# Final Air Monitoring Report for the South Scotlandville Air Toxics Monitoring Project

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**Air Monitoring Report for the South Scotlandville Project**

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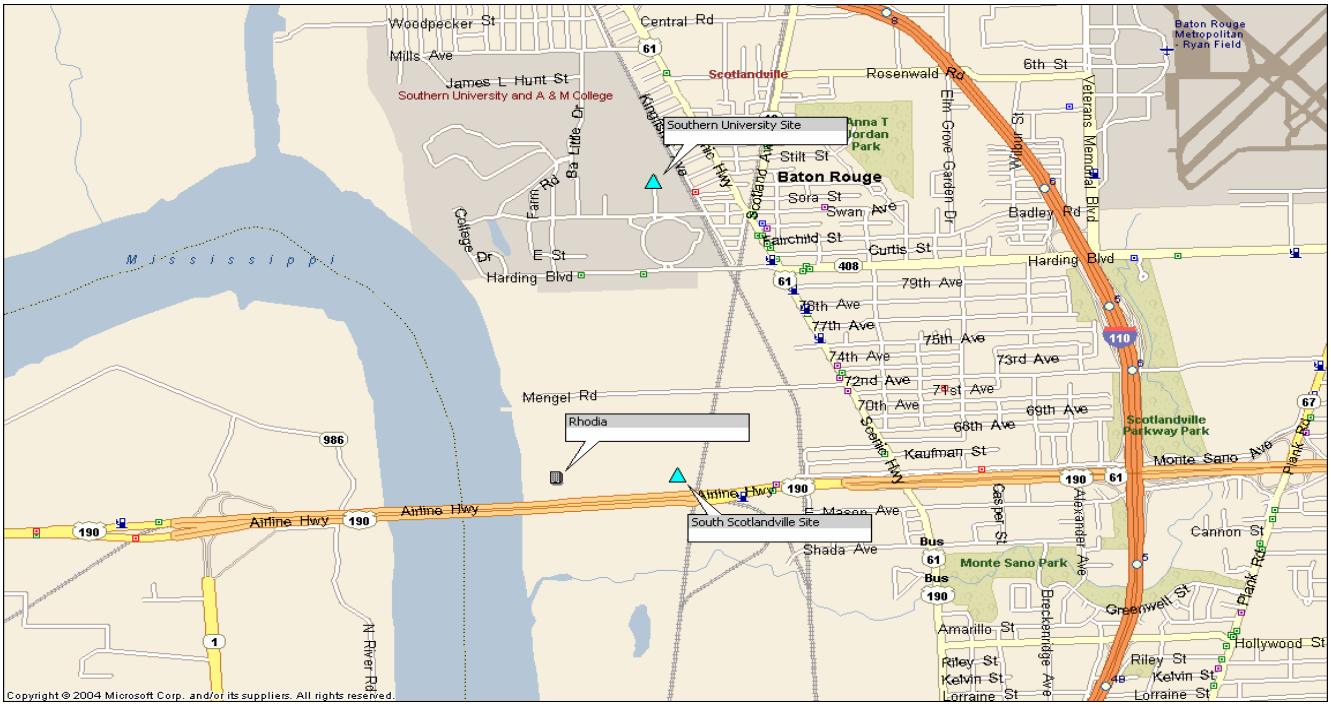
# Project Overview

The air monitoring project was initiated in response to plans to incinerate napalm derived fuel at the Rhodia facility in North Baton Rouge. The LDEQ installed two air monitoring stations in response to the public concerns, one was located on the eastern fenceline of the Rhodia property and the other was located on the Southern University campus. .

Rhodia commenced burning the napalm derived fuel in June 1999 and the burning was completed in 2001. However, LDEQ decided to continue the monitoring effort at the two monitoring locations. This study was undertaken due to observed ambient concentrations of the air toxics vinyl chloride & 1,3-butadiene which were exceeding the Louisiana ambient air standards. The emissions of these compounds were not related to the burning of the napalm derived fuel but may have originated at other nearby chemical manufacturing facilities.




# Study Focus

The focus of the study was to:

- Identify the chemical compounds that are most abundantly present in the ambient air in the North Baton Rouge communities and Southern University.
- Compare the measured chemical levels, along with appropriate statistical confidence limits, to the applicable ambient air standards established by LDEQ.
- Identify any chemical component(s) from the burning of the napalm derived fuel that may adversely affect the air quality in the area.

An examination of a wind rose generated for the greater Baton Rouge area shows the winds predominantly from southerly & easterly directions. To the west of the Rhodia facility is the Mississippi River which made it difficult to site a sampling station close to the facility in that direction. An examination of the population concentrations living around the Rhodia facility showed that the closest residents lived just beyond the eastern fence line. For that reason one sampling station was located near the eastern fence line very near the closest community. The other sampling station was located in a central area of the Southern University Campus to the north of Rhodia facility. It was felt these two sampling locations would provide a representative sampling of the average exposure of the citizens & students to any toxic compounds in the ambient air.

## Sampling & Analytical Methods

The sampling and analysis plan for this project revolved around two sampling and analysis strategies. In order to determine compliance with the state ambient air standards, the sites used a statistical canister sampler operating on a 24-hr/6-day schedule. This sampling was accomplished with a Model 911A Portable Summa Canister manufactured by RM Environmental Systems Incorporated.

Because of public concern about sudden releases of chemicals into the air, the site was also equipped with a continuous methane/non-methane hydrocarbon analyzer & a triggered canister sampler. The continuous hydrocarbon monitor consisted of a TECO model 55C. This instrument was connected to an ESC data logger which recorded the data in 10 minute averages. When a 10 minute average concentration exceeded the set trigger level (usually 1.5 ppm), the data logger activated the strike canister sampler which collected a 25 minute duration canister sample.

