Health Consultation

SOUTH SCOTLANDVILLE AIR CONTAMINANTS
1999-2004

BATON ROUGE, LOUISIANA

JUNE 20, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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1999-2004

BATON ROUGE, LOUISIANA

Prepared by:

Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology and Toxicology
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
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List of Acronyms

AAS	Ambient Air Standard
AEGL 3	Interim Acute Exposure Guideline Level
ATSDR	Agency for Toxic Substances and Disease Registry
COC	Contaminant of Concern
DHAC	Division of Health Assessment and Consultation
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
mg/m^3	milligrams per cubic meter
OPH	Office of Public Health
ppb	parts per billion
ppbc	parts per billion as carbon
ppbv	parts of pollutant per billion parts of air, by volume
ppm	parts per million
RfC	Reference Concentration
SEET	Section of Environmental Epidemiology and Toxicology
$\mu g/m^3$	micrograms per cubic meter
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Summary and Statement of Issues

From 1999-2004, the South Scotlandville air monitor in East Baton Rouge Parish, Louisiana, detected 60 ambient air contaminants. In October 2004, the Louisiana Department of Environmental Quality (LDEQ) asked the Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (LDHH/OPH/SEET) to review 1,3-butadiene exceedences measured by the air monitor during this time period. SEET found no public health hazard involved with inhalation of these concentrations of 1,3-butadiene [1]. LDEQ then requested that SEET review the 59 other air contaminants detected by the South Scotlandville air monitor during this time period. SEET, through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), examined concentrations detected for these contaminants to determine whether they posed a threat to human health and to decide what further public health actions, if any, may be needed.

Background

Site Description and History

The South Scotlandville air monitor was erected in 1999. Formerly referred to as the Rhodia monitor, the air monitor is part of a network of toxic air pollutant ambient air monitors that LDEQ operates throughout the state of Louisiana. This particular monitor is located on U.S. Highway 190 (Airline Highway) near the old Mississippi River Bridge (see Figure 1). The monitor's air intake is positioned 12 feet above ground level and regularly measures total non-methane hydrocarbons within ambient air.

The South Scotlandville air monitor reports its findings both as concentration in parts per billion by volume (ppbv) and in hydrocarbon concentration in parts per billion as carbon (ppbc). Regular sampling takes place over a 24-hour period every 6 days. In addition, whenever the monitor detects high total hydrocarbon concentrations, it is triggered to catch a "high VOC event" (high volatile organic compound) sample (M. Oubre, Louisiana Department of Environmental Quality, personal communication, 2004). Table 1 lists the 60 contaminants detected by the monitor from 1999-2004 and the Louisiana ambient air standards used to regulate levels of these contaminants [2]. Originally presented in micrograms per cubic meter ($\mu g/m^3$), the ambient air standards have been converted to ppbv to correspond with the air monitor's data.

Demographics

South Scotlandville is located in East Baton Rouge Parish, Louisiana. Census 2000 results record a parish population of 412,852. The largest ethnic group in the parish at that time was Caucasian (56.2%), followed by African-American (40.1%), Asian (2.1%), and American Indian or Alaska Native (0.2%), with 0.5% of the population reporting as Other.

Figure 1. Location of the South Scotlandville Air Monitoring Station

Map Adapted from information provided by the Louisiana Department of Environmental Quality

Table 1. Air Contaminants Detected by the South Scotlandville Air Monitor from 1999-2004

CHEMICAL	8-hour LA AAS* (ppbv†)	annual LA AAS (ppbv)
1,1,1-trichloroethane	8.29E+03	
1,1,2,2-tetrachloroethane		2.48E-01
1,1,2-trichloroethane		1.15E+00
1,1-dichloroethane		
1,1-dichloroethene		
1,2,4-trichlorobenzene		
1,2,4-trimethylbenzene		
1,2-dibromoethane		5.86E-02
1,2-dichlorobenzene		
1,2-dichloroethane		9.52E-01
1,2-dichloropropane	1.79E+03	
1,3,5-trimethylbenzene		
1,3-dichlorobenzene		
1,3-hexachlorobutadiene		4.27E-01
1,4-dichlorobenzene	2.38E+02	
2-Butanone		
2-hexanone		
4-methyl-2-pentanone		
Acetone		
Acetonitrile	4.83E+02	
Acrylonitrile		6.78E-01
Allyl chloride	2.28E+01	
Benzene		3.76E+00
Benzyl chloride		
Bromomethane		
Carbon disulfide	2.29E+01	
Carbon tetrachloride		1.06E+00
Chloroacetonitrile		
Chlorobenzene	2.39E+02	
Chlorobutane		
Chloroethane	2.39E+03	
Chloroform		8.81E-01
Chloromethane		2.69E+01
cis-1,2-dichloroethene		
cis-1,3-dichloropropene		
Diethyl ether		
Ethyl methacrylate		
Ethylbenzene	2.37E+03	
Freon-11		
Freon-113		
Freon-114		
Freon-12		
m/p Xylene	2.37E+03	
Methacrylonitrile		
Methyl acrylate		
Methyl methacrylate	2.39E+03	
Methylene chloride		
MTBE		
Nitrobenzene	2.36E+01	
Nitropropane		5.49E+00
o Xylene	2.37E+03	
Styrene	1.19E+03	
Tetrachloroethylene		
Tetrahydrofuran		
Toluene	2.36E+03	
trans-1,3-dichloropropene		
Trichloroethylene		1.09E+01
Vinyl acetate	2.36E+02	
Vinyl chloride		7.83E-01

*ambient air standard

†parts per billion by volume

Industrial facilities within one-half mile of the South Scotlandville ambient air monitor include Rhodia Inc., UOP LLC, the Formosa Plastics Corporation, the Albermarle Corporation, ExxonMobile, and DSM Copolymer Inc. Residential neighborhoods begin within approximately one-half mile radius and six elementary and high schools are located within a 2-mile radius of the air monitor.

