



Health Report on Mossville, Calcasieu Parish, Louisiana

The Chemicals and the Mossville Area Industrial Sources
of the Chemicals Associated with the Medical Symptoms
and Health Conditions of Mossville Residents

Prepared by Wilma Subra

May 25, 2009



P. O. Box 9813
New Iberia, LA 70562
Phone: 337.367.2216
subracom@aol.com

Table of Contents

Introduction	1
About the Mossville Health Survey Participants	1
Medical Symptoms and Conditions of Mossville Health Survey Participants	3
The Chemicals and the Mossville Area Industrial Sources of the Chemicals Associated with the Medical Symptoms and Conditions of Mossville Residents	4
Muscle Aches and Pains	4
Respiratory Ailments	7
Eye Irritations	10
Skin Rashes and Skin Irritations	13
Dizziness	16
Increased Fatigue	18
Sleep Disorders	20
Vision Impairment	22
Memory Problems	22
Key Findings	24
Comparative Analysis of the 1998 and 2008 Mossville Health Surveys	26
Conclusion	27

INTRODUCTION

At the request of Mossville Environmental Action Now, a health survey instrument was prepared by Wilma Subra of the Subra Company. The health survey was conducted in the Mossville community in February 2008 by Michele Roberts of Advocates for Environmental Human Rights in coordination with Mossville Environmental Action Now. The results of the health survey were evaluated by Wilma Subra. The health survey results were documented in the report entitled *Results of Health Survey of Mossville Residents*, July 31, 2008 and presented by Wilma Subra to Mossville residents at a community meeting convened by Mossville Environmental Action Now on August 7, 2008.

This report incorporates the *Results of Health Survey of Mossville Residents* report and evaluates the chemicals associated with both the medical symptoms and health conditions of Mossville and the industrial facilities located in and around Mossville.

ABOUT THE MOSSVILLE HEALTH SURVEY PARTICIPANTS

A total of 69 individuals between the ages of 6 and 90 participated in the health survey. A total of 37 females and 32 males participated in the survey. All healthy survey participants are African American.

Age and Gender of Survey Participants

Age range of the 69 total participants: 6-90
Age range of the 37 female participants: 7-90
Age range of the 32 male participants: 6-88

Female Health Survey Participants		Male Health Survey Participants	
Age	Number	Age	Number
7	1	6-9	3
18	1	19	2
20-29	2	20-29	--
30-39	2	30-39	2
40-49	3	40-49	3
50-59	9	50-59	8
60-69	6	60-69	8
70-79	7	70-79	2
80-89	5	80-88	4
	90	1	

Years Lived in Mossville

The average length of health survey participants' residency in Mossville was 40 years. The years that participants lived in the community ranged from 5 years to 83 years. Twenty-seven of the participants have lived in Mossville all of their lives, and their ages ranged from 6 to 83 years.

Ten of the health survey participants are former residents of Mossville, who currently live in Westlake, Sulfur, Moss Bluff, and Lake Charles. One of these participants moved from Mossville as recently as 2007. Nine of the participants moved from Mossville between 1975 and 2003.

General Health of Individuals Surveyed

Thirty-one or 57% of the responders to the health survey question between the ages of 8 and 88 consider themselves to be sickly while 23 or 43% of the responders between the ages of 6 and 90 consider themselves to be healthy.

Sixteen or 57% of the female responders to the health survey question between the ages of 22 and 87 consider themselves to be sickly. Twelve or 43% of the female responders consider themselves to be healthy.

Fifteen or 58% of the male responders to the health survey question between the ages of 8 and 88 consider themselves to be sickly. Eleven or 42% of the male responders between the ages of 6 and 83 considered themselves to be healthy.

Fifteen of the health survey participants did not respond to the survey question.

Frequency of Illness

In response to the health survey question, "How frequently are you sick," 24 of the 31 health survey participants who consider themselves to be sickly responded that they were sick from 3 days per month to every day. Three of the health survey participants who consider themselves to be healthy responded that they were sick once, four, and eight times per month.

Access to Doctors and Health Care Providers

Of the 69 total health survey participants, 53 participants (77%) reported that they had access to doctors and 39 participants (57%) had access to other health care providers.

Occupational Exposure

Twelve of the 69 total health survey participants worked in the industrial facilities located in the Mossville area and reported occupational exposures. The twelve health survey participants consisted of nine males between the ages of 42 and 84 and three females between the ages of 45 and 63.

Six of the 12 health survey participants (five males between the ages of 57 and 84, and one female at the age of 56) reported their general health as sick, three of the individuals reported their general health as healthy, and three individuals did not respond to the health survey question.

Two of the 69 total health survey participants (one male age 37 and one female age 49) reported exposure to pesticides and sporocides in their occupations. In response to a previous health survey question, the male survey participant considers himself to be healthy, whereas the female participant considers herself to be sickly.

Smoking

Thirty-five of the 69 total health survey participants have never smoked. Thirty health survey participants smoke or had smoked in the past. Twenty participants are current smokers who have smoked for an average of 30 years, which includes smoking periods that range from 4.5 years to 60 years. Four participants did not respond to the health survey questions regarding smoking history.

Current smokers consisted of six females and 14 males. The six females had smoked from 8 to 60 years (average 35 years), while the 14 males had smoked from 4.5 to 50 years (average 28 years).

Ten health survey participants had smoked in the past but no longer smoked. These individuals smoked for an average of 25 years, which includes smoking periods that range from 2 weeks to 52 years. Four females had smoked in the past for a period that ranged from 2 weeks to 30 years (average 16 years). Six males had smoked in the past for a period that ranged from 8 to 52 years (average 27 years).