All sampling and analysis was conducted in accordance Method TO-15 of the U.S. Environmental Protection Agency's "Compendium to the Determination of Toxic Organic Compounds in Ambient Air." This method involves the collection of air samples in specially prepared stainless steel canisters with subsequent analysis using gas chromatography techniques with Flame Ionization Detectors (FID) and Mass Spectrometry Detectors (MSD). The samples were analyzed in the laboratory for nearly 100 Volatile Organic Compounds (VOCs).

All samples collected were picked up within 24 hours after sample collection and returned to the LDEQ Laboratory for analysis.

In addition to identifying approximately 100 compounds including Hazardous Air Pollutants (HAPs) and other VOCs, the laboratory also used the GC/MS Tentatively Identified Compound analysis to identify other compounds that may have been in the sample matrix. The laboratory identified and listed any compound that had an estimated concentration of 5 ppbv or higher.

**Triggered Canister Samplers**

During the six year period the site was in operation, a total of 609 triggered event samples were collected. The results for these samples were highly variable depending mostly on the wind direction at the time of collection and the point source emissions which triggered the sampler. By utilizing the meteorological data such as wind direction and speed, the emissions detected could often be backtracked to the original point source. Specific point sources were identified for emissions of ethylene dichloride, vinyl chloride, 1,3-butadiene and benzene.

**South Scotlandville Site Sample Count**

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|
| Triggered Strike Samples | 50 | 118 | 203 | 41 | 34 | 92 | 71 |
| 24-hour Samples | 39 | 60 | 55 | 55 | 60 | 61 | 58 |

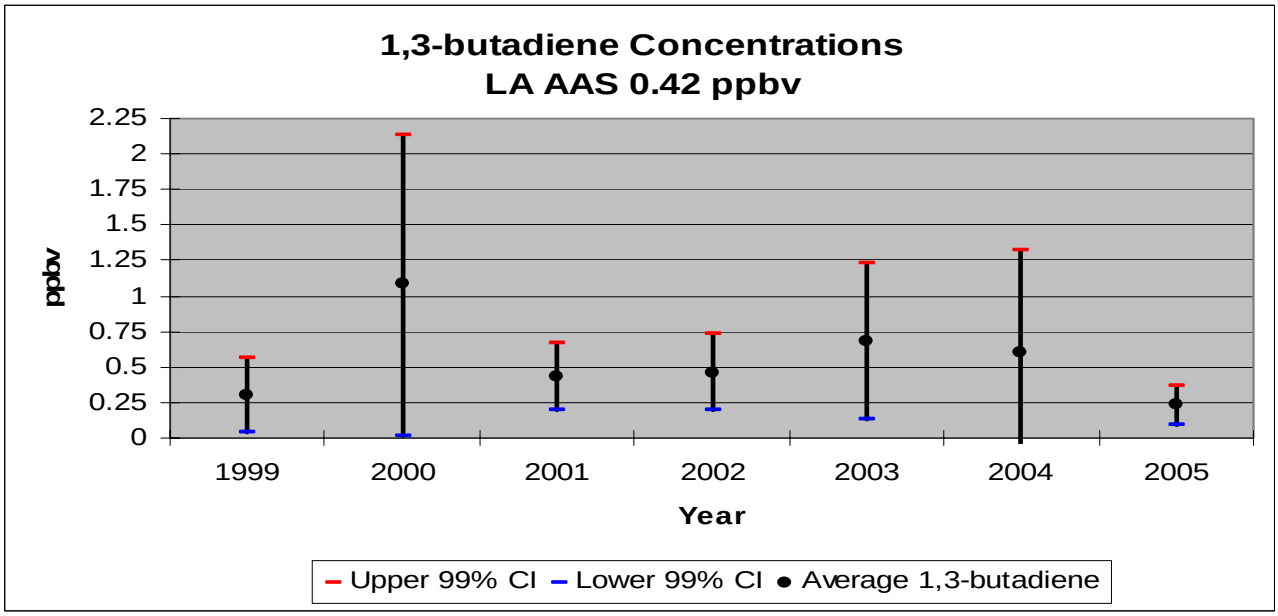
The most abundant compounds found in the strike samples were n-propane, n-butane, isobutene and ethane. This profile of compounds is very consistent with mobile source emissions as well as refinery emissions involving the production of gasoline.