Discussion

Exposure Pathways

An exposure pathway contains the following five elements: a source of contamination, transport through some kind of environmental medium, a point of exposure, a route of exposure, and a receptor population. The source of the VOCs detected at the South Scotlandville air monitor has not been specifically identified. Ambient air in the vicinity of the monitor serves as both the transport medium and point of exposure for the contamination. The route of exposure to these contaminants is through inhalation of contaminated ambient air. The exposed population includes residents living within the South Scotlandville community of East Baton Rouge Parish, Baton Rouge, Louisiana. Residential neighborhoods, while not directly adjacent to the monitor, begin within approximately one-half mile of the monitor's location.

Evaluation Process

Assessment of the health effects of exposure to contaminant concentrations measured in South Scotlandville's ambient air samples is summarized in Appendix A. To determine the possible health impact of these exposures, each concentration was compared to its corresponding reference concentration (RfC) or other available comparison value. Cancer risks were also estimated for each year's averaged exposure to air contaminants of concern (COCs). The U.S. Environmental Protection Agency's (U.S. EPA's) range of acceptable cancer risk levels is from 1 excess cancer per 10,000 people to 1 excess cancer per 1,000,000 people exposed for a lifetime (1×10^{-4} to 1×10^{-6}) [5]. If cancer risks exceed 1×10^{-4}, the exposed population may develop a greater number of cases of cancer than those ordinarily found in an unexposed population.

Health Effects Evaluation

Assessment of health effects from exposure to the ambient air contaminants detected in South Scotlandville is described in Appendix A. COC concentrations did not appear to increase or decrease during certain months or seasons. COC concentrations sampled during both the regular and high VOC sampling schedules were at least ten times lower than concentrations known to cause health effects. Therefore, the COCs detected by the South Scotlandville air monitor from 1999-2004 did not pose a hazard to human heath.

Cancer Health Effects Evaluation

Estimation of lifetime cancer risks is described in Appendix A. Estimated lifetime cancer risks for residential exposure to the COCs measured by the South Scotlandville air monitor do not exceed the U.S. EPA's upper limit of acceptable cancer risk levels of 1 excess cancer per 10,000 people exposed for a lifetime (1.00×10^{-4}).

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

The mean annual average concentrations of ambient air contaminants sampled by the South Scotlandville air monitor are more than ten times lower than concentrations known to cause health effects. These concentrations should have no adverse effect on the health of children.

Conclusions

The annual average concentrations of ambient air contaminants measured by the South Scotlandville air monitor from 1999-2004 were below levels likely to cause adverse health effects in the surrounding community. Inhalation of these contaminant concentrations presented *no public health hazard* to the community of South Scotlandville.

Recommendations

- The LDEQ should continue to monitor concentrations of ambient air contaminants in South Scotlandville.

Public Health Action Plan

The information produced within this health consultation should be disseminated to the community members and stakeholders within South Scotlandville, East Baton Rouge Parish, Louisiana.

Preparers of this Report

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1. Agency for Toxic Substances and Disease Registry. South Scotlandville 1,3-Butadiene Evaluation (a/k/a Rhodia, Inc.-Unit #6) Baton Rouge, Louisiana. Atlanta: US Department of Health and Human Services; 2005 Mar 21.

2. Louisiana Administrative Code. Air. Title 33, Part III. Chapter 51. Louisiana Department of Environmental Quality, Water Quality Management Division. Baton Rouge, LA. 2005.

3. U.S. Census Bureau. State and County Quickfacts. Louisiana Quickfacts. East Baton Rouge, Louisiana. <http://quickfacts.census.gov/qfd/states/22/22033.html>; Accessed 19 October, 2004.

4. U.S. Census Bureau. 2000 County Business Patterns for East Baton Rouge, LA. <http://www.census.gov/epcd/cbp/map/00data/22/033.txt>; Accessed 19 October, 2004.

5. U.S. Environmental Protection Agency. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001A. Washington, DC: Risk Assessment Forum, US Environmental Protection Agency, February 2003.

Certification

This South Scotlandville Air Contaminants 1999-2004 health consultation was prepared by the Louisiana Department of Health and Hospitals under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures at the time the health consultation was begun. The editorial review was conducted by the Cooperative Agreement Partner.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Cooperative Agreement Team Leader, DHAC, ATSDR

Appendix A: Evaluation Process

Screening Process

The screening process was performed separately for contaminants sampled during high VOC sampling times versus those sampled during the regular 24-hour sampling schedule. Ambient air concentrations of the 60 contaminants measured by the South Scotlandville air monitor were initially compared to Louisiana's established ambient air standards*. *Ambient air standards* (AAS) are conservative levels of air pollution set to protect human health from air emissions. Since AAS are usually listed in terms of micrograms per cubic meter ($\mu g/m^3$) and the South Scotlandville air monitor measured contaminants in terms of parts per billion by volume (ppbv), the AAS were converted to ppbv the following equation†:

$$\mathbf{X\ ppbv\ =\ (Y\ \mu g/m^3)(24.45)/(molecular\ weight)}$$

If no AAS was available, the contaminant concentrations were compared to *risk-based concentrations* (RBCs), which are estimated contaminant concentrations at which noncarcinogenic or carcinogenic health effects are unlikely‡§. If no RBC was available, contaminant concentrations were compares to the reference concentration for the specific contaminant or to other available guideline values**. Contaminants whose highest concentrations exceeded any of these values were identified as *contaminants of concern* (COCs) and are listed in Tables A-1 through A-12.

