. The canister composition appears in Figure 6, page 17. The figure shows that most of the mass for hydrocarbons in the can comes from **pentane** and **isopentane**, two five-carbon species. A few other five and six-carbon species also contribute.

The TCEQ Upset Report database notes three reported emission events at the Valero Refinery West Plant that involved pentane species on May 19, May 29, and June 1. Valero West is east of general upwind direction from the site during the periods of elevated TNMHC being discussed. The public oil docks 8, 9, and 10 would be more directly upwind, as would be part of the FHR West Refinery.

**Figure 4. THNMC five-minute data at WEH C631 May 17 – 26, 2010**

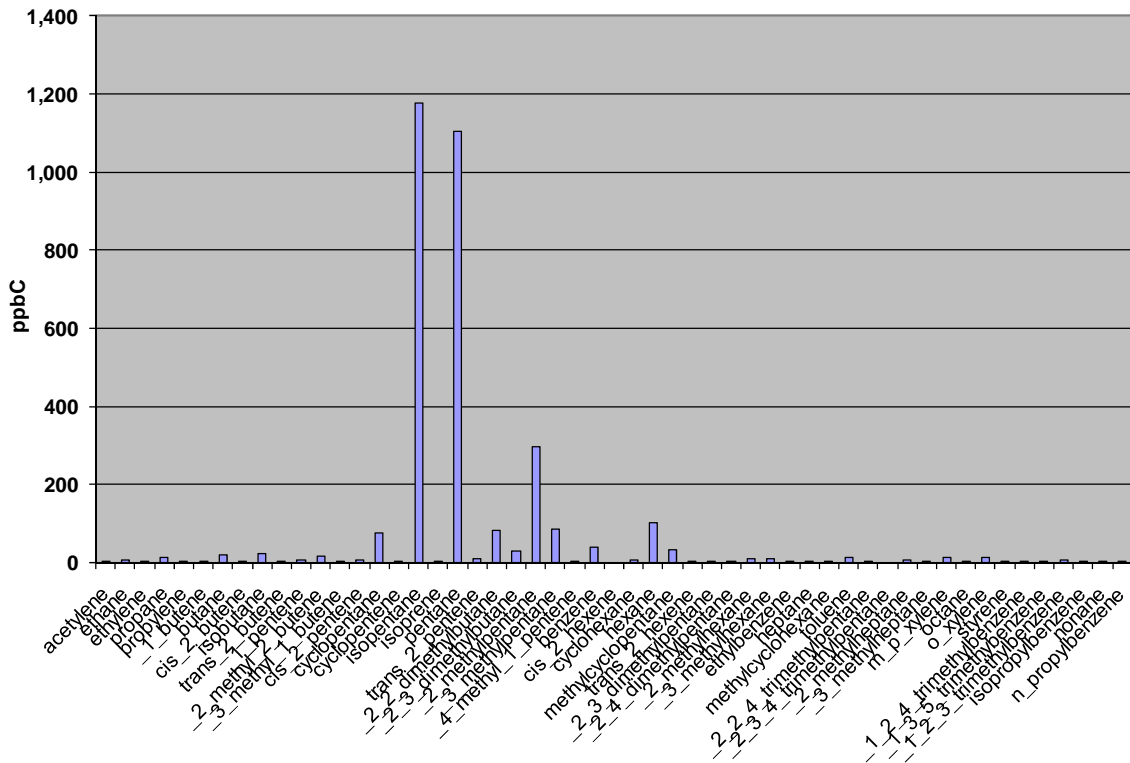


**Figure 5. Surface 30-minute back-trajectory from CCG C631 started 11:55 p.m. CST June 3, 2010**





**Figure 6. Canister composition approx. mass (ppbC), WEH 5/22/10, 11:21:00 pm**



**June 4 at Corpus Christi Grain C629**

At the Port Grain (CCG) CAMS 629 site on June 3, at 10:10 p.m. CST, TNMHC concentrations swiftly rose from background levels close to 0 ppbC to 2,000 ppbC, then dropped to around 500 – 600 ppbC for several minutes before rising quickly at 11:20 p.m. to almost 14,000 ppbC. The graph in Figure 7, on page 18, shows the 5-minute time series of data for TNMHC, methane, and H<sub>2</sub>S at the site. The highest TNMHC concentrations were associated with southerly winds. As has been noted in past reports, the quality of wind direction data at this site are compromised by the nearby large building housing the actual granary. Nevertheless, the back-trajectory generated using winds from nearby sites tracks back over the Flint Hills East Refinery as shown in Figure 8, on page 19. Concentrations of H<sub>2</sub>S have a slight rise around the same time period that may or may not be related to this event.

