



A Review of the

“Health Survey Results of Current and Former DISH/Clark, Texas Residents”

Following is the report and survey form from the environmental group from Colorado, *Earthworks’ Texas Oil And Gas Accountability Project*. It is entitled *“Health Survey Results of Current and Former DISH/Clark, Texas Residents”* dated December, 2009. This report, like all the work of *Earthworks’ Oil & Gas Accountability Projects* only attacks the sector of oil & gas drilling, completion, production and transportation as demonstrated by the survey form actually “completed by 31 individuals between the ages of 4 and 69” who submitted their survey application. It is important to see the questionnaire utilized in order to evaluate how biased the questions and check lists were. The actual survey was provided to each of the residents and some who had moved. The U.S. Census Bureau showed a population of 181 as of July 1, 2008.

Since each person in a family was encouraged to complete the survey, it is possible that the 31 individuals beginning at age 4 could have all come from just 8 complainant families. No attempt was made to interview each home in the town to provide a more representative view in the words of each person rather than a check list of possible ailments. There was no attempt to evaluate the health symptom frequency data with regional, state or national health survey statistics. Many of the non-specific type of symptoms reported can be attributable to stress, depression, aging, etc. It has been found that asking the question about health symptoms and providing a long check list can elicit more symptoms.

There was no attempt to put the health survey data in perspective other than potential association with chemicals exposure associated with oil and gas, smoking, occupational exposure, a septic system or farmland (hay and grass smells). The health surveys were conducted in October and November when “fall” allergies may also present many of the same symptoms. Similarly, symptoms were not stratified by age (this would be important since symptoms such as joint pain, ringing in the ears, etc. can be age-related). There appeared to be no attempt to find out from the respondents, what if any, health conditions had been diagnosed by a physician which might be associated with some the symptoms reported as not

direct contact with any participants was indicated by the person from Iberia, Louisiana, who wrote the report.

There are numerous reports in the literature regarding the perception of health effects due to the presence of strange or unpleasant odors. Certainly there are symptoms which can be associated with strong odors, however, the health significance of these symptoms may be subject to question. One area of the summary on “Odors Associated with Sources in the DISH Area” was gas wells and the participants responded to the “natural gas smell” and checked numerous “REPORTED EFFECTS” such as headaches, nausea, sinus problems, asthma. The problem with that analysis is that natural gas has no odor which is why mercaptan has to be added to natural gas to give it a distinguishable odor.

The author associates symptoms with concentrations in air samples above the TCEQ standards without presentation of the data, e.g. how high were the results above the standards and what State certified professional engineering firm ran the tests and analysis. Further there is no attempt to evaluate whether the symptoms (health effects) reported have been associated with high acute level exposures rather than chronic low level exposures. There was no attempt to differentiate if there was a difference in the frequency of those odor events versus the odor events associated with oil and gas operations since it is obvious that the author recognized there were other potential sources of odor, e.g. sewer smells and pastures, but only mentioned those two.

Michael E. (Gene) Powell, Jr.
Publisher/Editor
Powell Barnett Shale Newsletter®
P. O. Box 470157
Fort Worth , Texas 76147-0157
Office: (817) 924-1900
Mobile: (817) 614-6979
E-Mail: mepowell@barnettshalenews.com
Web: <http://www.barnettshalenews.com>

