Letter Health Consultation

Review of School Air Toxics Survey Data for

VINCENT SETTLEMENT ELEMENTARY

CALCASIEU PARISH, LOUISIANA

Prepared by the
Louisiana Department of Health and Hospitals

JULY 14, 2010

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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Prepared By:

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State of Louisiana

Department of Health and Hospitals
Center for Environmental Health Services

Tom Harris, Administrator
Environmental Technology Division
Louisiana Department of Environmental Quality
602 N. Fifth Street
Baton Rouge, LA 70802

June 18, 2010

Dear Mr. Harris,

The Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (DHH/OPH/SEET) has evaluated air sampling data collected from the air monitor at Vincent Settlement Elementary School located in Sulphur, Louisiana. The following letter provides the results of SEET's assessment.

Background and Statement of Issues

In response to a December 2008 USA Today report, "The Smokestack Effect: Toxic Air and America's Schools", the Louisiana Department of Environmental Quality (LDEQ) published a "School Air Toxics Survey Report" to examine the potential effects of industrial pollution on air quality at select Louisiana schools. Vincent Settlement Elementary School was listed and ranked in the first percentile by USA Today [1,2].

Vincent Settlement Elementary School has been at its present address of 1072 Vincent Settlement Drive, Sulphur, LA 70663 since 1954. The original school was established in 1886, however, it was destroyed by a hurricane in 1918 and was rebuilt. In 1952, the school was destroyed by a fire and was rebuilt in 1954 [3]. Eight industries are located within 2 miles northwest of the school: Citgo, Targa, Calcasieu Power, Grace Division, CII Carbon, Conoco Phillips, Southern Ionics, and Westlake Chemical (See Figure A-1).

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Discussion

One air canister sample was collected on February 4, 2009 from the air monitor located at the parking lot of the Vincent Settlement Elementary School grounds (coordinates $30^0$8'52.33" N, $93^0$21'33.75'W) (See Figure A-2).

SEET screened the contaminants detected in the sample for potential human health risks using health-based comparison values, as described in Appendix B and listed in Tables B-1 and B-2. Contaminants that exceeded the comparison values were identified as contaminants of concern (COCs).

None of the contaminant concentrations detected during the sampling event posed a noncancer health risk. Benzene, chloroform, 1,2-dibromoethane, and carbon tetrachloride were identified as COCs for carcinogenic effects. (Background levels of these contaminants in ambient air are provided in Table B-3). However, carcinogenic effects occur due to long-term exposures. The one 10 second sample collected represents a "snapshot" in time and may have captured unusual spikes in the concentrations of these contaminants or some contaminant concentrations could have been missed and not detected. Monitoring of these contaminants at regular intervals over a longer period of time would yield data more suitable for determining whether any potential increase in cancer risk due to long-term exposures exists.

Conclusion

Non-carcinogenic contaminants detected in the air at the Vincent Settlement Elementary School site from the one 10 second sample collected were present in concentrations that posed no short term non-cancer effects and harm to public health. Four contaminants were identified as COCs for carcinogenic effects; however, a cancer risk determination cannot be made based on one 10 second sample collected. SEET and ATSDR cannot currently conclude, based on this one sample, whether any contaminants detected could cause long-term non cancer or cancer effects and harm people's health. The carcinogenic contaminants identified as COCs would pose a potential increase in cancer risk if the concentrations detected were shown to be an accurate representation of the long-term presence of these contaminants in ambient air in this community. In addition, contaminants that were not detected in this one 10 second sample may be present in samples collected at regular intervals over a longer period of time.

Recommendations

SEET suggests longer term sampling in order to obtain a more representative analysis and a more definitive conclusion regarding the contaminants present in the ambient air. SEET will assess any additional data as it becomes available. If there are questions regarding this assessment, please contact me at (504) 219-4575.

Sincerely,

Kathleen G. Aubin, MSPH

Environmental Health Scientist Supervisor
Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology & Toxicology

References

1. USAToday Special Report. The Smokestack Effect: Toxic Air and America's Schools. Accessed 2010 June 3, 2010 at URL: http://content.usatoday.com/news/nation/environment/smokestack/index
2. Louisiana Department of Environmental Quality, Office of Environmental Assessment, Air Quality Assessment Division. School Air Toxics Survey Final Report. 2009 Oct 12.
3. Email from Michael Vince (LDEQ) to Kathleen Aubin (LDHH), June 16, 2010.