MEDICAL SYMPTOMS AND CONDITIONS OF MOSSVILLE HEALTH SURVEY PARTICIPANTS

The results of the Mossville Health Survey indicated the following medical symptoms and medical conditions as the most prevalent in the surveyed population.

Medical Symptom	Number of Health Survey Participants	Percentage of Health Survey Participants
Muscle Aches and Pains	43	62%
Sinus Problems	42	61%
Shortness of Breath	42	61%
Arthritis	39	57%
High Blood Pressure	38	55%
Joint Pain	34	49%
Irritated Eyes	33	48%
Skin Rashes	32	46%
Feeling Weak & Tired	32	46%
Skin Irritation	29	42%
Muscle Pain	29	42%
Swollen, Painful Joints	29	42%
Allergies	29	42%
Coughing	28	41%
Forgetfulness	28	41%
Nasal Irritation	27	39%
Throat Irritation	27	39%
Difficulty Breathing	27	39%
Wheezing	26	38%
Sleep Disturbances	26	38%
Decrease in Vision	25	36%
Memory Problems	24	35%
Sleep Disorders	24	35%
Dizziness	23	33%
Blurred Vision	23	33%
Vision Difficulty	22	32%
Balance Difficulty	22	32%
Increased Fatigue	21	30%
Weakness	21	30%
Reduced Muscle Strength	21	30%
Memory Loss, Feeling Confused	20	29%
Tingling in Hands	20	29%

Medical Condition	Number of Health Survey Participants	Percentage of Health Survey Participants
Vision Impairment	12	17%
Diabetes	10	14%
Cataracts	9	13%
Cardiovascular Disease	8	12%
Nerve Damage	7	10%
Bone Fracture	7	10%
Rheumatoid Arthritis	6	9%
Gout	6	9%

Medical Condition, <i>contd.</i>	Number of Health Survey Participants	Percentage of Health Survey Participants
Hepatitis	5	7%
Thyroid Trouble	5	7%
Bronchitis	5	7%
Prostate Cancer	5	7%

THE CHEMICALS AND THE MOSSVILLE AREA INDUSTRIAL SOURCES OF THE CHEMICALS ASSOCIATED WITH THE MEDICAL SYMPTOMS AND CONDITIONS OF MOSSVILLE RESIDENTS

Muscle Aches and Pains

Of the 69 total health survey participants, 43 have muscle aches and pains (62%) and 29 individuals have muscle pain (42%). These medical symptoms are the most prevalent of all medical symptoms reported by the 69 individuals participating in the health survey.




Associate Chemicals

The chemicals that are scientifically known to cause muscle aches and pains include:

- 1,2-Dichloroethane
- Dioxin and Dioxin Like Compounds
- Ethylene Oxide
- n-Hexane
- 1,1,1,2-Tetrachloroethane

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause muscle aches and pains. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Muscle Ache/Pain Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Dioxin and Dioxin Like Compounds	0.636 grams/year
	n-Hexane	39,423 pounds/year
Entergy Roy S. Nelson <i>coal-fired power plant</i>	Dioxin and Dioxin Like Compounds	1.01 grams/year
Georgia Gulf <i>vinyl manufacturer</i> 	1,2-Dichloroethane	12,321 pounds/year
	Dioxin and Dioxin Like Compounds	0.52 grams/year
	Ethylene Oxide	6 pounds/year
PPG Industries <i>vinyl manufacturer</i> 	1,2-Dichloroethane	16,807 pounds/year
	Dioxin and Dioxin Like Compounds	17.25 grams/year
	1,1,1,2-Tetrachloroethane	894 pounds/year
Sasol North America <i>chemical manufacturer</i>	Dioxin and Dioxin Like Compounds	0.42 grams/year
	Ethylene Oxide	4,099 pounds/year
	n-Hexane	31,845 pounds/year

Respiratory Ailments

Sixty-one of the 69 total survey participants (88%) have respiratory ailments. Eight survey participants indicated they do not have respiratory ailments.

Respiratory Ailments	Number of Health Survey Participants	Percentage of Health Survey Participants
Shortness of Breath	42	61%
Sinus Problems	42	61%
Coughing	28	41%
Nasal Irritation	27	39%
Throat Irritation	27	39%
Difficulty Breathing	27	39%
Wheezing	26	38%
Asthma	14	20%
Coughing up blood/sputum	9	13%
Bronchitis	5	7%
Total	61	88%

Associate Chemicals


The chemicals that are scientifically known to cause respiratory ailments include:

Ammonia	1,2-Dichloroethylene	Nitric Acid
Benzene	Ethyl Benzene	Sulfuric Acid
1,3-Butadiene	Ethylene Oxide	1,1,1,2-Tetrachloroethane
Chlorine	Formic Acid	1,1,2,2-Tetrachloroethane
Chlorobenzene	n-Hexane	Toluene
Chloroform	Hydrochloric Acid	1,1,2-Trichloroethane
Chlorodifluoromethane	HydrogenFluoride	Trichloroethylene
Cyclohexane	MercuryCompounds	Vinyl Chloride
1,2-Dichloroethane	Naphthalene	Vinylidene Chloride
		Xylene