Evaluation of high VOC sampling times was based on the maximum monthly concentrations of COCs from this data set. Monthly averages were calculated for the COCs from each year's regular sampling schedule. If the monthly averages exceeded the RBC, the contaminants were further evaluated for noncancer health effects.

Noncancer Health Effects

Monthly averages of the COCs remaining after the screening process were compared to their corresponding reference concentration. A *reference concentration* (RfC) is an estimate of a

* Louisiana Administrative Code. Air. Title 33, Part III. Chapter 51. Louisiana Department of Environmental Quality, Water Quality Management Division. Baton Rouge, LA. 2005.

† Retrieved from the Conversion Calculator webpage at http://www.cdc.gov/niosh/docs/2004-101/calc.htm

‡ US Environmental Protection Agency. Region III RBC Table. Washington, DC: US Environmental Protection Agency; 2005 Apr.

§ Methacrylonitrile's RBC was removed from the April 2005 table because it is not typically found at Region III Superfund sites. Its RBC was retrieved from the October 2004 table.

** Concentrations of chloroacetonitrile were compared to its AEGL 3, or interim Acute Exposure Guideline Level. AEGLs are available from the EPA website at http://www.epa.gov/oppt/aegl/chemlist.htm

continuous inhalation exposure to a contaminant that is likely to be without risk of noncancer health effects during a lifetime. If a COC concentration was higher than the RfC, then it was evaluated in comparison with concentrations of that contaminant known to cause adverse health effects. The same evaluation process was also performed on the monthly maximum concentrations from the high VOC sampling times.

Calculation of Carcinogenic Risk

Cancer occurs from long-term exposure to carcinogens. To determine whether any of the ambient air contaminants in South Scotlandville presented any cancer risk to South Scotlandville residents, contaminant concentrations were averaged for each year. Because of the uncertainties involved in estimating carcinogenic risk, the ATSDR employs a weight-of-evidence approach in evaluating all relevant carcinogenic data, describing carcinogenic risk in words as well as in numerical terms.[††] The estimated risks of developing cancer resulting from residential exposures to the COCs sampled from South Scotlandville were calculated by multiplying each exposure volume over a 70-year (lifetime) period by the COC's *inhalation unit risk* (IUR; retrieved for each contaminant from the Integrated Risk Information System website[‡‡] or similar resources[§§]). In order to perform this calculation, the average air concentrations expressed in ppbv were converted to $\mu g/m^3$ using the following equation[***]:

$$\mathbf{Y\ \mu g/m^3 = (X\ ppb)(molecular\ weight)/24.45}$$

The results of the carcinogenic risk calculation estimate the worst-case maximum increase in the risk of developing cancer after exposure to the contaminant. This estimation is accurate within one order of magnitude; a calculated cancer risk of 2 excess cancers per 10,000 people might actually be 2 excess cancers per 1,000 people or 2 excess cancers per 100,000 people.

[††] Agency for Toxic Substances and Disease Registry.1993. Cancer policy framework. Atlanta, Georgia: US Department of Health and Human Services.

[‡‡] http://www.epa.gov/iris/subst/0139.htm

[§§] For benzyl chloride: Retrieved from the EPA-Air Toxics Website-Benzyl Chloride web page at http://www.epa.gov/ttn/atw/hlthef/benzylch.html#ref6

[***] Retrieved from the Conversion Calculator webpage at http://www.cdc.gov/niosh/docs/2004-101/calc.htm