There was a reported upset at the FHR East Refinery Corpus Christi Refinery earlier in the day on June 3 between 12:13 p.m. and 8:13 p.m. CDT (11:13 a.m. and 7:13 p.m. CST). The cause reported on the TCEQ’s Emission Event Reporting Database<sup>1</sup> was as follows:

The cause of the excess opacity was the unplanned start up of the Fluid Catalytic Cracking Unit (FCCU II) after the FCCU II had shutdown due to the loss of the Wet Gas Compressor which was associated with inclement weather conditions that were in the area. The opacity was generated from the FCCU II scrubber stack due to excess oxygen mixture during the initial torch oil burn. Unauthorized air

<sup>1</sup> See <http://www11.tceq.state.tx.us/oce/eer/index.cfm?fuseaction=main.getDetails&target=140585> accessed July 2010

contaminants generated during the start up of the FCCU II did not exceed reportable quantities, therefore, Flint Hills Resources; LP is reporting this as an opacity only event.

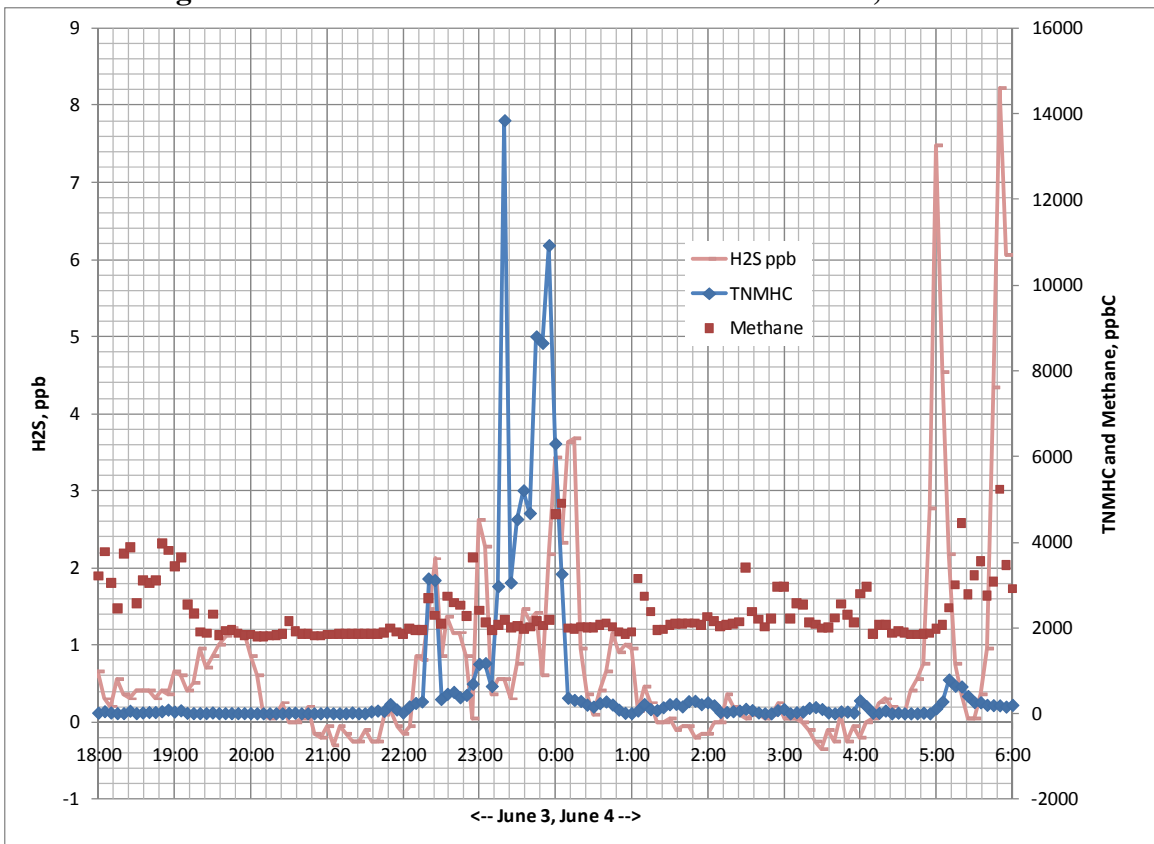
The reported action taken was as follows:

The FCCU II was placed into service per the Startup, Shutdown and Malfunction Plan (SSMP). Efforts were made to minimize the duration and magnitude of emissions to the fullest extent possible.

The data suggest that some excess emissions may have continued for several hours beyond the stated end of the event.