**Twenty-four Hour Samples**

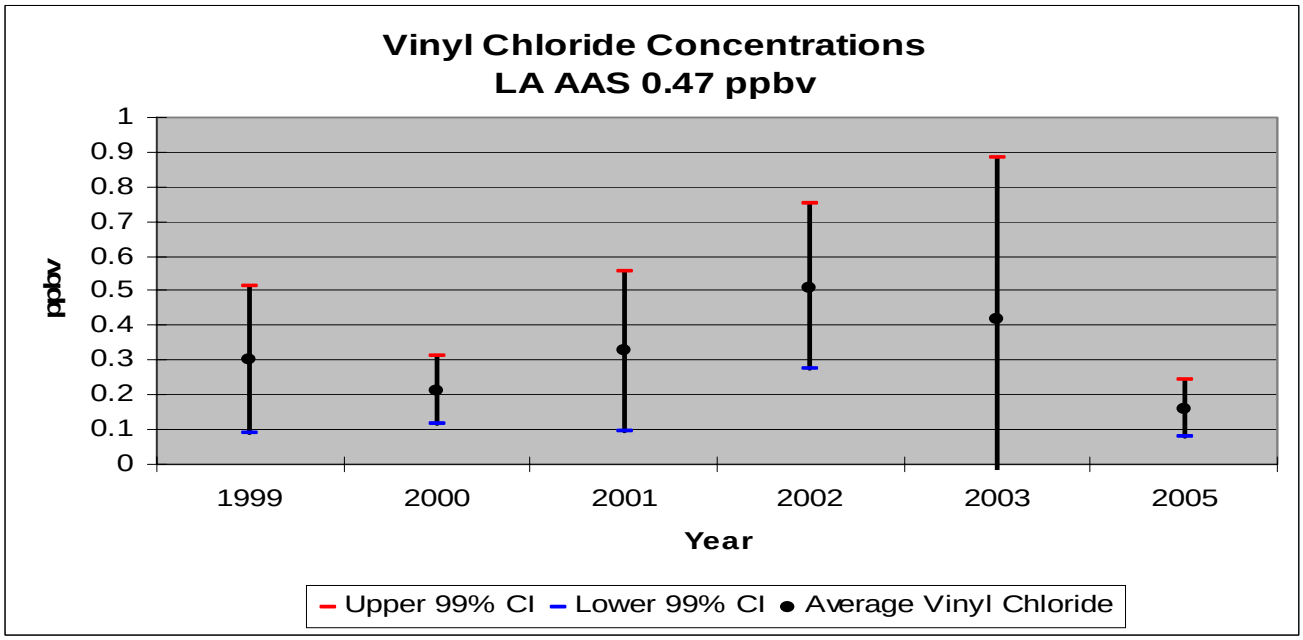
388 samples were collected on the 24-hour sampler beginning on May 24, 1999 and ending with the final sample collected on December 30, 2005. The most abundant compounds found in these samples were propane, ethane, acetone, isopentane and n-butane. All of these compounds were detected within the normal concentration range for an urban area. The general profile of compounds detected was very typical of an area dominated by mobile source emissions. However, the local point sources did frequently impact the sampler often enough to significantly impact the observed average concentrations. The impact of the local point sources was the primary cause of multiple exceedances of the Louisiana ambient air standards for the toxic air pollutants. During the six years of operation the site exceeded the standard for vinyl chloride once, the standard for EDC two times and the standard for 1,3-butadiene five times. In 2005, the site was in compliance with all of the ambient air standards.

**Ambient Air Exceedances**

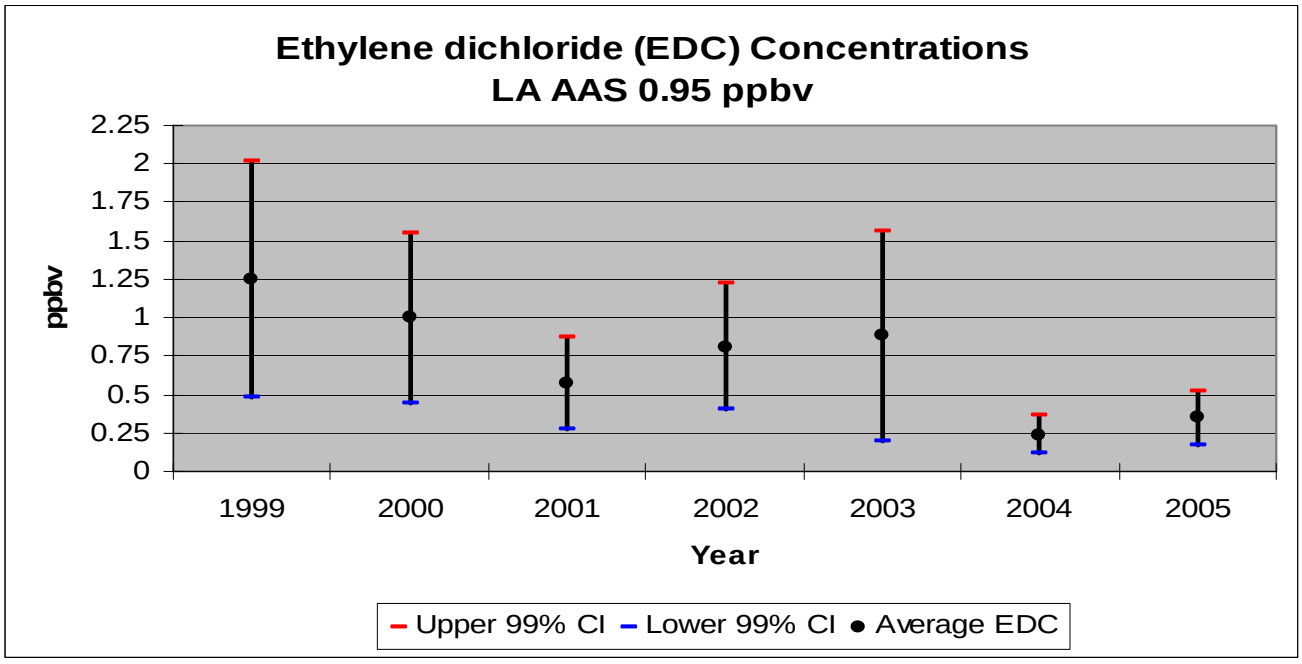
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|
| 1,3-butadiene | | X | X | X | X | X | |
| Ethylene dichloride | X | X | | | | | |
| Vinyl Chloride | | | | X | | | |