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause respiratory ailments. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Respiratory Ailment Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Ammonia	18,994 pounds/year
	Benzene	17,907 pounds/year
	1,3-Butadiene	500 pounds/year
	Chlorine	62 pounds/year
	Cyclohexane	11,896 pounds/year
	Ethyl Benzene	12,444 pounds/year
	n-Hexane	39,423 pounds/year
	Hydrochloric Acid	43 pounds/year
	Mercury Compounds	62 pounds/year
	Napthalene	14,279 pounds/year
	Propylene	62,197 pounds/year
	Sulfuric Acid	198,797 pounds/year
	Toluene	40,609 pounds/year
	Xylene	50,605 pounds/year
Entergy Roy S. Nelson <i>coal-fired power plant</i>	Hydrochloric Acid	7,874 pounds/year
	Hydrogen Flouride	120,805 pounds/year
	Mercury Compounds	403 pounds/year
	Sulfuric Acid	58,278 pounds/year
Georgia Gulf <i>vinyl manufacturer</i> 	Benzene	18 pounds/year
	Chlorine	1,756 pounds/year
	Chlorobenzene	6 pounds/year
	Chloroform	388 pounds/year
	1,2-Dichloroethane	12,321 pounds/year
	Ethylene Oxide	6 pounds/year
	Hydrochloric Acid	251,247 pounds/year
	1,1,2,2-Tetrachloroethane	24 pounds/year
	Trichloroethylene	24 pounds/year
	Vinyl Chloride	4,805 pounds/year
Vinylidene Chloride	3 pounds/year	
PPG Industries <i>vinyl manufacturer</i> 	Ammonia	64,000 pounds/year
	Chlorine	16,900 pounds/year
	Chlorobenzene	1 pound/year
	Chloroform	2,189 pounds/year
	Chlorodifluoromethane	44,000 pounds/year
	1,2-Dichloroethane	16,807 pounds/year
	1,2-Dichloroethylene	2,427 pounds/year
	Hydrochloric Acid	29,700 pounds/year
Mercury Compounds	1,987 pounds/year	

Industrial Source Located in the Mossville Area, <i>contd.</i>	Chemical Known to Cause Respiratory Ailment Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
PPG Industries <i>vinyl manufacturer, contd.</i> 	Napthalene	126 pounds/year
	1,1,1,2-Tetrachloroethane	894 pounds/year
	1,1,2,2-Tetrachloroethane	514 pounds/year
	Toluene	12,141 pounds/year
	1,1,2-Trichloroethane	3,909 pounds/year
	Trichloroethylene	12,907 pounds/year
	Vinyl Chloride	2,860 pounds/year
	Vinylidene Chloride	5,127 pounds/year
	Xylene	37,000 pounds/year
Sasol North America <i>chemical manufacturer</i>	Benzene	13,060 pounds/year
	1,3,-Butadiene	2,798 pounds/year
	Chlorine	1,198 pounds/year
	Ethyl Benzene	884 pounds/year
	Ethylene Oxide	4,099 pounds/year
	Formic Acid	2,383 pounds/year
	n-Hexane	31,845 pounds/year
	Hydrogen Flouride	838 pounds/year
	Mercury Compounds	2 pounds/year
	Napthalene	474 pounds/year
	Nitric Acid	1,390 pounds/year
	Toluene	3,986 pounds/year
	Xylene	3,390 pounds/year

The table below presents the detection of chemicals, which are scientifically known to cause respiratory impacts, in the ambient air of Mossville. The source for this data is the Louisiana Department of Environmental Quality air monitoring station. Included in this table are the industrial sources of these chemicals.

Chemical Known to Cause Respiratory Ailment that Is Detected in the Ambient Air of Mossville	Industrial Sources
Benzene	Conoco Phillips, Georgia Gulf, Sasol
1,3-Butadiene	Conoco Phillips, Sasol
Chlorobenzene	Georgia Gulf, PPG Industries
Chloroform	Georgia Gulf, PPG Industries
Ethyl Benzene	Conoco Phillips, Sasol
1,1,2,2-Tetrachloroethane	Georgia Gulf, PPG Industries

Chemical Known to Cause Respiratory Ailment that Is Detected in the Ambient Air of Mossville, <i>contd.</i>	Industrial Sources
Toluene	Conoco Phillips, PPG Industries, Sasol
1,1,2-Trichloroethane	Georgia Gulf, PPG Industries
Trichloroethylene	Georgia Gulf, PPG Industries
Vinyl Chloride	Georgia Gulf, PPG Industries
Xylene	Conoco Phillips, PPG Industries, Sasol

Irritation to the Eyes

Of the 69 total health survey participants, 33 participants have eye irritations (48%).



Associate Chemicals


The chemicals that are scientifically known to cause irritation to the eyes include:

Ammonia	1,2-Dichloroethylene	Sulfuric Acid
Benzene	Dioxin/Dioxin Like Compounds	1,1,1,2-Tetrachloroethane
1,3-Butadiene	Ethyl Benzene	1,1,2,2-Tetrachloroethane
n-Butyl Alcohol	Ethylene Oxide	Toluene
Chlorine	Formic Acid	1,1,2-Trichloroethane
Chlorobenzene	n-Hexane	Trichloroethylene
Chloroform	Hydrochloric Acid	Vinyl Chloride
Cyclohexane	Mercury Compounds	Vinylidene Chloride
1,2-Dichloroethane	Naphthalene	Xylene