Health Survey Results

of Current and Former DISH/Clark,
Texas Residents

EARTHWORKS' OIL AND GAS
ACCOUNTABILITY PROJECT



Texas Oil & Gas

Accountability Project

Results of Health Survey of Current and Former DISH/Clark, Texas Residents

December 2009

by Wilma Subra
Subra Company

P.O. Box 9813
New Iberia, LA 70562
337-367-2216
subracom@aol.com

On behalf of EARTHWORKS'
Oil and Gas Accountability Project



Table of Contents

Executive Summary	3
Introduction	4
Health Survey Participants.....	4
Participant Ages	4
Years Lived in DISH/Clark	5
General Health of Individuals Surveyed.....	5
General Health	5
Frequency of Illness	5
Access to Doctors and Health Care Providers.....	5
Occupational Exposure	6
Smoking History	6
Odors and Associated Health Impacts	6
Odors Associated with Sources in the DISH Area	7
Health Impacts Associated with Odor Events	8
Duration of Health Impacts Associated with Odor Events	8
Distance from Surveyed Households to Compressor Stations and Gas Processing Plants/Gas Metering Stations.....	9
Medical Conditions Reported in the DISH/Clark Health Survey	9
Health Effects Reported by DISH Community as of October 12, 2009	10
Respiratory Impacts.....	10
Respiratory Impacts as it Relates to Smokers and Non-Smokers	10
Individuals with Most Medical Conditions.....	11
Correlation of Chemicals Detected in the Ambient Air of DISH with the Health Impacts Experienced by Community Members in DISH/Clark.....	11
Human Health Effects Associated with Chemicals Detected in the air in Excess of TCEQ Short and Long-Term Effects Screening Levels.....	11
Most Prevalent Health Impacts and Health Impacts Associated with Odor Events, With Chemicals Known to Cause the Health Impacts and Which Exceeded TCEQ Short-term and Long-term Effects Screening Levels in the air of DISH.....	12
Summary	13
Recommendations.....	14

Executive Summary

The following health survey for DISH, Texas residents was compiled by Wilma Subra on behalf of Earthworks' Oil & Gas Accountability Project. The health survey was completed by a total of 31 individuals between the ages of 4 and 69 during October and November of 2009. Participants consisted of 30 current residents and one previous resident of DISH, Texas.

Of the population surveyed 19% considered themselves to be sick, or both healthy and sick. 81% considered themselves to be healthy. However, 39% of the population reported frequency of illness on average of three days per week and five days per month with a maximum of seven days per week and all days of the month. Participants reported 130 medical conditions and of the conditions the survey identifies 23 most prevalent medical conditions. 71% of participants reported having respiratory ailments.

Notable results from the survey include:

1. A summary of odor events experienced by participants, odor frequencies and possible odor sources, and
2. A comparison of health effects reported by the community with the known effects of chemicals found in the DISH area by Wolf Eagle Environmental in August of 2009.

First, 28 of the 31 individuals surveyed experienced odor events. Frequency of odor events ranged from one to two times per day to 24 days per month. Participants associated odors with specific facilities in the DISH area including, compressor stations, gas processing plants and metering stations, natural gas pipelines, gas wells, sewer systems and pastures.

Second, the human health impacts reported during the survey were compared to the health impacts associated with toxic air emission chemicals detected in the ambient air of DISH in August 2009, in excess of TCEQ screening levels. 61% of the health impacts reported by participants are known health effects of chemicals detected in the air by Wolf Eagle Environmental in August 2009. These chemicals include

- Volatile Organic Chemicals,
- Hazardous Air Pollutants, and
- Tentatively Identified Compounds.

The health effects associated with these chemicals and reported by the survey participants are included below.

61%

**Health effects reported
by the DISH community
were associated with
toxics measured in excess
of TCEQ screening levels**

Abnormal EEG
Brain disorders
Bronchitis
Chronic Eye Irritation
Decreased Motor Skills
Depression
Dizziness
Eyes Burning
Falling, Staggering
Frequent Irritation
Frequent Nausea
Increased Fatigue
Irregular/Rapid Heart Beat
Muscle Aches & Pains
Nasal Irritation
Pre-Cancerous Lesions
Severe Anxiety
Severe Headaches
Sinus Problems
Throat Irritation
Tired
Weakness
Allergies
Difficulty in Concentrating
Easy Bruising
Nervous System Impacts
Difficulty in Breathing

Recommendations based on this survey include:

- Community health investigation and long-term tracking by the Texas Department of State Health Services,
- Community-based documentation and tracking of odors and symptoms by Texas Commission on Environmental Quality,
- Increased tracking of operational upsets, spills, releases and permit violations of oil and gas infrastructure by both the Texas Commission on Environmental Quality and Texas Railroad commission, and
- The continuous monitoring of area emissions by Texas Commission on Environmental Quality.