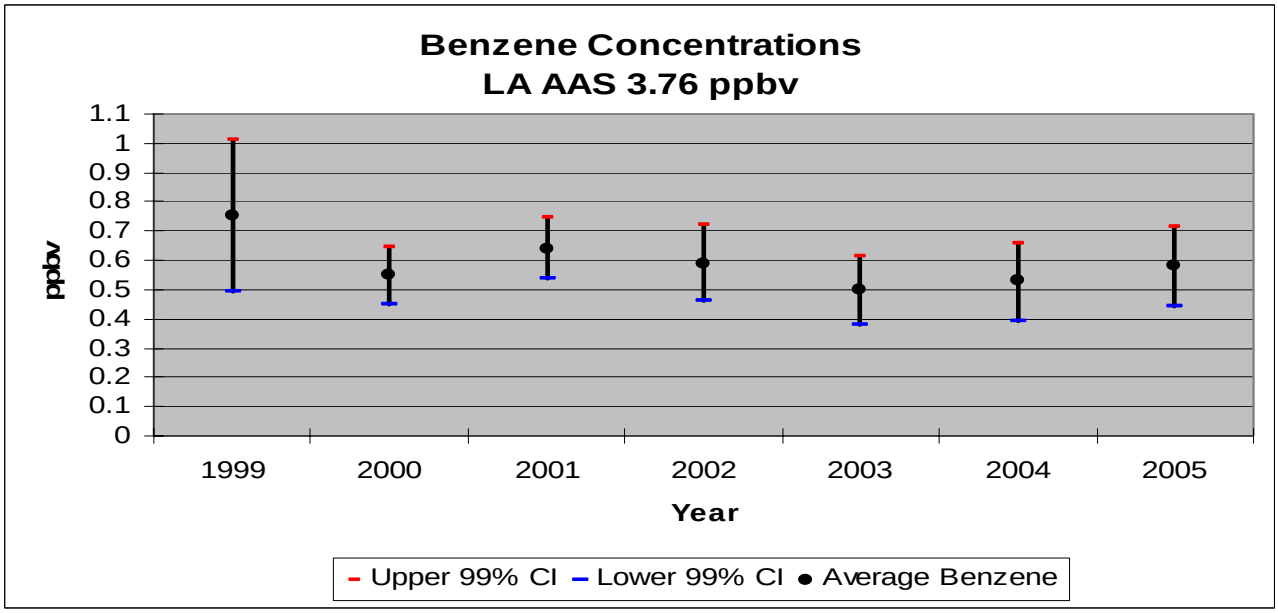

In October of 2004, in response to the fifth annual exceedance of the 1,3-butadiene standard, LDEQ met with the companies which were the principal emission sources to discuss the exceedances and how to reduce emissions. In addition, as a result of continued ozone problems in the Baton Rouge area, 15 companies were issued administrative orders to implement a fence-line monitoring system for ozone causing chemicals including 1,3-butadiene. Since the installation of the monitors, the measured concentration of 1,3-butadiene has decreased significantly and the annual ambient air standard for 1,3 butadiene was met in 2005.




The monitoring data also shows the concentration for vinyl chloride also decreased significantly in 2005.




The EDC level in 2005 was slightly higher than the 2004 level but still greatly reduced from the levels observed from 1999 to 2003.