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause irritation to the eyes. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Eye Irritation Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Ammonia	18,994 pounds/year
	Benzene	17,907 pounds/year
	1,3-Butadiene	500 pounds/year
	Chlorine	62 pounds/year
	Cyclohexane	11,896 pounds/year
	Dioxin and Dioxin Like Compounds	0.636 grams/year
	Ethyl Benzene	12,444 pounds/year
	n-Hexane	39,423 pounds/year
	Hydrochloric Acid	43 pounds/year
	Mercury Compounds	62 pounds/year
	Naphthalene	14,279 pounds/year
	Sulfuric Acid	198,797 pounds/year
	Toluene	40,609 pounds/year
	Xylene	50,605 pounds/year
Entergy Roy S. Nelson <i>coal-fired power plant</i>	Dioxin and Dioxin Like Compounds	1.01 grams/year
	Hydrochloric Acid	7,874 pounds/year
	Mercury Compounds	403 pounds/year
	Sulfuric Acid	58,278 pounds/year
Georgia Gulf <i>vinyl manufacturer</i> 	Chlorobenzene	6 pounds/year
	Benzene	18 pounds/year
	Chlorine	1,756 pounds/year
	Chloroform	388 pounds/year
	Dioxin and Dioxin Like Compounds	0.52 grams/year
	1,2-Dichloroethane	12,321 pounds/year
	Ethylene Oxide	6 pounds/year
	Hydrochloric Acid	251,247 pounds/year
	1,1,2,2-Tetrachloroethane	24 pounds/year
	1,1,2-Trichloroethane	175 pounds/year
	Trichloroethylene	24 pounds/year
	Vinyl Chloride	4,805 pounds/year
	Vinylidene Chloride	3 pounds/year
PPG Industries <i>vinyl manufacturer</i>	Ammonia	64,000 pounds/year
	Chlorine	16,900 pounds/year
	Chlorobenzene	1 pound/year
	Chloroform	2,189 pounds/year
	Dioxin and Dioxin Like Compounds	17.25 grams/year

Industrial Source Located in the Mossville Area, <i>contd.</i>	Chemical Known to Cause Eye Irritation Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
PPG Industries <i>vinyl manufacturer, contd.</i> 	1-2 Dichloroethane	16,807 pounds/year
	1,2-Dichloroethylene	2,427 pounds/year
	Hydrochloric Acid	29,700 pounds/year
	Mercury Compounds	1,987 pounds/year
	Napthalene	126 pounds/year
	1,1,1,2-Tetrachloroethane	894 pounds/year
	1,1,2,2-Tetrachloroethane	514 pounds/year
	Toluene	12,141 pounds/year
	1,1,2-Trichloroethane	3,909 pounds/year
	Trichloroethylene	12,907 pounds/year
	Vinyl Chloride	2,860 pounds/year
	Vinylidene Chloride	5,127 pounds/year
	Xylene	27,000 pounds/year
Sasol North America <i>chemical manufacturer</i>	Benzene	13,060 pounds/year
	1,3-Butadiene	2,798 pounds/year
	n-Butyl Alcohol	41,876 pounds/year
	Chlorine	1,198 pounds/year
	Dioxin and Dioxin Like Compounds	0.42 grams/year
	Ethyl Benzene	884 pounds/year
	Ethylene Oxide	4,099 pounds/year
	Formic Acid	2,383 pounds/year
	n-Hexane	31,845 pounds/year
	Mercury Compounds	2 pounds/year
	Napthalene	474 pounds/year
	Toluene	3,986 pounds/year
	Xylene	3,390 pounds/year

The table below presents the detection of chemicals, which are scientifically known to cause irritation to the eyes, in the ambient air of Mossville. The source for this data is the Louisiana Department of Environmental Quality air monitoring station. Included in this table are the industrial sources of these chemicals.

Chemical Known to Cause Eye Irritation that Is Detected in the Ambient Air of Mossville	Industrial Sources
Benzene	Conoco Phillips, Georgia Gulf, Sasol
1,3-Butadiene	Conoco Phillips, Sasol
Chlorobenzene	Georgia Gulf, PPG Industries
Chloroform	Georgia Gulf, PPG Industries
Ethyl Benzene	Conoco Phillips, Sasol
1,1,2,2-Tetrachloroethane	Georgia Gulf, PPG Industries
Toluene	Conoco Phillips, PPG Industries, Sasol
1,1,2-Trichloroethane	Georgia Gulf, PPG Industries
Trichloroethylene	Georgia Gulf, PPG Industries
Vinyl Chloride	Georgia Gulf, PPG Industries
Xylene	Conoco Phillips, PPG Industries, Sasol

Rashes and Irritation of the Skin

Of the 69 total health survey participants, 32 participants have skin rashes (46%) and 29 have skin irritations (42%).



Associate Chemicals


The chemicals that are scientifically known to cause rashes and skin irritations include:

Ammonia	1,2-Dichloroethylene	Naphthalene
Benzene	Dioxin/Dioxin Like Compounds	Sulfuric Acid
1,3-Butadiene	Ethyl Benzene	1,1,1,2-Tetrachloroethane
n-Butyl Alcohol	Ethylene	1,1,2,2-Tetrachloroethane
Chlorine	Ethylene Oxide	Toluene
Chlorobenzene	Formic Acid	Trichloroethylene
Chloroform	Hydrochloric Acid	Vinylidene Chloride
Cyclohexane	Hydrogen Fluoride	Xylene
1,2-Dichloroethane	Mercury Compounds	