Odors Associated with Sources in the DISH Area

Individuals responding to the health survey reported odors associated with specific types of facilities in the DISH area:

					
gas wells	natural gas pipelines	compressor stations	gas processing plants / metering stations	sewer	pastures
Natural gas smell	Odorized natural gas	Sulfur smell Odorized natural gas Ozone Burnt butter	Sulfur smell Odorized natural gas Burnt wire Strong chemical like smell Ether	Septic odors	Hay and grass smells
REPORTED EFFECTS headaches nausea sinus problems asthma	REPORTED EFFECTS headaches nausea sinus problems asthma	REPORTED EFFECTS burning eyes nausea headaches running nose sore throat asthma sinus problems	REPORTED EFFECTS burning eyes nausea headaches running nose sore throat asthma sinus problems bronchitis	REPORTED EFFECTS infection of airways irritation of sinus and throat	

Duration of Health Impacts

Associated with odor events

Airway Infection	1-3 weeks
Allergies.....	24 hours after odors dissipates
Bronchitis	1 week
Burning and Irritated Throat	Until smell goes away
Chest Congestion	1-3 days
Hard to Breathe.....	2-3 days
Headache	4 hours to one week
Irritated Eyes	1-2 days
Nasal Irritation	1 week
Nausea	Until smell goes away
Respiratory Irritation	24 hours after odor dissipates
Sinus Irritation	1-3 days
Sinus with Plugged Ears.....	10-20 days

Odor events were reported to be as often as twice per day.

Introduction

A health survey instrument for current and former DISH/Clark, Texas residents was compiled by Wilma Subra of Subra Company on behalf of EARTHWORKS' Oil and Gas Accountability Project. The health survey instrument was distributed to current and former DISH/Clark residents. The health survey forms were filled out during the months of October and November 2009. The results of the health survey were evaluated by Wilma Subra of Subra Company.

Health Survey Participants

A total of 31 individuals between the ages of 4 and 69 participated in the health survey. The individuals consisted of 30 current residents of DISH/Clark and one previous resident of DISH/Clark. Fourteen households were surveyed. The individuals participating in the survey consisted of 15 females and 16 males.

Participant Ages

- 31 Total Participants between the ages of 4 and 69
- 15 Females between the ages of 19 and 67
- 16 Males between the ages of 4 and 69

Age Range	Number of Females	Number of Males
0-5	0	2
6-10	0	2
11-15	0	1
16-20	1	0
21-30	1	1
31-40	3	2
41-50	4	3
51-60	4	3
61-70	2	2

Years Lived in DISH/Clark

The 31 participants in the survey lived in DISH/Clark an average of 8.5 years and ranged from three months to 25 years. One of the 31 individuals surveyed had lived in DISH for four years but had relocated 5 months prior to the survey.

General Health of Individuals Surveyed

Of the total of 31 individuals surveyed, 21 considered themselves healthy, 4 individuals considered themselves sick and one individual, both healthy and sick. Five individuals did not respond to this question.

General Health

21 Individuals between the ages of 4 and 69	Healthy	81%
4 Individuals between the ages of 5 and 59	Sick	15%
1 individual age 49	Healthy and Sick	4%

Females

11 Individuals between the ages 19 and 64	Healthy	92%
1 Individual age 26	Sick	8%

Males

10 Individuals between the ages of 4 and 69	Healthy	72%
3 Individuals between the ages of 5 and 59	Sick	21%
1 Individual age 49	Healthy and Sick	7%

Frequency of Illness

The four individuals who reported their general health as sick, reported the frequency of their illnesses as three to seven days per week, and one day, two days and every day per month. The individual who reported his general health as healthy and sick, reported the frequency of his illness as one day per week and three days per month.

Six of the 21 individuals who reported their general health as healthy, reported their frequency of illness as seven days per week and one, two and four days per month. Two of the five individuals who did not report their general health as healthy or sick, responded to the frequency of their illness as two days per month and up to five days per month.

Thus, even though 21 of the 31 individuals surveyed reported their general health as healthy, six individuals reported their frequency of illness as much as four days per month and seven days per week. Two of the five individuals who did not report the condition of their general health, reported their frequency of illness as two to five days per month. Thus 12 of the 31 individuals survey (39% of the population surveyed) reported frequency of illnesses on average of three days per week and five days per month with a maximum of seven days per week and all days per month.