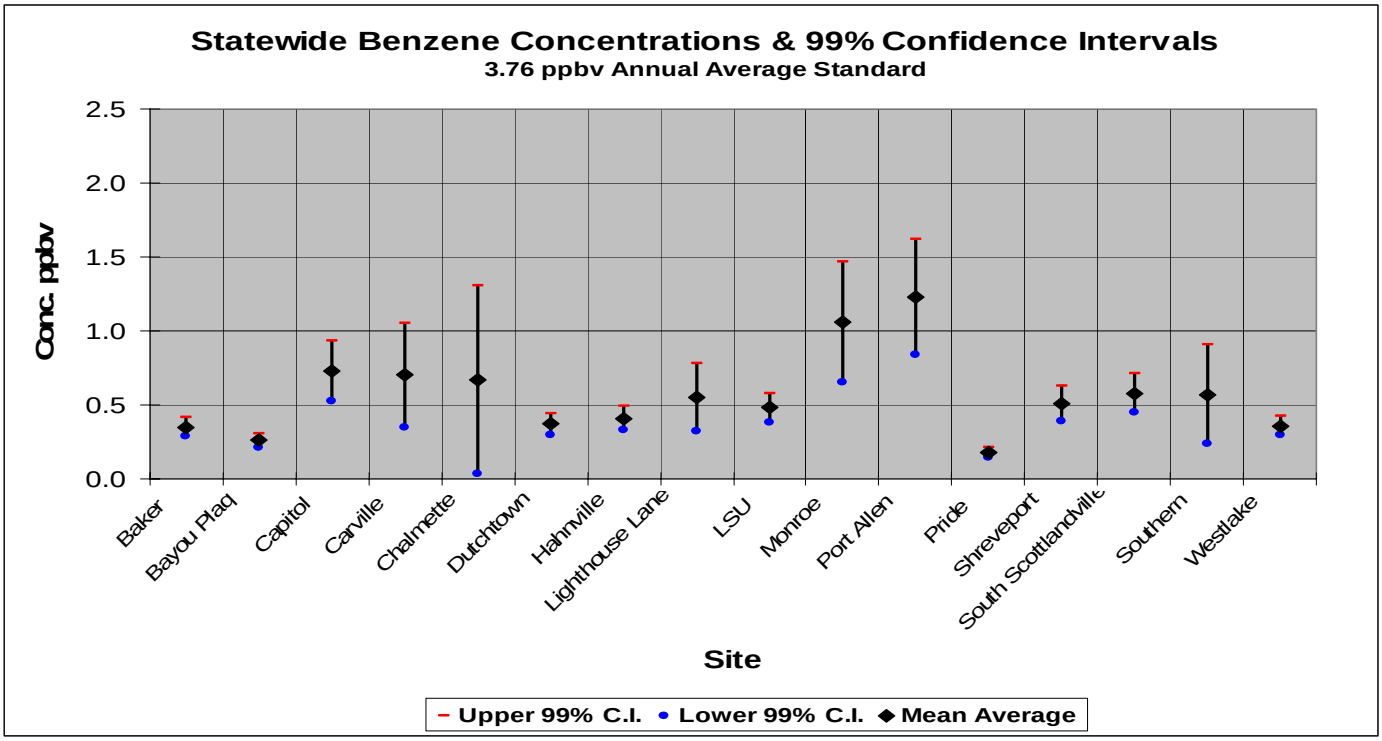


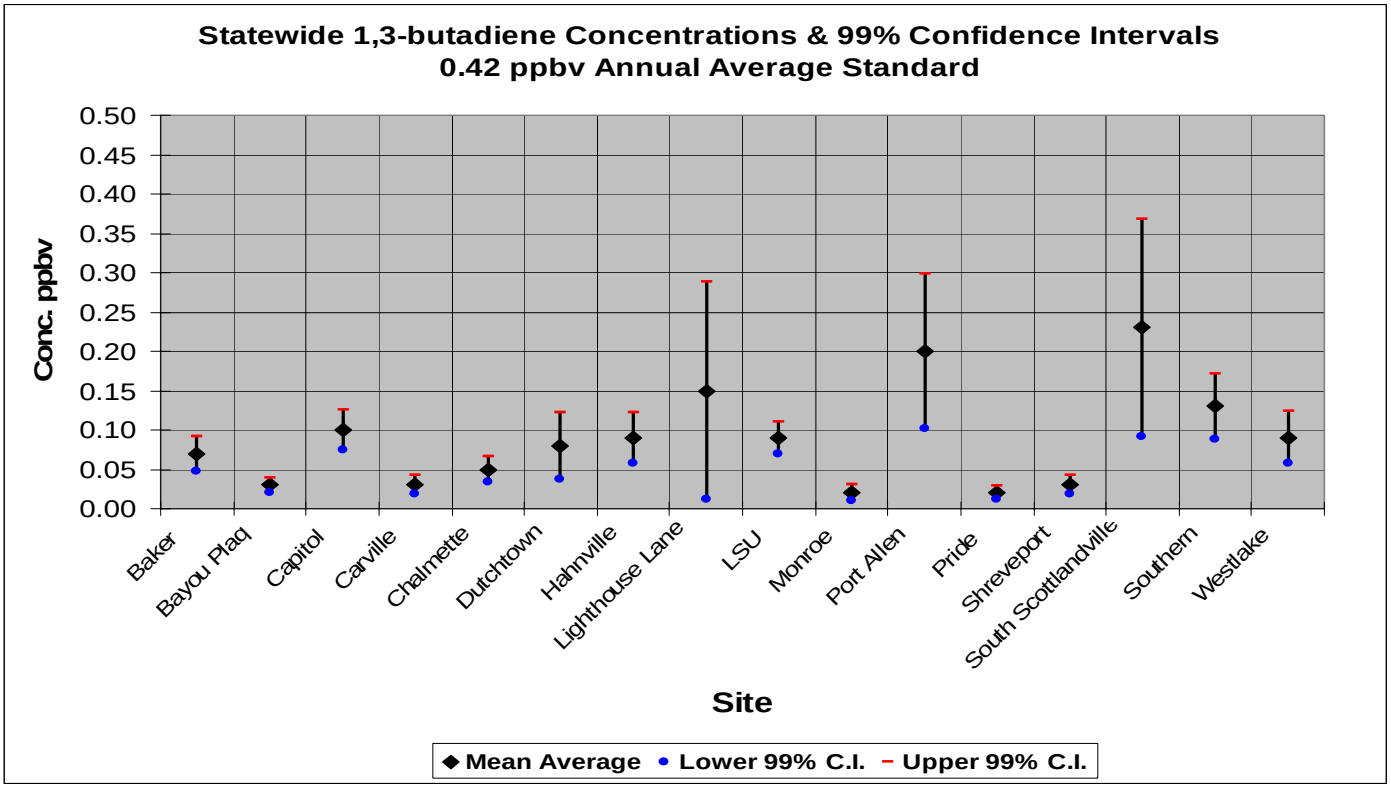

The benzene level shows a slight increase in 2005. This is primarily due to increased mobile source emissions in the second half of the year as a result of Hurricanes Katrina & Rita.

# Conclusions

During the course of operations the site collected a vast amount of monitoring data. Although no adverse effects from the incineration of the napalm derived fuel were observed, it became apparent that the site was impacted very heavily from the other surrounding industries. The site was also significantly affected by mobile source emissions.

In 2005, the air quality measurements improved a great deal at that monitoring site. Most of the air samples contained low levels of VOCs that are typical of urban areas. The principal source of these VOCs is mobile sources. Most of the average concentrations are very close to or slightly above the statewide average concentrations. Benzene is most often cited by the general public as one of the HAPs they are most often concerned about. The EPA National Air Toxics Assessment Study (NATA) estimated the average concentration of benzene in East Baton Rouge Parish to be about 0.48 ppbv with one half originating from mobile sources, one sixth originating from local point & area sources and one third from transported background. The results from the South Scotlandville monitor show the benzene levels are consistent with the NATA estimations.