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause rashes and skin irritations. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Skin Rash and Skin Irritation Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
<p>Conoco Phillips <i>oil refinery</i></p> 	Ammonia	18,994 pounds/year
	Benzene	17,907 pounds/year
	1,3-Butadiene	500 pounds/year
	Chlorine	62 pounds/year
	Cyclohexane	11,896 pounds/year
	Dioxin and Dioxin Like Compounds	0.636 grams/year
	Ethyl Benzene	12,444 pounds/year
	Ethylene	13,826 pounds/year
	Hydrochloric Acid	43 pounds/year
	Mercury Compounds	62 pounds/year
	Naphthalene	14,279 pounds/year
	Sulfuric Acid	198,797 pounds/year
	Toluene	40,609 pounds/year
	Xylene	50,605 pounds/year
<p>Entergy Roy S. Nelson <i>coal-fired power plant</i></p>	Dioxin and Dioxin Like Compounds	1.01 grams/year
	Hydrochloric Acid	7,874 pounds/year
	Hydrogen Flouride	120,805 pounds/year
	Mercury Compounds	403 pounds/year
	Sulfuric Acid	58,278 pounds/year
<p>Georgia Gulf <i>vinyl manufacturer</i></p> 	Benzene	18 pounds/year
	Chlorine	1,756 pounds/year
	Chlorobenzene	6 pounds/year
	Chloroform	388 pounds/year
	Dioxin and Dioxin Like Compounds	0.52 grams/year
	1,2-Dichloroethane	12,321 pounds/year
	Ethylene	997 pounds/year
	Ethylene Oxide	6 pounds/year
	Hydrochloric Acid	251,247 pounds/year
	1,1,2,2-Tetrachloroethane	24 pounds/year
	1,1,2-Trichloroethane	175 pounds/year
	Trichloroethylene	24 pounds/year
	Vinylidene Chloride	3 pounds/year
<p>PPG Industries <i>vinyl manufacturer</i></p>	Ammonia	64,000 pounds/year
	Chlorine	16,900 pounds/year
	Chlorobenzene	1 pound/year
	Chloroform	2,189 pounds/year

Industrial Source Located in the Mossville Area, <i>contd.</i>	Chemical Known to Cause Skin Rash and Skin Irritation Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
PPG Industries <i>vinyl manufacturer, contd.</i> 	Dioxin and Dioxin Like Compounds	17.25 grams/year
	1,2-Dichloroethane	16,807 pounds/year
	1,2-Dichloroethylene	2,427 pounds/year
	Ethylene	20,000 pounds/year
	Mercury Compounds	1,987 pounds/year
	Naphthalene	126 pounds/year
	1,1,1,2-Tetrachloroethane	894 pounds/year
	1,1,1,2-Tetrachloroethane	514 pounds/year
	Trichloroethylene	12,907 pounds/year
	Vinylidene Chloride	5,127 pounds/year
	Xylene	27,000 pounds/year
Sasol North America <i>chemical manufacturer</i>	Benzene	13,060 pounds/year
	1,3-Butadiene	2,798 pounds/year
	n-Butyl Alcohol	41,876 pounds/year
	Chlorine	1,198 pounds/year
	Dioxin and Dioxin Like Compounds	0.42 grams/year
	Ethyl Benzene	884 pounds/year
	Ethylene	75,654 pounds/year
	Ethylene Oxide	4,099 pounds/year
	Formic Acid	2,383 pounds/year
	Hydrogen Flouride	838 pounds/year
	Mercury Compounds	2 pounds/year
	Naphthalene	474 pounds/year
	Toluene	3,986 pounds/year
	Xylene	3,390 pounds/year

The table below presents the detection of chemicals, which are scientifically known to cause rashes and skin irritations, in the ambient air of Mossville. The source for this data is the Louisiana Department of Environmental Quality air monitoring station. Included in this table are the industrial sources of these chemicals.

Chemical Known to Cause Skin Rash and Skin Irritation that Is Detected in the Ambient Air of Mossville	Industrial Sources
Benzene	Conoco Phillips, Georgia Gulf, Sasol
1,3-Butadiene	Conoco Phillips, Sasol
Chlorobenzene	Georgia Gulf, PPG Industries
Chloroform	Georgia Gulf, PPG Industries
Ethyl Benzene	Conoco Phillips, Sasol
1,1,2,2-Tetrachloroethane	Georgia Gulf, PPG Industries
Toluene	Conoco Phillips, PPG Industries, Sasol
1,1,2-Trichloroethane	Georgia Gulf, PPG Industries
Trichloroethylene	Georgia Gulf, PPG Industries
Xylene	Conoco Phillips, PPG Industries, Sasol

Dizziness

Of the 69 total health survey participants, 23 participants reported experiencing dizziness (33%).




Associate Chemicals

The chemicals that are scientifically known to cause dizziness include:

Benzene	1,2-Dichloroethane	Propylene
1,3-Butadiene	1,2-Dichloroethylene	1,1,1,2-Tetrachloroethane
n-Butyl Alcohol	Dioxin/Dioxin Like Compounds	Toluene
Chlorine	Ethyl Benzene	1,1,2-Trichloroethane
Chlorobenzene	Ethylene	Trichloroethylene
Chloroform	Ethylene Oxide	Vinyl Chloride
Chlorodifluoromethane	Formic Acid	Xylene
Cyclohexane	Hydrogen Fluoride	

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause dizziness. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Dizziness Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Benzene	17,907 pounds/year
	1,3-Butadiene	500 pounds/year
	Chlorine	62 pounds/year
	Cyclohexane	11,896 pounds/year
	Dioxin and Dioxin Like Compounds	0.636 grams/year
	Ethyl Benzene	12,444 pounds/year
	Ethylene	13,826 pounds/year
	Propylene	62,197 pounds/year
	Toluene	40,609 pounds/year
	Xylene	50,605 pounds/year
Entergy Roy S. Nelson <i>coal-fired power plant</i>	Dioxin and Dioxin Like Compounds	1.01 grams/year
	Hydrogen Flouride	120,805 pounds/year
Georgia Gulf <i>vinyl manufacturer</i> 	Benzene	18 pounds/year
	Chlorine	1,756 pounds/year
	Chlorobenzene	6 pounds/year
	Chloroform	388 pounds/year
	Dioxin and Dioxin Like Compounds	0.52 grams/year
	1,2-Dichloroethane	12,321 pounds/year
	Ethylene Oxide	6 pounds/year
	Ethylene	997 pounds/year
	Propylene	595 pounds/year
	1,1,2-Trichloroethane	175 pounds/year
	Trichloroethylene	24 pounds/year
	Vinyl Chloride	4,805 pounds/year
PPG Industries <i>vinyl manufacturer</i> 	Chlorine	16,900 pounds/year
	Chlorobenzene	1 pound/year
	Chloroform	2,189 pounds/year
	Chlorodifluoromethane	44,000 pounds/year
	Dioxin and Dioxin Like Compounds	17.25 grams/year
	1,2-Dichloroethane	16,807 pounds/year
	1,2-Dichloroethylene	2,427 pounds/year
	Ethylene	20,000 pounds/year
	1,1,1,2-Tetrachloroethane	894 pounds/year
	Toluene	12,141 pounds/year
	1,1,1,2-Trichloroethane	3,909 pounds/year
	Trichloroethylene	12,907 pounds/year