Access to Doctors and Health Care Providers

Of the 31 individuals responding to the survey, 30 individuals (97%) had access to doctors. Twenty-six of 31 individuals (84%) had access to other health care providers, four individuals did not and one individual did not respond.

Occupational Exposure

Four of the 31 individuals surveyed reported occupational exposure. None of the individuals surveyed reported exposure to chemicals from family member work places transported into their homes.

Two individuals employed as air craft mechanics (68 year old male and 37 year old male) reported exposure to jet fuel (25 years and 13 years), ammonia (23 years), acetone (23 years) and MEK (3 years). One individual, employed as a truck driver (49 year old male), reported exposure to creosote (1 year) and hydrochloric acid (1 year). The fourth individual (36 year

old female) reported occupational exposure to anesthetics - Isoflurene and cleaners - Rocal and Parvosal for 11 years.

One air craft mechanic reported his general health as healthy, the other did not respond to the general health question. The truck driver reported his general health as both healthy and sick. The female reported her general health as healthy.

Smoking History

A total of 14 households were surveyed. Seven of the 14 households were nonsmoking households. Four households were occupied by smokers and three households were occupied by past smokers.

Twenty of the 31 individuals surveyed have never smoked. Seventeen of the twenty individuals did not have any other member of the household that smoked. Three individuals, who have never smoked, have other members of the household who are smokers eight individuals currently smoke, two individuals had smoked in the past and one individual did not provide information on smoking history.

The eight individuals who are current smokers have smoked for two to 34 years with an average smoking history of 23 years. Six of the current smokers are long term smokers who have smoked for 20 to 34 years. The smokers currently smoke a half to two packs of cigarettes per day.

The eight current smokers consist of five males and three females. The five males range in age from 22 to 59 and have smoked from two to 30 years. The three females who are current smokers range in age from 50 to 55 and have smoked for 20 to 34 years.

The two past smokers are 48 and 68 year old males who had smoked a pack to a pack and a half of cigarettes per day for 15 and 20 years.

Odors and Associated Health Impacts

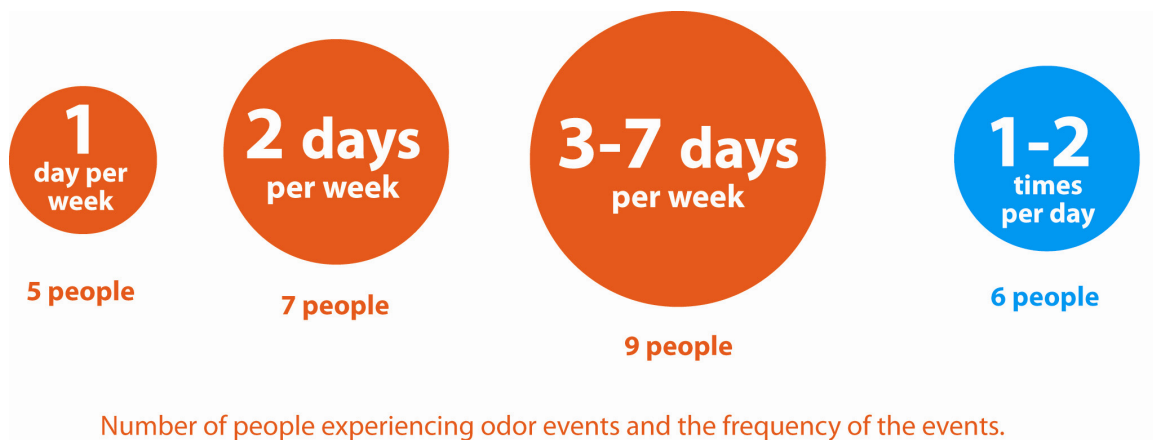
Odor Events

Twenty-eight of the 31 individuals surveyed experienced odor events. Three individuals did not report experiencing odor events.

Frequency of Odor Events and Number of Individuals Experiencing the Odor Events

Frequency of Odor Events	Individuals Experiencing Events
1-2 times per day	6
1 day per week	5
2 days per week	7
3 days per week	4
6 days per week	1
7 days per week	4
2 days per month	4
3 days per month	4
5 days per month	3
10 days per month	4
12 days per month	2
20 days per month	3
24 days per month	1

Note: Odors are more predominant when the wind is out of the south.