Table A-1. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 1999: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-trimethylbenzene	0	2.57	1.26	RBC‡
1,2-dibromoethane	0	1.1E-01	5.86E-02	annual LA AAS§
1,2-dichloroethane	0	1.67E+01	9.52E-01	annual LA AAS
Acrylonitrile	0	6.33	6.78E-01	annual LA AAS
Allyl chloride	0	4.87E+01	2.28E+01	8-hour LA AAS
Benzene	1.3E-01	1.4E+01	3.76	annual LA AAS
Benzyl Chloride	0	1.4E-01	7.15E-03	RBC
Chloroform	0	1.24	8.81E-01	annual LA AAS
Methacrylonitrile	0	1.19	2.66E-01	RBC
MTBE	0	1.16E+01	4.44E-01	RBC
Tetrahydrofuran	0	1.42	3.12E-01	RBC
Vinyl Chloride	0	4.55	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-2. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 1999: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-trimethylbenzene	0	1.99	1.26	RBC‡
1,2-dibromoethane	0	8.0E-02	5.86E-02	annual LA AAS§
1,2-dichloroethane	0	7.32	9.52E-01	annual LA AAS
Acrylonitrile	0	1.30	6.78E-01	annual LA AAS
Benzene	2.3E-01	3.87	3.76	annual LA AAS
Benzyl Chloride	0	5E-02	7.15E-03	RBC
Chloroform	0	2.37	8.81E-01	annual LA AAS
Methacrylonitrile	0	8.1E-01	2.66E-01	RBC
Methylene Chloride	0	2.54	1.09	RBC
MTBE	0	2.47	4.44E-01	RBC
Vinyl Chloride	0	2.63	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-3. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2000: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,1,2,2-tetrachloroethane	0	8.8E-01	2.48E-01	annual LA AAS‡
1,2,4-trimethylbenzene	0	3.72	1.26	RBC§
1,2-dibromoethane	0	6E-02	5.86E-02	annual LA AAS
1,2-dichloroethane	0	4.52E+02	9.52E-01	annual LA AAS
Acrylonitrile	0	8.5	6.78E-01	annual LA AAS
Benzene	9E-02	1.37E+01	3.76	annual LA AAS
Benzyl Chloride	0	1.51	7.15E-03	RBC
Bromomethane	0	3.25	1.31	RBC
Carbon Tetrachloride	0	1.91	1.06	annual LA AAS
Chloroform	0	3.45E+01	8.81E-01	annual LA AAS
Methacrylonitrile	0	3.39	2.66E-01	RBC
Methylene Chloride	0	2.13	1.09	RBC
MTBE	0	8.35	4.44E-01	RBC
Tetrahydrofuran	0	1.02	3.12E-01	RBC
trans-1,3-Dichloropropene	0	4E-01	1.39E-01	RBC
Vinyl Chloride	0	5.12E+01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-4. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2000: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-dichloroethane	0	1.45E+01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.43	6.78E-01	annual LA AAS
Benzyl Chloride	0	9E-01	7.15E-03	RBC
Bromomethane	0	1.49	1.31	RBC
Chloroform	0	1.35	8.81E-01	annual LA AAS
Methacrylonitrile	0	4.5E-01	2.66E-01	RBC
MTBE	0	1.25	4.44E-01	RBC
trans-1,3-Dichloropropene	0	1.03	1.39E-01	RBC
Vinyl Chloride	0	1.87	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-5. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2001: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	0	3.91	1.26	RBC‡
1,2-Dichloroethane	0	3.32E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	4.83	6.78E-01	annual LA AAS
Benzene	6E-01	1.32E+01	3.76	annual LA AAS
Benzyl Chloride	0	2.46	7.15E-03	RBC
Bromomethane	0	1.77	1.31	RBC
Carbon Tetrachloride	5E-02	1.44	1.06	annual LA AAS
Chloroform	0	1.31	8.81E-01	annual LA AAS
Methacrylonitrile	0	1.88	2.66E-01	RBC
MTBE	0	13.45	4.44E-01	RBC
Tetrahydrofuran	0	1.39	3.12E-01	RBC
trans-1,3-Dichloropropene	0	2.4E-01	1.39E-01	RBC
Vinyl Chloride	0	1.99E+01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-6. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2001: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	5.84	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.16	6.78E-01	annual LA AAS
Benzyl Chloride	0	1.8E-01	7.15E-03	RBC§
Methacrylonitrile	0	3.7E-01	2.66E-01	RBC
MTBE	0	1.19	4.44E-01	RBC
Vinyl Chloride	0	5.66	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-7. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2002: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	1E-01	2.51	1.26	RBC‡
1,2-Dichloroethane	0	1.11E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	2.15	6.78E-01	annual LA AAS
Benzene	1.1E-01	5.23	3.76	annual LA AAS
Benzyl Chloride	0	1.E-02	7.15E-03	RBC
Chloroform	1E-01	1.17	8.81E-01	annual LA AAS
Methacrylonitrile	0	9.9E-01	2.66E-01	RBC
MTBE	0	1.04E+01	4.44E-01	RBC
Vinyl Chloride	0	3.65	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-8. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2002: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	8.01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	7.8E-01	6.78E-01	annual LA AAS
Benzyl Chloride	0	1E-02	7.15E-03	RBC§
MTBE	0	3.57	4.44E-01	RBC
Vinyl Chloride	0	3.77	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-9. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2003: High VOC sampling time

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	4E-02	1.46	1.26	RBC‡
1,2-Dichloroethane	0	1.3E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	1.53	6.78E-01	annual LA AAS
Benzene	1.4E-01	8.28	3.76	annual LA AAS
Benzyl Chloride	0	3E-02	7.15E-03	RBC
Carbon Tetrachloride	7E-02	5.36	1.06	annual LA AAS
Chloroform	0	8.43	8.81E-01	annual LA AAS
Methacrylonitrile	0	7.4E-01	2.66E-01	RBC
MTBE	0	1.36E+01	4.44E-01	RBC
Tetrahydrofuran	0	1.02	3.12E-01	RBC
Vinyl Chloride	0	5.54	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-10. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2003: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	1.11E+01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.15	6.78E-01	annual LA AAS
Benzyl Chloride	0	2E-02	7.15E-03	RBC§
Chloroform	2E-02	1.03	8.81E-01	annual LA AAS
MTBE	0	1.96	4.44E-01	RBC
Vinyl Chloride	0	8	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-11. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2004: High VOC sampling time

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,1,2-Trichloroethane	0	4.05	1.15	8-hour LA AAS‡
1,2,4-Trimethylbenzene	1E-02	2.09	1.26	RBC§
1,2-Dichloroethane	0	2.38E+01	9.52E-01	annual LA AAS
Acrylonitrile	0	1.34	6.78E-01	annual LA AAS
Benzene	7E-02	7E+01	3.76	annual LA AAS
Benzyl Chloride	0	3E-02	7.15E-03	RBC
Chloroform	1E-02	1.16	8.81E-01	annual LA AAS
Methacrylonitrile	0	5.6E-01	2.66E-01	RBC
Methylene chloride	1.2E-01	1.28	1.09	RBC
MTBE	0	6.47+02	4.44E-01	RBC
Tetrahydrofuran	0	3.5E-01	3.12E-01	RBC
Vinyl Chloride	0	5.03	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-12. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2004: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	2.25	9.52E-01	annual LA AAS‡
Acrylonitrile	0	7.3E-01	6.78E-01	annual LA AAS
Benzyl Chloride	0	1.4E-01	7.15E-03	RBC§
MTBE	0	9.31	4.44E-01	RBC
Vinyl Chloride	0	9.4E-01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Health Consultation

SOUTH SCOTLANDVILLE AIR CONTAMINANTS

1999-2004

BATON ROUGE, LOUISIANA

Prepared by

Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology and Toxicology
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Table of Contents