The EPA NATA study estimated the average concentration of 1,3-butadiene in East Baton Rouge Parish to be about 0.057 ppbv with a little over 50% originating from mobile sources, one fifth originating from local point and area sources and about 30% from transported background. These estimates are very close to the actual concentrations measured at the Baker, Capitol & LSU sites. At South Scotlandville the NATA estimates for local point sources is underestimated due to the close proximity of the site to several local point sources. While the 1,3-butadiene concentration at South Scotlandville is still above the statewide average concentration, it has been greatly reduced from previous years and is now in compliance with the ambient air standards.

As a result of the improvement in the air quality at the site and due to serious budget constraints it is recommended that this monitoring project be discontinued.

# Appendix A

# 2005 Summary Results

# Louisiana Department of Environmental Quality
## Air Toxics Summary
*1/27/2006*

**Monitoring Site Code** South Scotlandville

**Sample Duration: 25 min Strike Samples**

**Samples Collected:** 72 **Sample Date Range:** 1/10/2005 - 12/29/2005

**All Concentrations are in parts per billion molar volume (ppbv)**

| Compound | Mean | Max | Compound | Mean | Max |
|---|---|---|---|---|---|
| **Freon-12** | 0.52 | 1.46 | **trans-1,3-dichloropropene** | 0.00 | 0.00 |
| **Chloromethane** | 0.86 | 11.12 | **1,1,2-trichloroethane** | 0.01 | 0.09 |
| **Freon-114** | 0.04 | 0.88 | **Toluene** | 3.43 | 14.68 |
| **Vinyl Chloride** | 0.15 | 1.37 | **2-Butanone** | 1.08 | 5.88 |
| **1,3-butadiene** | 2.67 | 24.77 | **1,2-dibromoethane** | 0.00 | 0.03 |
| **Bromomethane** | 0.00 | 0.04 | **Tetrachloroethylene** | 0.05 | 0.92 |
| **Carbon disulfide** | 0.17 | 0.63 | **Methyl Acrylate** | 0.03 | 0.81 |
| **Chloroethane** | 0.03 | 0.21 | **Chlorobenzene** | 0.02 | 0.18 |
| **Freon-11** | 0.26 | 0.55 | **Ethylbenzene** | 0.42 | 2.34 |
| **Acetonitrile** | 0.30 | 1.19 | **Vinyl Acetate** | 0.00 | 0.00 |
| **1,1-dichloroethene** | 0.00 | 0.02 | **m/p Xylene** | 1.48 | 8.70 |
| **Methylene Chloride** | 0.34 | 3.09 | **Styrene** | 1.09 | 12.78 |
| **Freon-113** | 0.10 | 1.04 | **o Xylene** | 0.53 | 3.12 |
| **Acetone** | 6.80 | 27.32 | **2-nitropropane** | 0.00 | 0.00 |
| **1,1-dichloroethane** | 0.01 | 0.08 | **1,1,2,2-tetrachloroethane** | 0.00 | 0.03 |
| **cis-1,2-dichloroethene** | 0.00 | 0.02 | **1,3,5-trimethylbenzene** | 0.14 | 1.04 |
| **Acrylonitrile** | 0.20 | 2.38 | **1,2,4-trimethylbenzene** | 0.51 | 3.73 |
| **Chloroform** | 0.08 | 0.91 | **Chlorobutane** | 0.00 | 0.02 |
| **1,2-dichloroethane** | 0.62 | 9.89 | **Benzyl Chloride** | 0.00 | 0.03 |
| **Diethyl ether** | 0.03 | 0.55 | **4-methyl-2-pentanone** | 0.36 | 0.86 |
| **1,1,1-trichloroethane** | 0.02 | 0.05 | **Chloroacetonitrile** | 0.00 | 0.00 |
| **Benzene** | 1.93 | 10.73 | **1,3-dichlorobenzene** | 0.00 | 0.02 |
| **Carbon Tetrachloride** | 0.10 | 0.21 | **1,4-dichlorobenzene** | 0.05 | 0.40 |
| **Allyl Chloride** | 0.00 | 0.00 | **1,2-dichlorobenzene** | 0.00 | 0.03 |
| **1,2-dichlorpropane** | 0.00 | 0.03 | **1,2,4-trichlorobenzene** | 0.02 | 0.09 |
| **Trichloroethylene** | 0.03 | 0.15 | **1,3-hexachlorobutadiene** | 0.01 | 0.05 |
| **cis-1,3-dichloropropene** | 0.00 | 0.02 | **2-Hexanone** | 0.01 | 0.20 |
| **MTBE** | 0.49 | 13.35 | **Methyl Methacrylate** | 0.00 | 0.09 |
| **Tetrahydrofuran** | 0.00 | 0.29 | **Ethyl Methacrylate** | 0.00 | 0.00 |
| **Methacrylonitrile** | 0.02 | 0.44 | **Nitrobenzene** | 0.00 | 0.09 |