Odors Associated with Sources in the DISH Area

Individuals responding to the health survey reported odors associated with specific types of facilities in the DISH area.

Compressor Stations

- Sulfur
- Odorized Natural Gas Smell
- Ozone
- Burnt Butter Smell

Gas Processing Plants/Gas Metering Stations

- Sulfur
- Odorized Natural Gas Smell
- Burnt Wire
- Strong Chemical Like Smell
- Ether

Natural Gas Pipe Lines

- Odorized Natural Gas

Gas Wells

- Natural Gas Smell

Sewer System

- Septic odors

Pastures

- Hay and Grass Smells

Health Impacts Associated with Odor Events

Sulfur, Rotten Egg Smell

- Burning Eyes
- Nausea
- Headaches
- Runny Nose
- Sore Throat
- Asthma
- Sinus Problems

Odorized Natural Gas

- Headaches
- Nausea
- Chronic Sinus Infections
- Asthma
- Hypertension
- Indigestion

Burnt Wire

- Burning Throat

Ether

- Bronchitis

Sewer Smell

Infection of air ways
Irritation of sinus and throat

Duration of Health Impacts Associated with Odor Events

Health Impact	Duration of Health Impacts
Airway Infection	1-3 weeks
Allergies	24 hours after odors dissipates
Bronchitis	1 week
Burning and Irritated Throat	Until smell goes away
Chest Congestion	1-3 days
Hard to Breathe	2-3 days
Headache	4 hours to one week
Irritated Eyes	1-2 days
Nasal Irritation	1 week
Nausea	Until smell goes away
Respiratory Irritation	24 hours after odor dissipates
Sinus Irritation	1-3 days
Sinus with Plugged Ears	10-20 days

Distance from Surveyed Households to Compressor Stations and Gas Processing Plants/Gas Metering Stations

Distance	Number of Households
50 Feet	1
100 Feet or less	3
600 Feet	1
1,000 Feet	2
0.5 miles	3
Less than 1 mile	1
1 to 2 miles	1

Note: Two households surveyed did not report distances.

Medical Conditions Reported in the DISH/Clark Health Survey

In addition to the requested information concerning odor events and related health impacts, the health survey requested information on specific medical symptoms and diseases from each individual completing the survey. The symptoms reported in the odor events and related health impacts section of the survey were specifically requested to be included in this section of the survey.

A total of 165 medical symptoms and diseases were reported by the 31 individuals who completed the DISH/Clark Health Survey forms. Twenty-three medical conditions were the

most prevalent conditions reported by the 31 individuals surveyed in the DISH/Clark Health Survey.

Medical Condition	# of Individuals Surveyed	% of Individuals Surveyed
Sinus Problems	18	58
Throat Irritation	17	55
Allergies	17	55
Weakness and Fatigue	17	55
Eye Irritation	16	52
Nasal Irritation	15	48
Joint Pain	14	45
Muscle Aches and Pains	13	42
Breathing Difficulties	13	42
Vision Impairment	13	42
Severe Headaches	12	39
Sleep Disturbances	12	39
Swollen and Painful Joints	12	39
Frequent Irritation	10	32
Skin Irritation	10	32
Wheezing	9	29
Frequent Nausea	9	29
Ringing in Ears	9	29
Decreased Motor Skills	8	26
Loss of Sexual Drive	8	26
Bronchitis	7	23
Easy Bruising	7	23
Difficulty in Concentrating	7	23

In addition to these 23 most prevalent medical conditions, the survey identified more than 130 medical conditions and medical symptoms each occurring in a small number of individuals. Two females have neurological conditions - neuromuscular disorder, dystonia and muscular/skeletal disorder. Additional medical conditions occurring in a small number of individuals range from lung, liver and kidney disorders, brain disorders, strokes, thyroid problems, internal bleeding, frequent nose bleeds, and bone conditions, to high blood pressure, depression, anxiety, tremors, and behavioral changes.