A canister sample was triggered at 23:57 CST, capturing the air associated with the second of the two large peaks in Figure 7, below. Concentrations dropped during the 20-minute canister sampling period, but enough of the plume was sampled to assess its composition. The canister sampling results are shown in Figure 9, on page 19. As can be seen in this figure, the large majority of hydrocarbon mass is accounted for by one species: **propane**.

**Figure 7. CCG C631 five-minute data June3 – June 4, 2010**





## **Conclusions from the Second Quarter 2010 Data**

In this quarter's report, several findings have been made:

- Second quarter benzene concentrations at the auto-GCs show an overall significant downward trend since 2005, with a flattening out over the past three years. All auto-GC species of interest show a decline from the first two years of monitoring.
- Periodic air pollution events continue to be measured on a routine basis, but values of hydrocarbons above the air monitoring comparison values levels are rarely observed. No measurements exceeded AMCVs this quarter in the auto-GC data or canister data.
- The TCEQ is now operating a new auto-GC at the Palm C624 site in the Hillcrest neighborhood. One month's worth of data have been collected and no levels above the AMCVs have been recorded.

Further analyses will be provided upon request.

## **APPENDIX B**

**April 29, 2010  
Advisory Board Meeting Notes**

# ADVISORY BOARD MEETING

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

Texas A&M University - Corpus Christi

Room 1003, NRC Building

1:30 pm – 4:00 pm

April 29, 2010

### Advisory Board Members Present:

Ms. Gretchen Arnold  
Ms. Joyce Jarmon  
Dr. Glen Kost  
Ms. Pat Suter

Corpus Christi Pollution Prevention Partnership TAMUCC  
Corpus Christi Community Council  
Public Health Awareness  
Coastal Bend Sierra Club

### Advisory Board Guest Present:

Arnold Ott  
Glenn Monette  
John Wilhelmi  
Danielle Langmann  
George Pettigrew  
Lillian Riojas  
Laurie Wood  
Mike Wood  
Suzie Canzales

Railroad Commission  
Railroad Commission  
Eastern Research Group  
Agency for Toxic Substances & Disease Registry  
Agency for Toxic Substances & Disease Registry  
Valero  
Community Member  
Community Member  
Community Member

### Project Personnel Present:

Mr. James Martinez  
Dr. David Allen  
Mr. Vince Torres  
Dr. David Sullivan  
Mr. David Kennebeck  
Ms. Susan Clewis  
Dr. Elena McDonald-Buller  
Mr. Edward Michel  
Mr. Yosuke Kimura  
Ms. Terri Mulvey  
Ms. Maria Stanzione

Probation Office - US District Court  
The University of Texas at Austin  
The University of Texas at Austin  
The University of Texas at Austin  
TCEQ – Region 14  
TCEQ – Region 14  
The University of Texas at Austin  
The University of Texas at Austin  
The University of Texas at Austin  
The University of Texas at Austin  
The University of Texas at Austin

## I. Call to Order and Welcome

A. Mr. Vince Torres called the meeting to order at 1:35 pm. Introductions of advisory board members and invited guests.

### B. SEP Projects

Mr. Torres provided the following update through a written summary provided at the meeting. Any questions about the SEP update should be directed to Mr. Torres.

- 1) Equistar Petro Chemicals/Millennium - \$400,000 – Funding for the Equistar SEP award is on indefinite hold. UT Austin will advise the Advisory Board once the final status of the Equistar SEP funds has been determined.
- 2) Sherwin Alumina - \$10,244 – Charges for analyzing 18 canister performed during the period between December 2008 and August 2009 were transferred from the Corpus Christi Air Monitoring Project to the Sherwin Alumina SEP account during the 4<sup>th</sup> quarter of 2009.
- 3) TM Corpus Christi Services, Ltd. - \$67,900 – A revised proposal was submitted to be used toward the purchase of an infrared camera. The amount of this proposal was \$306,008. Additional SEP funds in the amount of \$234,814 (allowing for \$3,294 interest earned to date) would need to be

identified in order to fully fund this request. UT Austin received official notification that the revised use of the funds had been approved. However, without sufficient funding to conduct the project, the project is on hold until the additional funds needed are identified.

## **II. Project Overview and Status**

### **A. Data Collection and Analyses**

Dr. Dave Sullivan reported there was a slight uptick in benzene concentrations during 1<sup>st</sup> quarter of 2009. However during the 1<sup>st</sup> and 4<sup>th</sup> quarter the benzene concentrations are usually the highest. . At the Solar Estates and Oak Park sites benzene concentrations have downward trends for the multi-year period of the monitoring, now flattening out.