Industrial Source Located in the Mossville Area, <i>contd.</i>	Chemical Known to Cause Dizziness Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
PPG Industries <i>vinyl manufacturer, contd.</i>	Vinyl Chloride	2,860 pounds/year
	Xylene	27,000 pounds/year
Sasol North American <i>chemical manufacturer</i>	Dioxin and Dioxin Like Compounds	0.42 grams/year
	Ethyl Benzene	884 pounds/year
	Ethylene	75,654 pounds/year
	Ethylene Oxide	4,099 pounds/year
	Formic Acid	2,383 pounds/year
	Hydrogen Fluoride	838 pounds/year
	Propylene	14,058 pounds/year
	Toluene	3,986 pounds/year
	Xylene	3,390 pounds/year

The table below presents the detection of chemicals, which are scientifically known to cause dizziness, in the ambient air of Mossville. The source for this data is the Louisiana Department of Environmental Quality air monitoring station. Included in this table are the industrial sources of these chemicals.

Chemical Known to Cause Dizziness that Is Detected in the Ambient Air of Mossville	Industrial Sources
Benzene	Conoco Phillips, Georgia Gulf, Sasol
1,3-Butadiene	Conoco Phillips, Sasol
Chlorobenzene	Georgia Gulf, PPG Industries
Chloroform	Georgia Gulf, PPG Industries
Ethyl Benzene	Conoco Phillips, Sasol
Toluene	Conoco Phillips, PPG Industries, Sasol
1,1,2-Trichloroethane	Georgia Gulf, PPG Industries
Trichloroethylene	Georgia Gulf, PPG Industries
Vinyl Chloride	Georgia Gulf, PPG industries
Xylene	Conoco Phillips, PPG Industries, Sasol

Increased Fatigue

Of the 69 total health survey participants, 32 participants report feeling weak and tired (46%) and 21 individuals report weakness (30%).



Associate Chemicals


The chemicals that are scientifically known to cause increased fatigue include:

- Dioxin and Dioxin Like Compounds
- Ethylene
- Naphthalene
- 1,1,2,2-Tetrachloroethane
- Vinyl Chloride

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause increased fatigue. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Increased Fatigue Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Dioxin and Dioxin Like Compounds	0.636 grams/year
	Ethylene	13,826 pounds/year
	Naphthalene	14,279 pounds/year
Entergy Roy S. Nelson <i>coal-fired power plant</i>	Dioxin and Dioxin Like Compounds	1.01 grams/year
Georgia Gulf <i>vinyl manufacturer</i> 	Dioxin and Dioxin Like Compounds	0.52 grams/year
	Ethylene	997 pounds/year
	1,1,2,2-Tetrachloroethane	24 pounds/year
	Vinyl Chloride	4,805 pounds/year
PPG Industries <i>vinyl manufacturer</i>	Dioxin and Dioxin Like Compounds	17.25 grams/year
	Ethylene	20,000 pounds/year
	Naphthalene	126 pounds/year
	1,1,2,2-Tetrachloroethane	514 pounds/year

Industrial Source Located in the Mossville Area, <i>contd.</i>	Chemical Known to Cause Increased Fatigue Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
PPG Industries <i>vinyl manufacturer, contd.</i> 	Vinyl Chloride	2,860 pounds/year
Sasol North America <i>chemical manufacturer</i>	Dioxin and Dioxin Like Compounds	0.42 grams/year
	Ethylene	75,654 pounds/year
	Naphthalene	474 pounds/year

The table below presents the detection of chemicals, which are scientifically known to cause increased fatigue, in the ambient air of Mossville. The source for this data is the Louisiana Department of Environmental Quality air monitoring station. Included in this table are the industrial sources of these chemicals.

Chemical Known to Cause Increased Fatigue that Is Detected in the Ambient Air of Mossville	Industrial Sources
1,1,2,2-Tetrachloroethane	Georgia Gulf, PPG Industries
Vinyl Chloride	Georgia Gulf, PPG Industries

Sleep Disorders

Of the 69 total health survey participants, 26 participants experience sleep disturbances (38%) and 24 participants have sleep disorders (35%).




Associate Chemicals

The chemicals that are scientifically known to cause sleep disorders include:

- Cyclohexane
- 1,1,1,2-Tetrachloroethane
- Vinylidene Chloride

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause sleep disorders. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Sleep Disorder Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
<p>Conoco Phillips <i>oil refinery</i></p> 	Cyclohexane	11,896 pounds/year
<p>Georgia Gulf <i>vinyl manufacturer</i></p> 	Vinylidene Chloride	3 pounds/year
<p>PPG Industries <i>vinyl manufacturer</i></p> 	1,1,1,2-Tetrachloroethane	514 pounds/year
	Vinylidene Chloride	5,127 pounds/year

Vision Impairment

Of the 69 total health survey participants, 25 participants reported decreased vision (36%), 23 participants reported blurred vision (33%), and 22 participants reported vision difficulties (32%).