List of Acronyms

AAS	Ambient Air Standard
AEGL 3	Interim Acute Exposure Guideline Level
ATSDR	Agency for Toxic Substances and Disease Registry
COC	Contaminant of Concern
DHAC	Division of Health Assessment and Consultation
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
mg/m^3	milligrams per cubic meter
OPH	Office of Public Health
ppb	parts per billion
ppbc	parts per billion as carbon
ppbv	parts of pollutant per billion parts of air, by volume
ppm	parts per million
RfC	Reference Concentration
SEET	Section of Environmental Epidemiology and Toxicology
$\mu g/m^3$	micrograms per cubic meter
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Summary and Statement of Issues

From 1999-2004, the South Scotlandville air monitor in East Baton Rouge Parish, Louisiana, detected 60 ambient air contaminants. In October 2004, the Louisiana Department of Environmental Quality (LDEQ) asked the Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (LDHH/OPH/SEET) to review 1,3-butadiene exceedences measured by the air monitor during this time period. SEET found no public health hazard involved with inhalation of these concentrations of 1,3-butadiene [1]. LDEQ then requested that SEET review the 59 other air contaminants detected by the South Scotlandville air monitor during this time period. SEET, through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), examined concentrations detected for these contaminants to determine whether they posed a threat to human health and to decide what further public health actions, if any, may be needed.

Background

Site Description and History

The South Scotlandville air monitor was erected in 1999. Formerly referred to as the Rhodia monitor, the air monitor is part of a network of toxic air pollutant ambient air monitors that LDEQ operates throughout the state of Louisiana. This particular monitor is located on U.S. Highway 190 (Airline Highway) near the old Mississippi River Bridge (see Figure 1). The monitor's air intake is positioned 12 feet above ground level and regularly measures total non-methane hydrocarbons within ambient air.

The South Scotlandville air monitor reports its findings both as concentration in parts per billion by volume (ppbv) and in hydrocarbon concentration in parts per billion as carbon (ppbc). Regular sampling takes place over a 24-hour period every 6 days. In addition, whenever the monitor detects high total hydrocarbon concentrations, it is triggered to catch a "high VOC event" (high volatile organic compound) sample (M. Oubre, Louisiana Department of Environmental Quality, personal communication, 2004). Table 1 lists the 60 contaminants detected by the monitor from 1999-2004 and the Louisiana ambient air standards used to regulate levels of these contaminants [2]. Originally presented in micrograms per cubic meter ($\mu g/m^3$), the ambient air standards have been converted to ppbv to correspond with the air monitor's data.

Demographics

South Scotlandville is located in East Baton Rouge Parish, Louisiana. Census 2000 results record a parish population of 412,852. The largest ethnic group in the parish at that time was Caucasian (56.2%), followed by African-American (40.1%), Asian (2.1%), and American Indian or Alaska Native (0.2%), with 0.5% of the population reporting as Other.

Figure 1. Location of the South Scotlandville Air Monitoring Station

Map Adapted from information provided by the Louisiana Department of Environmental Quality

Table 1. Air Contaminants Detected by the South Scotlandville Air Monitor from 1999-2004

CHEMICAL	8-hour LA AAS* (ppbv†)	annual LA AAS (ppbv)
1,1,1-trichloroethane	8.29E+03	
1,1,2,2-tetrachloroethane		2.48E-01
1,1,2-trichloroethane		1.15E+00
1,1-dichloroethane		
1,1-dichloroethene		
1,2,4-trichlorobenzene		
1,2,4-trimethylbenzene		
1,2-dibromoethane		5.86E-02
1,2-dichlorobenzene		
1,2-dichloroethane		9.52E-01
1,2-dichloropropane	1.79E+03	
1,3,5-trimethylbenzene		
1,3-dichlorobenzene		
1,3-hexachlorobutadiene		4.27E-01
1,4-dichlorobenzene	2.38E+02	
2-Butanone		
2-hexanone		
4-methyl-2-pentanone		
Acetone		
Acetonitrile	4.83E+02	
Acrylonitrile		6.78E-01
Allyl chloride	2.28E+01	
Benzene		3.76E+00
Benzyl chloride		
Bromomethane		
Carbon disulfide	2.29E+01	
Carbon tetrachloride		1.06E+00
Chloroacetonitrile		
Chlorobenzene	2.39E+02	
Chlorobutane		

CHEMICAL	8-hour LA AAS* (ppbv†)	annual LA AAS (ppbv)
Chloroethane	2.39E+03	
Chloroform		8.81E-01
Chloromethane		2.69E+01
cis-1,2-dichloroethene		
cis-1,3-dichloropropene		
Diethyl ether		
Ethyl methacrylate		
Ethylbenzene	2.37E+03	
Freon-11		
Freon-113		
Freon-114		
Freon-12		
m/p Xylene	2.37E+03	
Methacrylonitrile		
Methyl acrylate		
Methyl methacrylate	2.39E+03	
Methylene chloride		
MTBE		
Nitrobenzene	2.36E+01	
Nitropropane		5.49E+00
o Xylene	2.37E+03	
Styrene	1.19E+03	
Tetrachloroethylene		
Tetrahydrofuran		
Toluene	2.36E+03	
trans-1,3-dichloropropene		
Trichloroethylene		1.09E+01
Vinyl acetate	2.36E+02	
Vinyl chloride		7.83E-01

*ambient air standard

†parts per billion by volume

Industrial facilities within one-half mile of the South Scotlandville ambient air monitor include Rhodia Inc., UOP LLC, the Formosa Plastics Corporation, the Albermarle Corporation, ExxonMobile, and DSM Copolymer Inc. Residential neighborhoods begin within approximately one-half mile radius and six elementary and high schools are located within a 2-mile radius of the air monitor.