Certification

This Review of School Air Toxics Survey Data for Vincent Settlement Elementary School letter 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.

Jeffrey Kellam
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.

Alan W. Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR

APPENDIX A: Maps

Figure A-1: Vincent Settlement Elementary School and Industries located within 2-mile buffer

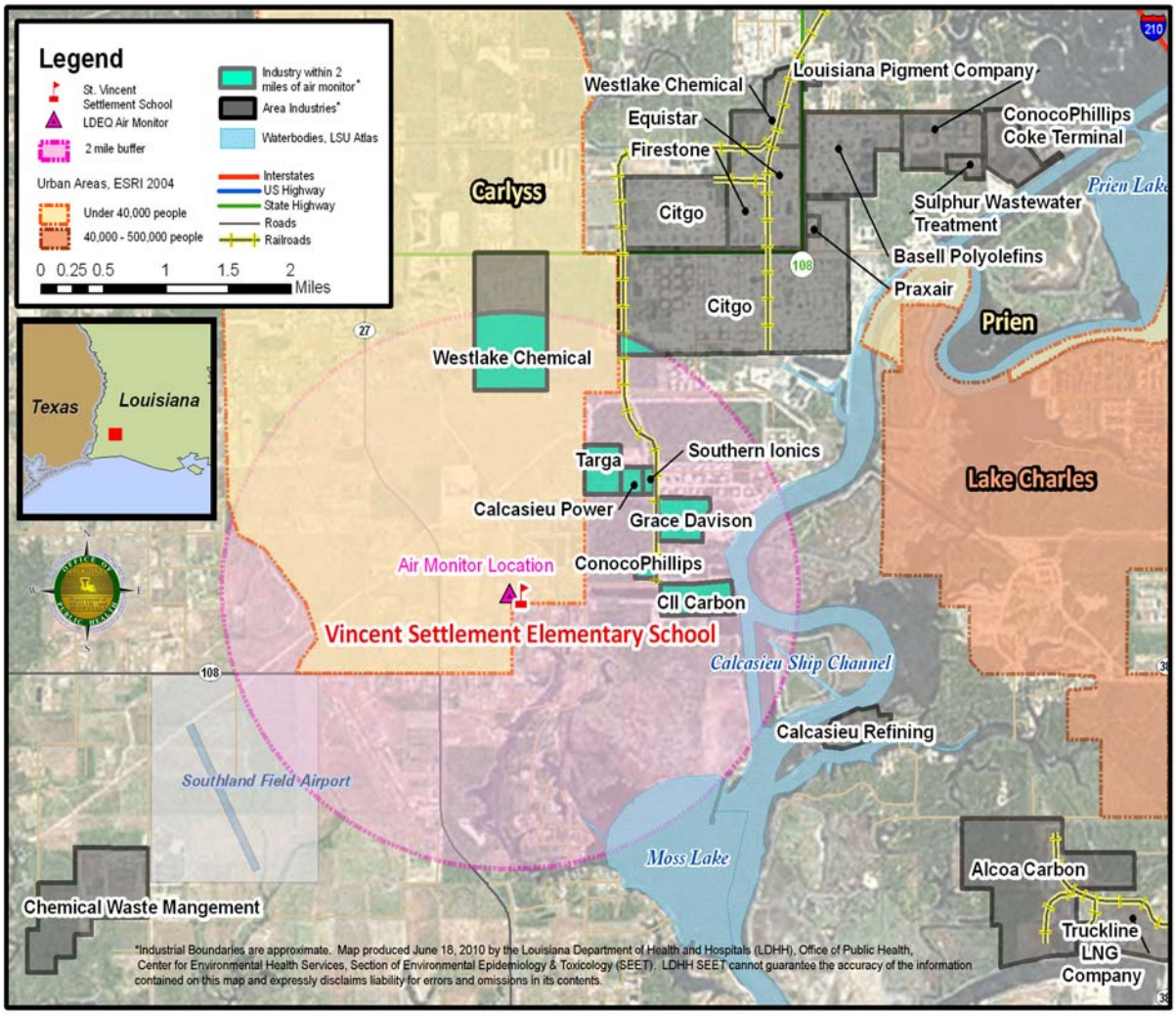
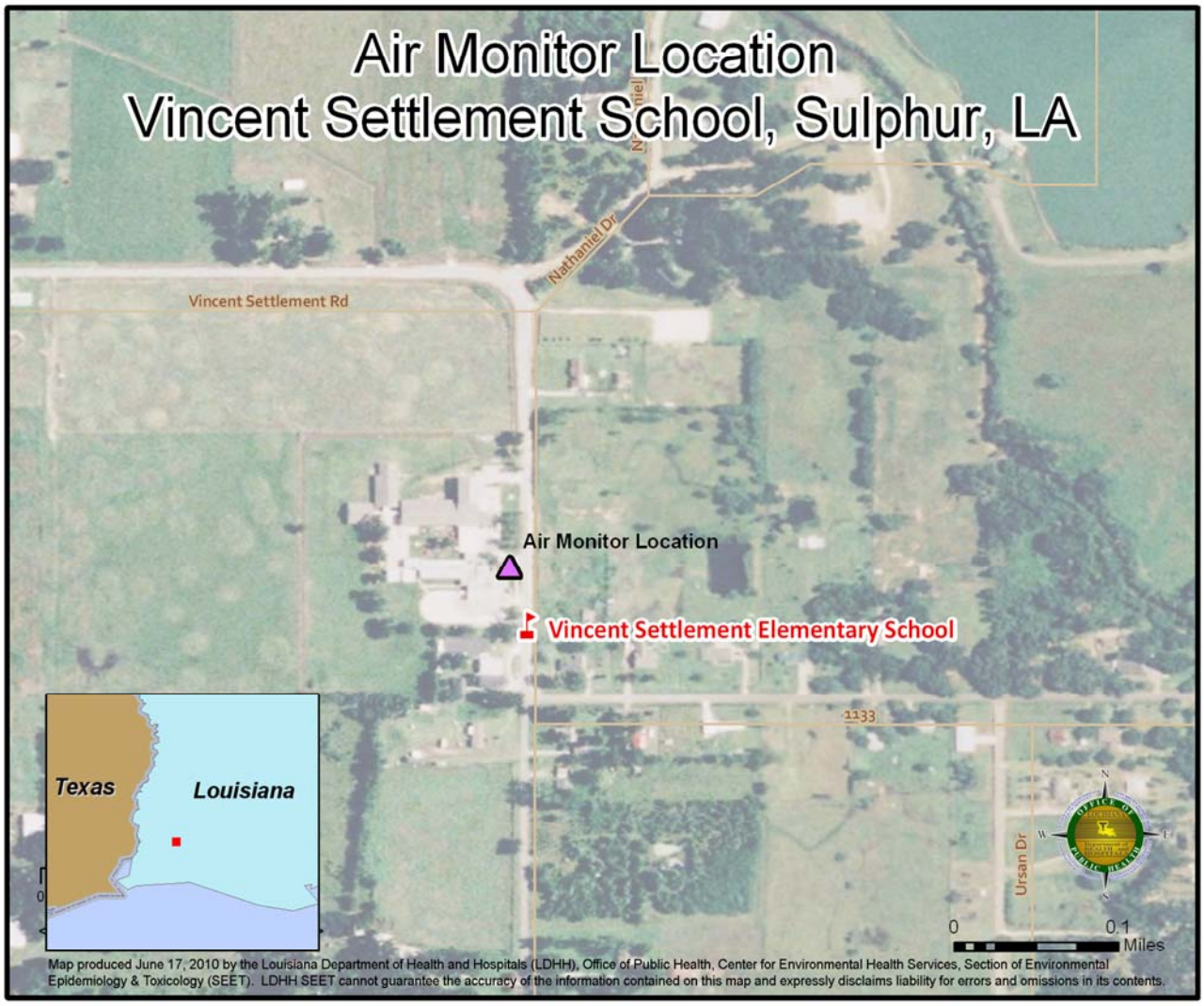