Dr. Sullivan mentioned that he included the FACT SHEET Changes to Health-Based Values used to Review Air Permits and Air Monitoring Data at the end of his handout in the packet.

## **III. Neighborhood Air Toxics Modeling Project**

### **A. Update on Corpus Christi Neighborhood-Scale Air Toxics Modeling Project**

Dr. McDonald-Buller reviewed the 2010 activities to date. The project is a collaborative effort with ENVIRON International Corporation in Novato, California, and Texas A&M University in College Station, Texas. Activities have included analyzing temporal trends in observed 1,3-butadiene concentrations using data from the UT Corpus Christi Air Quality Project and TCEQ Community Air Toxics Monitoring Network sites; dispersion modeling of benzene and 1,3-butadiene from industrial point sources with AERMOD and CALPUFF; developing emission inventories for on-road and non-road mobile sources with ENVIRON; photochemical modeling of benzene and 1,3-butadiene with CAMx with all anthropogenic emissions with ENVIRON; and meteorological modeling with WRF at 1-km spatial resolution for two time-periods: September 2005-February 2006 and September 2008-February 2009 with TAMU.

Dr. McDonald-Buller went on to explain factors can affect model performance, such as model configuration, land surface characteristics, and emission source release characteristics. Ms. Pat Suter inquired why there were differences between Fall/Winter and Spring/Summer. Dr. McDonald-Buller explained that predicted concentrations can be affected by different prevailing wind directions. She continued that impacts on performance can vary by time of day, wind speed, and wind direction

## **IV. Government Agency Interactions**

### **A. Agency for Toxic Substances and Disease Registry (ATSDR)**

Ms. Danielle Langemann provided an informational presentation on a public health assessment the ATSDR is performing in Corpus Christi. She explained that ATSDR is a Federal public health advisory agency. They address public health issues related to toxic chemicals in the environment and people affected by the toxic chemicals. They advised that they are responding to community concerns by preparing a public health assessment (PHA) and conducting an exposure investigation (EI). She further explained that a PHA reviews environmental data, evaluates effects of exposures and presents conclusions and recommendations. In regards to community concerns about the refinery row PHA, ATSDR will identify community environmental health and other public health concerns. They will also develop a community engagement plan.

Ms. Langemann explained that an ATSDR EI can focus on biological or environmental testing or both, to develop better characterization of human exposures and to evaluate exposure more thoroughly. She mentioned eligible participants of the Refinery Row include people who have the highest potential exposures to VOCs; participants from a previous pilot project; smokers and children. Flyers were distributed in the Hillcrest and Dona Park neighborhoods from February 18-19 to recruit participants. Ms. Langemann continued that they collected blood and urine samples, air monitoring badges and tap water samples during the week of March 22-25. ATSDR expects to have an internal agency review in late summer; external peer review by outside experts in late fall and comments by interested members

of the public in late winter 2010 for the PHA report. The participants should receive individual test results in about 6-8 weeks and a report released to the public in about 3 months for the EI report. Ms. Langemann mentioned that benzene is a bio marker for smokers only. Ms. Laurie Wood inquired if ATSDR tested bio markers for any non-smokers? Ms. Langemann replied that they tested bio markers across the board not only for smokers. Dr. David Allen inquired if there are EI performed around other industries? Ms. Langemann replied not as much. They have tested for VOCs in the past. ATSDR tries not to link to a specific source or company.

**B. Texas Railroad Commission**

Mr. Arnold Ott provided an overview presentation on the Texas Railroad Commission. He explained that the Railroad Commission of Texas (RRC, Commission) is the state agency with primary regulatory jurisdiction over the oil and natural gas industry, pipeline transporters, natural gas and hazardous liquid pipeline industry, natural gas utilities, the LP-gas industry, and coal and uranium surface mining operations. It is also responsible for research and education to promote the use of LP-gas as an alternative fuel in Texas. The Commission exercises its statutory responsibilities under provisions of the Texas Constitution, the Texas Natural Resources Code, the Texas Water Code, the Texas Health and Safety Code, the Texas Utilities Code, the Coal and Uranium Surface Mining and Reclamation Acts, and the Pipeline Safety Acts.

Dr. Glen Kost inquired about what role the Railroad Commission has with the White Point site? Mr. Ott replied that they have jurisdiction over the number of wells and abandoned wells. The Railroad Commission requires operators to plug abandoned wells, or any wells that are not active any more.

**V. Report on Annual Meeting before the Honorable Judge Jack on January 8, 2010**

Mr. Torres updated the Board on the presentation of the 2008 Annual Project report to the Honorable Judge Janice Graham Jack, U.S. District Court. It was reported that the Honorable Judge Jack was pleased with the progress of the project.