# Louisiana Department of Environmental Quality
## Air Toxics Summary
*1/27/2006*

**Monitoring Site Code** South Scotlandville

**Sample Duration:** 24

**Samples Collected:** 59 **Sample Date Range:** 1/4/2005 - 12/30/2005

**All Concentrations are in parts per billion molar volume (ppbv)**

| Compound | Mean | Max | Compound | Mean | Max |
|---|---|---|---|---|---|
| **Freon-12** | 0.55 | 0.90 | **trans-1,3-dichloropropene** | 0.00 | 0.00 |
| **Chloromethane** | 0.65 | 0.98 | **1,1,2-trichloroethane** | 0.01 | 0.21 |
| **Freon-114** | 0.03 | 0.47 | **Toluene** | 0.80 | 4.08 |
| **Vinyl Chloride** | 0.16 | 0.94 | **2-Butanone** | 0.54 | 1.80 |
| **1,3-butadiene** | 0.23 | 2.87 | **1,2-dibromoethane** | 0.00 | 0.04 |
| **Bromomethane** | 0.01 | 0.10 | **Tetrachloroethylene** | 0.02 | 0.16 |
| **Carbon disulfide** | 0.05 | 0.24 | **Methyl Acrylate** | 0.01 | 0.18 |
| **Chloroethane** | 0.04 | 0.44 | **Chlorobenzene** | 0.01 | 0.05 |
| **Freon-11** | 0.27 | 0.37 | **Ethylbenzene** | 0.10 | 0.67 |
| **Acetonitrile** | 0.22 | 0.45 | **Vinyl Acetate** | 0.07 | 4.11 |
| **1,1-dichloroethene** | 0.00 | 0.03 | **m/p Xylene** | 0.33 | 2.18 |
| **Methylene Chloride** | 0.20 | 0.32 | **Styrene** | 0.14 | 1.34 |
| **Freon-113** | 0.09 | 0.24 | **o Xylene** | 0.14 | 0.85 |
| **Acetone** | 4.79 | 12.98 | **2-nitropropane** | 0.00 | 0.00 |
| **1,1-dichloroethane** | 0.00 | 0.05 | **1,1,2,2-tetrachloroethane** | 0.00 | 0.02 |
| **cis-1,2-dichloroethene** | 0.00 | 0.00 | **1,3,5-trimethylbenzene** | 0.04 | 0.32 |
| **Acrylonitrile** | 0.01 | 0.32 | **1,2,4-trimethylbenzene** | 0.14 | 1.17 |
| **Chloroform** | 0.05 | 0.32 | **Chlorobutane** | 0.00 | 0.01 |
| **1,2-dichloroethane** | 0.34 | 2.76 | **Benzyl Chloride** | 0.00 | 0.01 |
| **Diethyl ether** | 0.00 | 0.14 | **4-methyl-2-pentanone** | 0.00 | 0.04 |
| **1,1,1-trichloroethane** | 0.03 | 0.07 | **Chloroacetonitrile** | 0.00 | 0.00 |
| **Benzene** | 0.57 | 2.09 | **1,3-dichlorobenzene** | 0.00 | 0.01 |
| **Carbon Tetrachloride** | 0.10 | 0.15 | **1,4-dichlorobenzene** | 0.03 | 0.72 |
| **Allyl Chloride** | 0.01 | 0.33 | **1,2-dichlorobenzene** | 0.00 | 0.01 |
| **1,2-dichlorpropane** | 0.00 | 0.00 | **1,2,4-trichlorobenzene** | 0.02 | 0.09 |
| **Trichloroethylene** | 0.01 | 0.05 | **1,3-hexachlorobutadiene** | 0.01 | 0.08 |
| **cis-1,3-dichloropropene** | 0.00 | 0.00 | **2-Hexanone** | 0.01 | 0.33 |
| **MTBE** | 0.13 | 1.07 | **Methyl Methacrylate** | 0.00 | 0.02 |
| **Tetrahydrofuran** | 0.00 | 0.04 | **Ethyl Methacrylate** | 0.00 | 0.00 |
| **Methacrylonitrile** | 0.01 | 0.18 | **Nitrobenzene** | 0.01 | 0.15 |