Discussion

Exposure Pathways

An exposure pathway contains the following five elements: a source of contamination, transport through some kind of environmental medium, a point of exposure, a route of exposure, and a receptor population. The source of the VOCs detected at the South Scotlandville air monitor has not been specifically identified. Ambient air in the vicinity of the monitor serves as both the transport medium and point of exposure for the contamination. The route of exposure to these contaminants is through inhalation of contaminated ambient air. The exposed population includes residents living within the South Scotlandville community of East Baton Rouge Parish, Baton Rouge, Louisiana. Residential neighborhoods, while not directly adjacent to the monitor, begin within approximately one-half mile of the monitor's location.

Evaluation Process

Assessment of the health effects of exposure to contaminant concentrations measured in South Scotlandville's ambient air samples is summarized in Appendix A. To determine the possible health impact of these exposures, each concentration was compared to its corresponding reference concentration (RfC) or other available comparison value. Cancer risks were also estimated for each year's averaged exposure to air contaminants of concern (COCs). The U.S. Environmental Protection Agency's (U.S. EPA's) range of acceptable cancer risk levels is from 1 excess cancer per 10,000 people to 1 excess cancer per 1,000,000 people exposed for a lifetime (1×10^{-4} to 1×10^{-6}) [5]. If cancer risks exceed 1×10^{-4}, the exposed population may develop a greater number of cases of cancer than those ordinarily found in an unexposed population.

Health Effects Evaluation

Assessment of health effects from exposure to the ambient air contaminants detected in South Scotlandville is described in Appendix A. COC concentrations did not appear to increase or decrease during certain months or seasons. COC concentrations sampled during both the regular and high VOC sampling schedules were at least ten times lower than concentrations known to cause health effects. Therefore, the COCs detected by the South Scotlandville air monitor from 1999-2004 did not pose a hazard to human heath.

Cancer Health Effects Evaluation

Estimation of lifetime cancer risks is described in Appendix A. Estimated lifetime cancer risks for residential exposure to the COCs measured by the South Scotlandville air monitor do not exceed the U.S. EPA's upper limit of acceptable cancer risk levels of 1 excess cancer per 10,000 people exposed for a lifetime (1.00×10^{-4}).

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

The mean annual average concentrations of ambient air contaminants sampled by the South Scotlandville air monitor are more than ten times lower than concentrations known to cause health effects. These concentrations should have no adverse effect on the health of children.

Conclusions

The annual average concentrations of ambient air contaminants measured by the South Scotlandville air monitor from 1999-2004 were below levels likely to cause adverse health effects in the surrounding community. Inhalation of these contaminant concentrations presented *no public health hazard* to the community of South Scotlandville.

Recommendations

- The LDEQ should continue to monitor concentrations of ambient air contaminants in South Scotlandville.

Public Health Action Plan

The information produced within this health consultation should be disseminated to the community members and stakeholders within South Scotlandville, East Baton Rouge Parish, Louisiana.

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2. Louisiana Administrative Code. Air. Title 33, Part III. Chapter 51. Louisiana Department of Environmental Quality, Water Quality Management Division. Baton Rouge, LA. 2005.

3. U.S. Census Bureau. State and County Quickfacts. Louisiana Quickfacts. East Baton Rouge, Louisiana. <http://quickfacts.census.gov/qfd/states/22/22033.html>; Accessed 19 October, 2004.

4. U.S. Census Bureau. 2000 County Business Patterns for East Baton Rouge, LA. <http://www.census.gov/epcd/cbp/map/00data/22/033.txt>; Accessed 19 October, 2004.

5. U.S. Environmental Protection Agency. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001A. Washington, DC: Risk Assessment Forum, US Environmental Protection Agency, February 2003.

Certification

This South Scotlandville Air Contaminants 1999-2004 health consultation was prepared by the Louisiana Department of Health and Hospitals under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures at the time the health consultation was begun. The editorial review was conducted by the Cooperative Agreement Partner.

Alan Yarbrough
Technical Project Officer, Division of Health Assessment and Consultation (DHAC)

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Cooperative Agreement Team Leader, DHAC, ATSDR

Appendix A: Evaluation Process

Screening Process

The screening process was performed separately for contaminants sampled during high VOC sampling times versus those sampled during the regular 24-hour sampling schedule. Ambient air concentrations of the 60 contaminants measured by the South Scotlandville air monitor were initially compared to Louisiana's established ambient air standards*. *Ambient air standards* (AAS) are conservative levels of air pollution set to protect human health from air emissions. Since AAS are usually listed in terms of micrograms per cubic meter ($\mu g/m^3$) and the South Scotlandville air monitor measured contaminants in terms of parts per billion by volume (ppbv), the AAS were converted to ppbv the following equation†:

$$\mathbf{X\ ppbv\ =\ (Y\ \mu g/m^3)(24.45)/(molecular\ weight)}$$

If no AAS was available, the contaminant concentrations were compared to *risk-based concentrations* (RBCs), which are estimated contaminant concentrations at which noncarcinogenic or carcinogenic health effects are unlikely‡§. If no RBC was available, contaminant concentrations were compares to the reference concentration for the specific contaminant or to other available guideline values**. Contaminants whose highest concentrations exceeded any of these values were identified as *contaminants of concern* (COCs) and are listed in Tables A-1 through A-12.

Evaluation of high VOC sampling times was based on the maximum monthly concentrations of COCs from this data set. Monthly averages were calculated for the COCs from each year's regular sampling schedule. If the monthly averages exceeded the RBC, the contaminants were further evaluated for noncancer health effects.