**VI. Site Operations Contractor**

Mr. Vincent Torres informed the Advisory Board that UT had been notified by multiple employees of AQSI, a site operations contractor that they had not been paid for work they had performed in relation to the Corpus Christi Air Monitoring and Surveillance Camera Project. Follow-up conversations with the President of AQSI confirmed that this information was correct. Several opportunities were given to AQSI to correct the situation; however, no acceptable resolution was reached. Mr. Torres asked the Advisory Board for their recommendation regarding the situation. The Advisory Board recommended that the contract be terminated. Mr. Torres acknowledged this recommendation and said he would bring this before the Honorable Judge Jack for her input before taking any action.

**VII. Advisory Board**

**A. Possible dates for future meeting of the Advisory Board**

The week of October 25, 2010 is being held for a possible future 2010 meeting date for the next Advisory Board meeting.

**B. Recommendations for agenda items for next meeting**

**VIII. Other Issues**

**IX. Adjourn**

The meeting was adjourned at 4:15 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  
04/01/10 - 06/30/10**

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

Total Grant Amount: \$6,761,718.02  
 Total Interest Earned: \$767,138.76  
 Total Funds Received: **\$7,528,856.78**

**B. Summary of Expenditures Paid by COCP Funds**

	Year 3 Budget	Year 4 Budget	Year 5 Budget	Year 6 Budget	Year 7 Budget	Yrs 1-7 Adjusted Budget	Prior Activity	Current Activity 04/01/10 - 06/30/10	Encumbrances	Remaining Balance 6/30/2010
Salaries-Prof 12	\$216,128.63	\$160,652.00	286,279.40	299,633.00	318,499.00	\$1,281,192.03	(\$1,057,598.59)	(\$33,765.70)	(\$25,889.15)	\$163,918.59
Salaries-CEER 15	\$19,606.37	\$15,636.00	33,123.00	30,948.00	29,860.00	\$129,193.37	(\$112,311.77)	(\$10,119.72)	\$0.00	\$6,761.88
Fringe 14	\$47,984.00	\$38,783.00	58,333.00	72,729.00	76,643.00	\$305,100.00	(\$235,080.81)	(\$9,335.72)	(\$5,526.51)	\$55,155.16
Communication 42					900.00	\$900.00	(\$405.00)	(\$225.00)	\$0.00	\$270.00
Other/C-Analysis 47/68	\$60,474.00	\$73,500.00	(8,656.40)	73,500.00	4,219.00	\$122,649.60	(\$71,243.00)	(\$2,700.00)	\$0.00	\$49,006.60
Supplies 50	\$86,844.00	\$33,500.00	68,676.00	122,682.00	65,386.00	\$447,783.73	(\$359,854.81)	(\$21,337.71)	(\$14,393.02)	\$52,178.39
51		\$20,300.00	8,000.00		6,170.00	\$30,792.27	(\$10,938.78)	(\$74.26)	(\$287.02)	\$13,491.21
Subcontract 62-65	\$1,965,693.00	\$314,022.00	296,734.00	\$46,289.00	591,523.00	\$3,514,281.00	(\$2,967,354.87)	(\$95,486.21)	\$0.00	\$451,408.92
Travel 75	\$2,300.00	\$2,000.00	7,719.00	9,000.00	6,712.00	\$30,191.00	(\$22,571.03)	(\$3,741.40)	(\$0.05)	\$3,878.52
Equipment 80	\$0.00	\$0.00	0.00			\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Indirect Costs 90	\$359,855.00	\$98,759.00	112,531.00	143,217.00	164,990.00	\$879,362.00	(\$690,501.16)	(\$26,522.36)	\$0.00	\$162,328.48
<b>TOTALS</b>	<b>\$2,758,885.00</b>	<b>757,152.00</b>	<b>862,739.00</b>	<b>1,097,997.00</b>	<b>1,264,922.00</b>	<b>\$6,741,695.00</b>	<b>(\$5,633,860.42)</b>	<b>(\$203,338.08)</b>	<b>(\$46,097.78)</b>	<b>\$958,398.75</b>

**C. Interest Earned by COCP Funds as of 06/30/10**

Prior Interest Earned: \$755,056.47  
 Interest Earned This Quarter: \$12,080.29  
 Total Interest Earned to Date: **\$767,136.76**

**D. Balance of COCP Funds as of 06/30/10**

Total Grant Amount: \$6,761,718.02  
 Total Interest Earned: \$767,136.76  
 Current Q. Expenses: (\$203,338.08)  
 Total Expenditures: (\$5,533,860.42)  
 Remaining Balance: **\$1,791,568.28**

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

  
Accounting Certification