Associate Chemical

A chemical that is scientifically known to cause vision disturbances is formic acid.

Mossville Area Industrial Source

Sasol North America is a Mossville area industrial facility that releases formic acid, and releases 2,383 pounds of the chemical annually. Source: 2007 Toxic Release Inventory report.

Memory Problems

Of the 69 total health survey participants, 24 individuals have memory problems (35%) and 20 individuals have loss of memory (29%).




Associate Chemicals

The chemicals that are scientifically known to cause memory problems include:

- 1,2-Dichloroethane
- Ethylene
- Naphthalene

Mossville Area Industrial Sources

The table below shows the Mossville area industrial facilities and their reported amount of annual releases of the chemicals that are scientifically known to cause memory problems. The 2007 Toxic Release Inventory report is the source for the data.

Industrial Source Located in the Mossville Area	Chemical Known to Cause Memory Problems Released by Industrial Source	Quantity of the Chemical Annually Released to the Environment by the Industrial Source
Conoco Phillips <i>oil refinery</i> 	Ethylene	13,826 pounds/year
	Naphthalene	14,279 pounds/year
Georgia Gulf <i>vinyl manufacturer</i> 	1,2-Dichloroethane	12,321 pounds/year
	Ethylene	997 pounds/year
PPG Industries <i>vinyl manufacturer</i> 	1,2-Dichloroethane	16,807 pounds/year
	Ethylene	20,000 pounds/year
	Naphthalene	126 pounds/year
Sasol North America <i>chemical manufacturer</i>	Ethylene	75,654 pounds/year
	Naphthalene	474 pounds/year

KEY FINDINGS

A total of 32 chemicals have been identified as being associated with the major medical conditions experienced by Mossville community members. Twenty of the 32 chemicals are released by PPG, 17 chemicals are released by Sasol North America, 16 chemicals are released by Conoco Phillips, 15 chemicals are released by Georgia Gulf and 5 chemicals are released by Entergy Roy S. Nelson Power Plant.

Eleven of the 32 chemicals identified as being associated with the major medical conditions experienced by Mossville community members are regularly detected in elevated concentration in the ambient air of Mossville. PPG Industries releases 8 of the 11 chemicals, Georgia Gulf releases 7, and Sasol North America and Conoco Phillips release 5 each.

The chemicals that are associated with the highest number of medical symptoms experienced by individuals in Mossville are 1,1,1,2-Tetrachloroethane, 1,2-Dichloroethane, Cyclohexane, Dioxin and Dioxin Like Compounds, Ethylene Oxide, Formic Acid, Naphthalene and Vinylidene Chloride. Georgia Gulf releases five of the eight highest ranking chemicals associated with medical symptoms. Sasol North America and PPG Industries release four of the eight highest ranking chemicals. Conoco Phillips Petroleum Refinery releases three of the eight chemicals. Entergy Roy S. Nelson Power Plant releases one of the eight highest ranking chemicals associated with medical symptoms. Dioxin and Dioxin Like Compounds is the only highest ranking chemicals that is released by all 5 industrial facilities in the Mossville area. Dioxin congeners are present in the blood of Mossville residents at elevated levels and are present at three times the national ATSDR comparison concentration.

Medical Symptoms and Medical Conditions

The 69 total health survey participants had an average of 33 medical symptoms and conditions. The female population averaged 34 medical symptoms and conditions. The male population averaged 32 medical symptoms and conditions.

The age bracket with the most medical symptoms and medical conditions was the 50 to 59 year olds for both males and females. The males in the 50 to 59 age bracket ranged from 3 to 106 symptoms and conditions and averaged 48 medical symptoms and conditions. The females in the 50 to 59 age bracket ranged from 12 to 105 symptoms and conditions and averaged 46 medical symptoms and conditions. The age bracket with the second most symptoms and medical conditions was the 70-79 age bracket for both males (average 40) and females (average 43).

Individuals with the Most Medical Symptoms and Conditions

The two individuals with the most medical symptoms and conditions were a 50 year old male with 106 medical symptoms and conditions and a 56 year old female with 105 medical symptoms and conditions. The male is a nonsmoker who has lived in Mossville

his entire life. He has worked in construction at the refineries in the Mossville area. He described his medical condition as sick. He did not list how frequently he was ill.

The female with the most medical symptoms and conditions is a nonsmoker who has lived in Mossville on and off for a total of 30 years. She has worked at a hazardous waste facility in Calcasieu Parish and at a petroleum refinery out of the area. She described herself as sick and listed being sick 7 days per week and 29-30 days per month.

The next two individuals with the largest number of medical symptoms and conditions were a 74 year old female with 94 medical symptoms and conditions and a 71 year old female with 84 medical symptoms and conditions. The female with 94 medical symptoms and conditions is a non smoker who has lived in Mossville for 50 years and listed her occupation as a cook. She described herself as sick but did not list the frequency of her illnesses.

The 71 year old female with 84 medical symptoms and conditions is a non smoker who has lived in Mossville her entire life. She listed her occupation as domestic and described herself as sick with illnesses 7 days per week.

Respiratory Ailments of Smokers and Nonsmokers

Of the 61 individuals that had respiratory ailments, 29 never smoked, 18 were current smokers, 10 had smoked in the past, and 4 individuals did not respond to the smoking request for information. Overall, 35 individuals of the 69 individuals surveyed had never smoked. Therefore 83% of the nonsmokers surveyed in the Mossville area had respiratory problems. Overall 20 individuals were current smokers, therefore 90% of the current smokers had respiratory problems. Overall 10 individuals had smoked in the past. Thus 100 % of the previous smokers had respiratory problems.