Noncancer Health Effects

Monthly averages of the COCs remaining after the screening process were compared to their corresponding reference concentration. A *reference concentration* (RfC) is an estimate of a

* Louisiana Administrative Code. Air. Title 33, Part III. Chapter 51. Louisiana Department of Environmental Quality, Water Quality Management Division. Baton Rouge, LA. 2005.

† Retrieved from the Conversion Calculator webpage at http://www.cdc.gov/niosh/docs/2004-101/calc.htm

‡ US Environmental Protection Agency. Region III RBC Table. Washington, DC: US Environmental Protection Agency; 2005 Apr.

§ Methacrylonitrile's RBC was removed from the April 2005 table because it is not typically found at Region III Superfund sites. Its RBC was retrieved from the October 2004 table.

** Concentrations of chloroacetonitrile were compared to its AEGL 3, or interim Acute Exposure Guideline Level. AEGLs are available from the EPA website at http://www.epa.gov/oppt/aegl/chemlist.htm

continuous inhalation exposure to a contaminant that is likely to be without risk of noncancer health effects during a lifetime. If a COC concentration was higher than the RfC, then it was evaluated in comparison with concentrations of that contaminant known to cause adverse health effects. The same evaluation process was also performed on the monthly maximum concentrations from the high VOC sampling times.

Calculation of Carcinogenic Risk

Cancer occurs from long-term exposure to carcinogens. To determine whether any of the ambient air contaminants in South Scotlandville presented any cancer risk to South Scotlandville residents, contaminant concentrations were averaged for each year. Because of the uncertainties involved in estimating carcinogenic risk, the ATSDR employs a weight-of-evidence approach in evaluating all relevant carcinogenic data, describing carcinogenic risk in words as well as in numerical terms.[††] The estimated risks of developing cancer resulting from residential exposures to the COCs sampled from South Scotlandville were calculated by multiplying each exposure volume over a 70-year (lifetime) period by the COC's *inhalation unit risk* (IUR; retrieved for each contaminant from the Integrated Risk Information System website[‡‡] or similar resources[§§]). In order to perform this calculation, the average air concentrations expressed in ppbv were converted to $\mu g/m^3$ using the following equation[***]:

$$\mathbf{Y\ \mu g/m^3 = (X\ ppb)(molecular\ weight)/24.45}$$

The results of the carcinogenic risk calculation estimate the worst-case maximum increase in the risk of developing cancer after exposure to the contaminant. This estimation is accurate within one order of magnitude; a calculated cancer risk of 2 excess cancers per 10,000 people might actually be 2 excess cancers per 1,000 people or 2 excess cancers per 100,000 people.

[††] Agency for Toxic Substances and Disease Registry.1993. Cancer policy framework. Atlanta, Georgia: US Department of Health and Human Services.

[‡‡] http://www.epa.gov/iris/subst/0139.htm

[§§] For benzyl chloride: Retrieved from the EPA-Air Toxics Website-Benzyl Chloride web page at http://www.epa.gov/ttn/atw/hlthef/benzylch.html#ref6

[***] Retrieved from the Conversion Calculator webpage at http://www.cdc.gov/niosh/docs/2004-101/calc.htm