Figure A-2: Location of Vincent Settlement Elementary School and the air monitor at the site



APPENDIX B: Data Evaluation

Screening Process

Comparison values were initially used to determine which samples needed to be closely evaluated. Comparison values are media-specific concentrations of chemicals that are used by health assessors to screen environmental contaminants for further evaluation. These values are not used as predictors of adverse health effects.

> *Environmental media evaluation guides* (EMEGs) are estimated contaminant concentrations at which noncarcinogenic health effects are unlikely. They are calculated from the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels (MRLs). EMEGs apply to acute (14 days or less), intermediate (15–365 days) and chronic (365 days or more) exposures.
>
> *Risk-based concentrations* (RBCs) are estimated contaminant concentrations in a media at which noncarcinogenic or carcinogenic health effects are unlikely. The RBCs used in this health consultation were last updated in June 2008.
>
> C*ancer risk evaluation guides* are estimated contaminant concentrations that would be expected to cause no more than one additional excess cancer in 1 million exposed persons over a lifetime. CREGs are calculated from EPA's cancer slope factors (CSFs).
>
> Short-term *effects screening levels* (ESLs) were used for screening contaminants when health-based comparison values were not available. ESLs, which are calculated by the Texas Commission on Environmental Quality, are based on data concerning health effects, the potential for odors to be a nuisance, effects on vegetation, and corrosive effects. "Short term" ESLs are used for data based on a one-hour averaging period.

Tables B-1 and B-2 list the contaminants concentrations detected in the air sample from the Vincent Settlement Elementary School site.

Table B-1:Contaminants detected using a gas chromatography/ flame ionization detector (GC/FID) for air sample collected from the Vincent Settlement Elementary School air monitor

Contaminant	Concentration (ug/m^{3*})	CV † (ug/m^3)	CV reference
Acetylene	1.97	26,600	short-term ESL‡
Ethylene	0.71	1400	short-term ESL
Ethane	5.14	12,000	short-term ESL
Propylene	0.21	3,100	RBC§
Propane	5.90	78,000	short-term ESL
Isobutane	2.01	4,800	short-term ESL
1-Butene	0.09	820	short-term ESL
n-Butane	3.58	19,000	short-term ESL
t-2-Butene	nd	4,800	short-term ESL
c-2-Butene	nd	4,800	short-term ESL
2-methylbutane	1.89	3500	short-term ESL
1-Pentene	nd	290	short-term ESL
n-Pentane	1.89	1,000	RBC
Isoprene	nd	14	short-term ESL
t-2-pentene	nd	7,500	short-term ESL
c-2-pentene	nd	7,500	short-term ESL
2,2-Dimethylbutane	0.14	3,500	short-term ESL
Cyclopentane	0.18	3,400	short-term ESL
2,3-dimethylbutane	0.18	3,500	short-term ESL
2-methylpentane	0.75	290	short-term ESL
3-Methylpentane	0.47	3,500	short-term ESL
1-hexene	nd	70	short-term ESL
n-hexane	1.01	2,000	chronic EMEG††
Methylcyclopentane	0.49	2,600	short-term ESL
2,4-dimethylpentane	nd	3,500	short-term ESL
Benzene	**0.46**	0.1	CREG‡‡
Cyclohexane	0.32	6300	RBC
2-methylhexane	0.21	3,070	short-term ESL
2,3-dimethylpentane	nd	3,500	short-term ESL
3-methylhexane	0.33	3070	short-term ESL
2,2,4-trimethylpentane	0.19	3500	short-term ESL
n-Heptane	0.46	3500	short-term ESL
Methylcyclohexane	0.33	16100	short-term ESL
2,3,4-trimethylpentane	nd	3500	short-term ESL
Toluene	0.38	300	chronic EMEG
2-methylheptane	0.10	3500	short-term ESL
3-methylheptane	nd	3500	short-term ESL
n-Octane	0.19	3500	short-term ESL
Ethylbenzene	nd	1000	chronic EMEG
m/p-Xylene	nd	730	RBC

Contaminant	Concentration (ug/m^{3*})	CV † (ug/m^3)	CV reference
Styrene	nd	900	chronic EMEG
o-Xylene	nd	730	RBC
n-Nonane	nd	210	RBC
Cumene	nd	420	RBC
n-Propylbenzene	nd	1000	RBC
m-Ethyltoluene	nd	1250	chronic EMEG
p-Ethyltoluene	nd	1250	chronic EMEG
1,3,5-Trimethylbenzene	nd	1250	chronic EMEG
o-Ethyltoluene	nd	1250	chronic EMEG
1,2,4-trimethylbenzene	nd	7.3	RBC
n-Decane	nd	10000	short-term ESL
1,2,3-trimethylbenzene	nd	1250	short-term ESL
m-Diethylbenzene	nd	2500	short-term ESL
p-Diethylbenzene	nd	2500	short-term ESL
n-Undecane	0.04	3500	short-term ESL
1,3-butadiene	nd	0.03	CREG

* ug/m^3=milligrams per kilogram
†CV=comparison value
‡ESL = effects screening level
§ RBC = risk-based concentration
**nd = not detected
††EMEG = environmental media evaluation guide
‡‡CREG = cancer risk evaluation guide

Table B-2: Contaminants detected using gas chromatography/mass spectrometry (GC/MS) for air sample collected from the Vincent Settlement Elementary School air monitor