The 18 current smokers that had respiratory ailments consisted of 6 females and 12 males. The 6 females had smoked for 8 to 60 years for an average of 35 years. The 12 males had smoked for 4.5 to 50 years for an average of 30 years.

The 10 previous smokers that had respiratory ailments consisted of 4 females and 6 males. The 4 females smoked for 2 weeks to 30 years for an average of 16 years. The 6 males smoked for 8 to 52 years for an average of 27 years.

In the *Mossville Health Symptom Survey* conducted by Dr. Marvin Legator of the University of Texas Medical Branch at Galveston (1998), 46% of nonsmokers reported respiratory illnesses. In the survey conducted in 2008, 83% of the nonsmokers reported respiratory illnesses.

Nose and Throat Ailments

A total of 37 individuals (54%) experienced nasal irritation (27 individuals) and/or throat irritation (27 individuals). In the *Mossville Health Symptom Survey* performed by Dr. Marvin Legator of the University of Texas Medical Branch at Galveston (1998), 99% of the individuals surveyed reported ear, nose and throat illnesses.

COMPARATIVE ANALYSIS OF THE 1998 AND 2008 MOSSVILLE HEALTH SURVEYS

In 1998, Dr. Marvin Legator of the University of Texas Medical Branch at Galveston performed the *Mossville Health Symptom Survey*. The overall results of the 1998 survey and the 2008 health survey are compared below.

- In the *Mossville Health Symptom Survey*, 46% of nonsmokers reported respiratory illnesses. In the health survey conducted in 2008, 83% of the nonsmokers reported respiratory illnesses.
- In the *Mossville Health Symptom Survey*, 99% of the individuals surveyed reported ear, nose and throat illnesses. In the 2008 health survey, 37 individuals (54%) experienced nasal irritation (27 individuals) and/or throat irritation (27 individuals).
- In the *Mossville Health Symptom Survey*, 84% of the residents reported having headaches, dizziness, tremors, and seizures. In the 2008 health survey, 37 individuals (54%) reported having headaches, dizziness, tremors, and seizures.
- In the *Mossville Health Symptom Survey*, 77% of the residents reported having cardiovascular problems such as irregular heart beat, stroke, heart disease and chest pains. In the 2008 health survey, 30 individuals (43%) reported having irregular heart beat, strokes, heart disease, chest pains, and arrhythmia.
- In the *Mossville Health Symptom Survey*, more than 50% of the residents reported having skin problems and digestive illnesses. In the 2008 health survey, 36 individuals (52%) reported having skin problems and 25 individuals (36%) reported having digestive illnesses.
- In the *Mossville Health Symptom Survey*, 25% of the residents reported having endocrine disorders including diabetes. In the 2008 health survey, 10 individuals (15%) reported having diabetes.

Mossville Health Surveys: A Comparative Look		
Health Symptoms and Conditions	1998 Survey	2008 Survey
Ear, Nose & Throat	99%	54%
Headaches, Dizziness, Tremors & Seizures	84%	54%
Cardiovascular Problems	77%	43%
Respiratory Illnesses in Nonsmokers	46%	83%
Skin Problems		52%
Digestive Illness	50%	36%
Diabetes	25%	15%

CONCLUSION

Based on the information provided in the health surveys, 57% of Mossville community members surveyed considered themselves sick and report being sick three days per month to every day each month. Of the population surveyed 88% had respiratory ailments, 54% had nose and throat illnesses, 54% had headaches, dizziness, tremors, and seizures, 52% had skin problems and 43% had cardiovascular conditions.

The 69 individuals surveyed had an average of 33 medical conditions and symptoms. The female population average 34 medical conditions and symptoms while the male population averaged 32 medical conditions and symptoms. The 50 to 59 year age bracket experienced the largest number of medical symptoms and medical conditions followed by the 70 to 79 year age bracket.

A total of 32 chemicals have been identified as being associated with the major medical conditions experienced by Mossville community members. Twenty of the 32 chemicals are released by PPG, 17 chemicals are released by Sasol North America, 16 chemicals are released by Conoco Phillips, 15 chemicals are released by Georgia Gulf and 5 chemicals are released by Entergy Roy S. Nelson Power Plant.

Eleven of the 32 chemicals identified as being associated with the major medical conditions experienced by Mossville community members are regularly detected in elevated concentration in the ambient air of Mossville. PPG Industries releases 8 of the 11 chemicals, Georgia Gulf releases 7, and Sasol North America and Conoco Phillips release 5 each.

The chemicals that are associated with the highest number of medical symptoms experienced by individuals in Mossville are 1,1,1,2-Tetrachloroethane, 1,2-Dichloroethane, Cyclohexane, Dioxin and Dioxin Like Compounds, Ethylene Oxide, Formic Acid, Naphthalene and Vinylidene Chloride. Georgia Gulf releases five of the eight highest ranking chemicals associated with medical symptoms. Sasol North America and PPG Industries release four of the eight highest ranking chemicals. Conoco Phillips Petroleum Refinery releases three of the eight chemicals. Entergy Roy S. Nelson Power Plant releases one of the eight highest ranking chemicals associated

with medical symptoms. Dioxin and Dioxin Like Compounds are the only highest ranking chemicals that are released by all 5 industrial facilities in the Mossville area. Dioxin congeners are present in the blood of Mossville residents at elevated levels and are present at three times the national ATSDR comparison concentration.

When Dr. Legator conducted his health survey in 1998, he concluded that Mossville was “a very sick community”. Based on the results of the 2008 health survey, Mossville continues to be a very sick community and the residents’ medical symptoms are closely associated with the chemicals released by the industrial facilities in their area.