A preliminary review of the first initial group of health surveys obtained on October 12, 2009, resulted in the following health conditions being reported by individuals completing the health survey. The results of the preliminary review were consistent with the medical conditions identified by the entire 31 individuals completing the survey.

Health Effects Reported by DISH Community as of October 12, 2009

Abnormal EEG*	Abnormal Mammogram	Allergies
Amnesia	Brain Disorders*	Bronchitis*
Chronic Eye Irritation*	Decreased Motor Skills*	Depression*
Difficulty in Concentrating	Dizziness*	Easy Bruising
Endometriosis	Enlarged Spleen	Excessive Sweating
Eyes Burning*	Falling, Staggering*	Forgetfulness
Frequent Irritation*	Frequent Nausea*	Frequent Nose Bleeds
Increased Fatigue*	Irregular/Rapid Heart Beat*	Joint Pain
Lump in Breast	Muscle Aches & Pains*	Nasal Irritation*
Nervous System Impacts	Persistent Cough	Pre-Cancerous Lesions*
Ringing in Ears	Severe Anxiety*	Severe Headaches*
Shortness of Breath	Sinus Problems*	Sleep Disturbances
Sores & Ulcers Mouth	Strokes	Throat Irritation*
Thyroid Problems	Urinary Infections	Weakness* & Tired*

*Health Impacts Associated with Chemicals present in Excess of TCEQ Short and Long Term Effects Screening Levels in the air of DISH

Respiratory Impacts

Twenty-two of the 31 individuals surveyed (71%) reported having respiratory ailments.

Sinus Problems	18/31	58%
Throat Irritation	17/31	55%
Breathing Difficulties	13/31	42%
Wheezing	9/31	29%
Bronchitis	7/31	23%
TOTAL	22/31	71%

Respiratory Impacts as it Relates to Smokers and Non-Smokers

Of the 22 individuals that had respiratory ailments, 12 never smoked, 8 were current smokers, one had smoked in the past, and 1 individual did not respond to the smoking request for information. Overall, 20 individuals of the 31 individuals surveyed had never smoked.

Therefore 60% of the nonsmokers surveyed had respiratory problems. Overall 8 individuals were current smokers; therefore 100% of the current smokers had respiratory problems. Overall 2 individuals had smoked in the past. Thus, 50% of the previous smokers had respiratory problems.

Individuals with Most Medical Conditions

The 31 individuals surveyed had an average of 20.5 medical conditions reported in the Health Surveys (range 0 to 46). The individuals with the largest number of reported health symptoms were a 49 year old male and a 55 year old female. They each reported 46 medical conditions. The 49 year old male, a nonsmoker truck driver, reported his general health as sick and healthy and reported being sick one day per week and three days per month. He also reported experiencing odor events once per day, one day per week and 12 days per month. The 55 year old female reported her health as healthy, did not report the number of times sick

and listed odor events as two days per month. She is a smoker and has smoked for 30 plus years.

Correlation of Chemicals Detected in the Ambient Air of DISH with the Health Impacts Experienced by Community Members in DISH/Clark

Wolf Eagle Environmental sampled the ambient air in DISH at seven locations from August 17 to 18, 2009. The air samples were analyzed for Volatile Organic Chemicals, Hazardous Air Pollutants, Tentatively Identified Compounds and NOX. Sixteen chemicals were detected in the ambient air of DISH in excess of Texas Commission on Environmental Quality (TCEQ) Short-term and Long-term Effects Screening Levels. These chemicals consisted of Benzene, Carbon Disulfide, 1,2,4-Trimethylbenzene, Xylene, Naphthalene, Carbonyl Sulfide, Trimethyl Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Methyl Pyridine, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide, Diemethyl Pyridine, and Diethyl Benzene. The health impacts associated with the chemicals detected in the air of DISH in excess of TCEQ Short-term and Long-term Effects Screening Levels correspond to the health impacts being experienced by DISH community members.