Contaminant	Concentration (ug/m^{3*})	CV † (ug/m^3)	CV reference
Freon-12	3.48	49500	short-term ESL‡
Chloromethane	1.47	100	chronic EMEG§
Freon-114	0.36	70,000	short-term ESL
Vinyl Chloride	nd	0.1	CREG††
1,3-Butadiene	nd	0.03	CREG
Bromomethane	0.16	20	chronic EMEG
Carbon Disulfide	0.13	900	chronic EMEG
Chloroethane	nd	40,000	acute EMEG
Freon-11	1.77	28,000	short-term ESL
Acetonitrile	0.17	63	RBC‡‡
1,1-Dichloroethene	nd	80	int. EMEG
Methylene Chloride	0.39	1100	RBC
Freon-113	0.94	38,000	short-term ESL
Acetone	3.29	30,000	chronic EMEG
1,1-Dichloroethane	nd	1.5	RBC
cis-1,2-Dichloroethene	nd	800	int. EMEG
Acrylonitrile	nd	0.01	CREG
Chloroform	**0.15**	0.04	CREG
1,2-Dichloroethane	nd	0.04	CREG
Diethyl Ether	nd	930	short-term ESL
1,1,1-Trichloroethane	0.17	4,000	int. EMEG
Benzene	**0.68**	0.1	CREG
Carbon Tetrachloride	**0.71**	0.2	CREG
Allyl Chloride	nd	0.41	RBC
1,2-Dichloropropane	nd	30	int. EMEG
Trichloroethylene	0.11	500	int. EMEG
cis-1,3-Dichloropropene	nd	0.61	RBC
MTBE	nd	2,000	chronic EMEG
Tetrahydrofuran	nd	5900	short-term ESL
Methacrylonitrile	nd	0.73	RBC
trans-1,3-Dichloropropene	nd	0.61	RBC
1,1,2-Trichlorethane	nd	0.06	CREG
Toluene	0.50	300	chronic EMEG
2-Butanone	0.54	3900	short-term ESL
1,2-Dibromoethane	**0.16**	0.002	CREG
Tetrachloroetheylene	0.14	300	chronic EMEG
Methyl Acrylate	nd	60	short-term ESL
Chlorobenzene	0.09	460	short-term ESL
Ethylbenzene	0.13	1,000	chronic EMEG
m/p-Xylene	0.22	730	RBC
Styrene	nd	900	chronic EMEG

Contaminant	Concentration (ug/m^{3*})	CV † (ug/m^3)	CV reference
o-Xylene	0.13	730	RBC
2-Nitropropane	nd	0.0009	RBC
1,1,2,2-Tetrachloroethane	nd	0.02	CREG
1,3,5-Trimethylbenzene	0.10	1250	short-term ESL
1,2,4-Trimethylbenzene	0.15	7.3	RBC
Chlorobutane	nd	3340	short-term ESL
Benzyl Chloride	nd	0.05	RBC
4-Methyl-2-Pentanone	nd	2050	short-term ESL
Chloroacetonitrile	nd		
1,4-Dichlorobenzene	nd	60	chronic EMEG
1,3-Dichlorobenzene	nd	720	short-term ESL
1,2-Dichlorobenzene	nd	210	RBC
1,2,4-Trichlorobenzene	0.15	2.1	RBC
1,3-Hexachlorobutadiene	nd	0.05	CREG
2-Hexanone	0.13	31	RBC
Methyl Methacrylate	nd	730	RBC
Ethyl Methacrylate	nd		
Nitrobenzene	nd	0.02	CREG

* ug/m^3=milligrams per kilogram
†CV=comparison value
‡ESL = effects screening level
§ EMEG = environmental media evaluation guide
**nd = not detected
††CREG = cancer risk evaluation guide
‡‡RBC = risk-based concentration

Table B3: Normal Background Levels of Contaminant Concentrations Above Comparison Values (CVs)

Contaminant	Background Concentrations (ppb)	Background Concentrations Reference
Benzene	0.02 - 34	ATSDR's Public Health Statement for Benzene (August 2007)
Carbon Tetrachloride	0.1	ATSDR's Public Health Statement for Carbon Tetrachloride (August 2005)
Chloroform	0.02-0.05	ATSDR's Public Health Statement for Chloroform (September 1997)
1,2-Dibromoethane	0.01-0.06	ATSDR's Public Health Statement for 1,2-dibromoethane (July 1992)