# Louisiana Department of Environmental Quality
## Photochemical Precursor Summary
### GC Flame Ionization Results

*1/27/2006*

**Monitoring Site Code** South Scotlandville **Sample Duration: 25 min Strike Samples**

**Samples Collected:** 72 **Sample Date Range:** 1/10/2005 - 12/29/2005

**Estimated Concentrations in parts per billion molar volume (ppbv)**

| Compound | Mean | Max | Compound | Mean | Max |
|---|---|---|---|---|---|
| **Ethylene** | 22.17 | 133.48 | **3-methylhexane** | 0.72 | 3.96 |
| **Acetylene** | 3.41 | 15.83 | **2,2,4-trimethylpentane** | 1.87 | 8.33 |
| **Ethane** | 24.57 | 228.23 | **n-Heptane** | 0.62 | 2.88 |
| **Propylene** | 19.07 | 310.49 | **Methylcyclohexane** | 0.52 | 1.86 |
| **Propane** | 214.33 | 5166.60 | **2,3,4-trimethylpentane** | 0.61 | 3.36 |
| **Isobutane** | 24.60 | 720.24 | **Toluene** | 3.73 | 14.79 |
| **1-butene** | 2.08 | 20.74 | **2-methylheptane** | 0.20 | 0.78 |
| **n-Butane** | 44.44 | 300.51 | **3-methylheptane** | 0.21 | 0.82 |
| **trans-2-Butene** | 2.23 | 19.72 | **n-Octane** | 0.23 | 0.81 |
| **cis-2-Butene** | 1.87 | 13.01 | **Ethylbenzene** | 0.44 | 1.90 |
| **2-methylbutane** | 24.33 | 145.23 | **m/p Xylene** | 1.42 | 7.37 |
| **1-Pentene** | 1.58 | 13.01 | **Styrene** | 0.96 | 9.49 |
| **n-Pentane** | 11.13 | 59.48 | **o Xylene** | 0.56 | 2.69 |
| **Isoprene** | 0.69 | 2.70 | **n-Nonane** | 0.14 | 0.72 |
| **trans-2-Pentene** | 3.12 | 22.86 | **Cumene** | 0.06 | 0.24 |
| **cis-2-Pentene** | 1.81 | 12.11 | **n-propylbenzene** | 0.10 | 0.56 |
| **2,2-dimethylbutane** | 1.20 | 8.10 | **m-ethyltoluene** | 0.35 | 2.20 |
| **Cyclopentane** | 1.22 | 7.05 | **p-ethyltoluene** | 0.14 | 0.95 |
| **2,3-dimethylbutane** | 1.37 | 5.65 | **1,3,5-trimethylbenzene** | 0.19 | 1.14 |
| **2-methylpentane** | 5.30 | 20.72 | **o-ethyltoluene** | 0.14 | 0.78 |
| **3-methylpentane** | 4.15 | 38.28 | **1,2,4-trimethylbenzene** | 0.77 | 3.74 |
| **1-Hexene** | 0.54 | 4.73 | **n-Decane** | 0.13 | 0.95 |
| **n-Hexane** | 6.06 | 116.92 | **1,2,3-trimethylbenzene** | 0.15 | 1.05 |
| **Methylcyclopentane** | 1.99 | 10.27 | **m-diethylbenzene** | 0.05 | 0.30 |
| **2,4-dimethylpentane** | 0.46 | 1.89 | **p-diethylbenzene** | 0.09 | 0.61 |
| **Benzene** | 1.87 | 8.83 | **n-Undecane** | 0.09 | 0.82 |
| **Cyclohexane** | 0.81 | 12.56 | **1,3-butadiene** | 3.10 | 24.67 |
| **2-methylhexane** | 0.71 | 3.51 | | | |
| **2,3-dimethylpentane** | 0.43 | 2.04 | **TNMOC (ppbc)** | 1768.56 | 16818.00 |

# Louisiana Department of Environmental Quality
## Photochemical Precursor Summary
### GC Flame Ionization Results

*1/27/2006*

**Monitoring Site Code** CAN_RDA

**Samples Collected:** 59

**Sample Duration:** 24

**Sample Date Range:** 1/4/2005 - 12/30/2005

**Estimated Concentrations in parts per billion molar volume (ppbv)**

| Compound | Mean | Max | Compound | Mean | Max |
|---|---|---|---|---|---|
| **Ethylene** | 4.73 | 22.00 | **3-methylhexane** | 1.47 | 78.09 |
| **Acetylene** | 1.38 | 4.09 | **2,2,4-trimethylpentane** | 0.46 | 2.05 |
| **Ethane** | 7.96 | 18.11 | **n-Heptane** | 0.25 | 5.60 |
| **Propylene** | 2.23 | 16.45 | **Methylcyclohexane** | 0.11 | 0.30 |
| **Propane** | 12.53 | 372.94 | **2,3,4-trimethylpentane** | 0.14 | 0.57 |
| **Isobutane** | 2.25 | 18.78 | **Toluene** | 1.00 | 4.01 |
| **1-butene** | 0.23 | 1.00 | **2-methylheptane** | 0.06 | 0.33 |
| **n-Butane** | 4.82 | 25.56 | **3-methylheptane** | 0.05 | 0.17 |
| **trans-2-Butene** | 0.16 | 0.86 | **n-Octane** | 0.08 | 0.25 |
| **cis-2-Butene** | 0.12 | 0.66 | **Ethylbenzene** | 0.13 | 0.54 |
| **2-methylbutane** | 3.07 | 11.85 | **m/p Xylene** | 0.43 | 1.81 |
| **1-Pentene** | 0.22 | 1.05 | **Styrene** | 0.18 | 1.48 |
| **n-Pentane** | 1.40 | 5.45 | **o Xylene** | 0.18 | 0.72 |
| **Isoprene** | 0.56 | 2.80 | **n-Nonane** | 0.06 | 0.16 |
| **trans-2-Pentene** | 0.28 | 1.75 | **Cumene** | 0.03 | 0.77 |
| **cis-2-Pentene** | 0.16 | 1.11 | **n-propylbenzene** | 0.03 | 0.21 |
| **2,2-dimethylbutane** | 0.11 | 0.56 | **m-ethyltoluene** | 0.12 | 0.75 |
| **Cyclopentane** | 0.14 | 0.55 | **p-ethyltoluene** | 0.05 | 0.33 |
| **2,3-dimethylbutane** | 0.20 | 0.81 | **1,3,5-trimethylbenzene** | 0.06 | 0.38 |
| **2-methylpentane** | 0.69 | 1.92 | **o-ethyltoluene** | 0.05 | 0.33 |
| **3-methylpentane** | 0.57 | 1.75 | **1,2,4-trimethylbenzene** | 0.20 | 1.18 |
| **1-Hexene** | 0.09 | 0.36 | **n-Decane** | 0.05 | 0.25 |
| **n-Hexane** | 0.81 | 2.63 | **1,2,3-trimethylbenzene** | 0.07 | 1.53 |
| **Methylcyclopentane** | 0.42 | 1.42 | **m-diethylbenzene** | 0.01 | 0.06 |
| **2,4-dimethylpentane** | 0.09 | 0.87 | **p-diethylbenzene** | 0.02 | 0.08 |
| **Benzene** | 0.63 | 2.19 | **n-Undecane** | 0.03 | 0.10 |
| **Cyclohexane** | 0.15 | 0.56 | **1,3-butadiene** | 0.26 | 3.87 |
| **2-methylhexane** | 1.55 | 82.77 | | | |
| **2,3-dimethylpentane** | 0.58 | 29.49 | **TNMOC (ppbc)** | 251.54 | 2850.00 |