Table A-1. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 1999: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-trimethylbenzene	0	2.57	1.26	RBC‡
1,2-dibromoethane	0	1.1E-01	5.86E-02	annual LA AAS§
1,2-dichloroethane	0	1.67E+01	9.52E-01	annual LA AAS
Acrylonitrile	0	6.33	6.78E-01	annual LA AAS
Allyl chloride	0	4.87E+01	2.28E+01	8-hour LA AAS
Benzene	1.3E-01	1.4E+01	3.76	annual LA AAS
Benzyl Chloride	0	1.4E-01	7.15E-03	RBC
Chloroform	0	1.24	8.81E-01	annual LA AAS
Methacrylonitrile	0	1.19	2.66E-01	RBC
MTBE	0	1.16E+01	4.44E-01	RBC
Tetrahydrofuran	0	1.42	3.12E-01	RBC
Vinyl Chloride	0	4.55	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-2. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 1999: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-trimethylbenzene	0	1.99	1.26	RBC‡
1,2-dibromoethane	0	8.0E-02	5.86E-02	annual LA AAS§
1,2-dichloroethane	0	7.32	9.52E-01	annual LA AAS
Acrylonitrile	0	1.30	6.78E-01	annual LA AAS
Benzene	2.3E-01	3.87	3.76	annual LA AAS
Benzyl Chloride	0	5E-02	7.15E-03	RBC
Chloroform	0	2.37	8.81E-01	annual LA AAS
Methacrylonitrile	0	8.1E-01	2.66E-01	RBC
Methylene Chloride	0	2.54	1.09	RBC
MTBE	0	2.47	4.44E-01	RBC
Vinyl Chloride	0	2.63	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-3. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2000: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,1,2,2-tetrachloroethane	0	8.8E-01	2.48E-01	annual LA AAS‡
1,2,4-trimethylbenzene	0	3.72	1.26	RBC§
1,2-dibromoethane	0	6E-02	5.86E-02	annual LA AAS
1,2-dichloroethane	0	4.52E+02	9.52E-01	annual LA AAS
Acrylonitrile	0	8.5	6.78E-01	annual LA AAS
Benzene	9E-02	1.37E+01	3.76	annual LA AAS
Benzyl Chloride	0	1.51	7.15E-03	RBC
Bromomethane	0	3.25	1.31	RBC
Carbon Tetrachloride	0	1.91	1.06	annual LA AAS
Chloroform	0	3.45E+01	8.81E-01	annual LA AAS
Methacrylonitrile	0	3.39	2.66E-01	RBC
Methylene Chloride	0	2.13	1.09	RBC
MTBE	0	8.35	4.44E-01	RBC
Tetrahydrofuran	0	1.02	3.12E-01	RBC
trans-1,3-Dichloropropene	0	4E-01	1.39E-01	RBC
Vinyl Chloride	0	5.12E+01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-4. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2000: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-dichloroethane	0	1.45E+01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.43	6.78E-01	annual LA AAS
Benzyl Chloride	0	9E-01	7.15E-03	RBC
Bromomethane	0	1.49	1.31	RBC
Chloroform	0	1.35	8.81E-01	annual LA AAS
Methacrylonitrile	0	4.5E-01	2.66E-01	RBC
MTBE	0	1.25	4.44E-01	RBC
trans-1,3-Dichloropropene	0	1.03	1.39E-01	RBC
Vinyl Chloride	0	1.87	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-5. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2001: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	0	3.91	1.26	RBC‡
1,2-Dichloroethane	0	3.32E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	4.83	6.78E-01	annual LA AAS
Benzene	6E-01	1.32E+01	3.76	annual LA AAS
Benzyl Chloride	0	2.46	7.15E-03	RBC
Bromomethane	0	1.77	1.31	RBC
Carbon Tetrachloride	5E-02	1.44	1.06	annual LA AAS
Chloroform	0	1.31	8.81E-01	annual LA AAS
Methacrylonitrile	0	1.88	2.66E-01	RBC
MTBE	0	13.45	4.44E-01	RBC
Tetrahydrofuran	0	1.39	3.12E-01	RBC
trans-1,3-Dichloropropene	0	2.4E-01	1.39E-01	RBC
Vinyl Chloride	0	1.99E+01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-6. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2001: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	5.84	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.16	6.78E-01	annual LA AAS
Benzyl Chloride	0	1.8E-01	7.15E-03	RBC§
Methacrylonitrile	0	3.7E-01	2.66E-01	RBC
MTBE	0	1.19	4.44E-01	RBC
Vinyl Chloride	0	5.66	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-7. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2002: High VOC sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	1E-01	2.51	1.26	RBC‡
1,2-Dichloroethane	0	1.11E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	2.15	6.78E-01	annual LA AAS
Benzene	1.1E-01	5.23	3.76	annual LA AAS
Benzyl Chloride	0	1.E-02	7.15E-03	RBC
Chloroform	1E-01	1.17	8.81E-01	annual LA AAS
Methacrylonitrile	0	9.9E-01	2.66E-01	RBC
MTBE	0	1.04E+01	4.44E-01	RBC
Vinyl Chloride	0	3.65	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-8. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2002: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	8.01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	7.8E-01	6.78E-01	annual LA AAS
Benzyl Chloride	0	1E-02	7.15E-03	RBC§
MTBE	0	3.57	4.44E-01	RBC
Vinyl Chloride	0	3.77	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-9. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2003: High VOC sampling time

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2,4-Trimethylbenzene	4E-02	1.46	1.26	RBC‡
1,2-Dichloroethane	0	1.3E+01	9.52E-01	annual LA AAS§
Acrylonitrile	0	1.53	6.78E-01	annual LA AAS
Benzene	1.4E-01	8.28	3.76	annual LA AAS
Benzyl Chloride	0	3E-02	7.15E-03	RBC
Carbon Tetrachloride	7E-02	5.36	1.06	annual LA AAS
Chloroform	0	8.43	8.81E-01	annual LA AAS
Methacrylonitrile	0	7.4E-01	2.66E-01	RBC
MTBE	0	1.36E+01	4.44E-01	RBC
Tetrahydrofuran	0	1.02	3.12E-01	RBC
Vinyl Chloride	0	5.54	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡Risk-based concentration
§Louisiana ambient air standard

Table A-10. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2003: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	1.11E+01	9.52E-01	annual LA AAS‡
Acrylonitrile	0	1.15	6.78E-01	annual LA AAS
Benzyl Chloride	0	2E-02	7.15E-03	RBC§
Chloroform	2E-02	1.03	8.81E-01	annual LA AAS
MTBE	0	1.96	4.44E-01	RBC
Vinyl Chloride	0	8	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-11. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2004: High VOC sampling time

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,1,2-Trichloroethane	0	4.05	1.15	8-hour LA AAS‡
1,2,4-Trimethylbenzene	1E-02	2.09	1.26	RBC§
1,2-Dichloroethane	0	2.38E+01	9.52E-01	annual LA AAS
Acrylonitrile	0	1.34	6.78E-01	annual LA AAS
Benzene	7E-02	7E+01	3.76	annual LA AAS
Benzyl Chloride	0	3E-02	7.15E-03	RBC
Chloroform	1E-02	1.16	8.81E-01	annual LA AAS
Methacrylonitrile	0	5.6E-01	2.66E-01	RBC
Methylene chloride	1.2E-01	1.28	1.09	RBC
MTBE	0	6.47+02	4.44E-01	RBC
Tetrahydrofuran	0	3.5E-01	3.12E-01	RBC
Vinyl Chloride	0	5.03	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration

Table A-12. Contaminants of Concern (COCs) measured by the South Scotlandville Air Monitor in 2004: Regular 24-hour sampling times

COC	Concentration range (ppbv*) Low	High	CV† (ppbv)	Type of CV
1,2-Dichloroethane	0	2.25	9.52E-01	annual LA AAS‡
Acrylonitrile	0	7.3E-01	6.78E-01	annual LA AAS
Benzyl Chloride	0	1.4E-01	7.15E-03	RBC§
MTBE	0	9.31	4.44E-01	RBC
Vinyl Chloride	0	9.4E-01	7.83E-01	annual LA AAS

*Parts per billion by volume
†Comparison value
‡ Louisiana ambient air standard
§ Risk-based concentration