Human Health Effects Associated with Chemicals Detected in the air in Excess of TCEQ Short and Long-Term Effects Screening Levels

Acute Health Effects

Irritates skin, eyes, nose, throat and lungs
Headaches
Dizziness, Light Headed
Nausea, Vomiting
Skin Rashes
Fatigue
Tense and Nervous
Personality Changes
Depression, Anxiety, Irritability
Confusion
Drowsiness
Weakness
Muscle Cramps
Irregular Heartbeat (arrhythmia)

Chronic Health Effects

Damage to Liver and Kidneys
Damage to lungs
Damage to Developing Fetus
Causes Reproductive Damage
Damages Nerves Causing Weakness and Poor Coordination
Affects Nervous System
Affects the Brain
Leukemia
Aplastic Anemia
Changes in Blood Cells
Affects Blood Clotting Ability
Carcinogen
Mutagen
Teratogen — Developmental Malformations

The most prevalent health impacts reported by individuals surveyed during the Health Survey and the health impacts associated with odor events correspond to the health effects of chemicals detected in the air in DISH in excess of the TCEQ Short-term and Long-term Effects Screening Levels.

Most Prevalent Health Impacts and Health Impacts Associated with Odor Events
With the associated chemicals known to cause those health impact. These chemicals exceeded TCEQ short-term and long-term effects screening levels in the air of DISH.

Allergies

Benzene, Xylenes, Naphthalene, Trimethyl Benzene, Diethyl Benzene, Carbonyl Sulfide, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Breathing Difficulties

Benzene, Xylenes, Naphthalene, Trimethyl Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Diethyl Benzene, Carbonyl Sulfide, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Bronchitis

Trimethyl Benzene

Difficulty in Concentrating

Naphthalene

Easy Bruising

Benzene

Eye Irritation

Benzene, Xylenes, Naphthalene, Trimethyl Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Diethyl Benzene, Carbon Disulfide, Carbonyl Sulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Frequent Irritation

Carbon Disulfide

Frequent Nausea

Benzene, Xylenes, Naphthalene, Diethyl Benzene, Carbon Disulfide, Carbonyl Sulfide, Dimethyl Disulfide, Methyl Pyridine, Dimethyl Pyridine

Muscle Aches and Pains

Carbonyl Sulfide

Nasal Irritation

Benzene, Xylenes, Naphthalene, Diethyl Benzene, Carbonyl Sulfide, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Severe Headaches

Benzene, Xylenes, Naphthalene, Trimethyl Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Diethyl Benzene, Carbon Disulfide, Methyl Pyridine, Dimethyl Pyridine

Sinus Problems

Benzene, Xylenes, Naphthalene, Diethyl Benzene, Carbonyl Sulfide, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

61%

Health effects reported by the DISH community were associated with toxics measured in excess of TCEQ screening levels

Abnormal EEG
Brain disorders
Bronchitis
Chronic Eye Irritation
Decreased Motor Skills
Depression
Dizziness
Eyes Burning
Falling, Staggering
Frequent Irritation
Frequent Nausea
Increased Fatigue
Irregular/Rapid Heart Beat
Muscle Aches & Pains
Nasal Irritation
Pre-Cancerous Lesions
Severe Anxiety
Severe Headaches
Sinus Problems
Throat Irritation
Tired
Weakness
Allergies
Difficulty in Concentrating
Easy Bruising
Nervous System Impacts
Difficulty in Breathing

Skin Irritation

Benzene, Xylenes, Naphthalene, Trimethyl Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Diethyl Benzene, Carbon Disulfide, Carbonyl Sulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Throat Irritation

Benzene, Xylenes, Naphthalene, Trimethyl, Benzene, Methyl-Methylethyl Benzene, Tetramethyl Benzene, Diethyl Benzene, Carbonyl, Sulfide, Dimethyl Disulfide, Methyl Ethyl Disulphide, Ethyl-Methylethyl Disulfide

Vision Impairment

Carbonyl Sulfide, Naphthalene

Weakness and Fatigue

Carbonyl Sulfide, Carbon Disulfide, Dimethyl Disulfide, Naphthalene

**These chemicals
exceeded TCEQ
short-term and
long-term levels in
the air of DISH, TX**

The medical conditions reported by DISH community members in the Health Survey correspond to the health conditions associated with the toxic air pollutants present in the air of DISH during August 2009 in excess of the TCEQ Short-term and Long-term Effects Screening Levels.

Summary

Thirty-one individuals (15 females and 16 males) completed the DISH/Clark Health Survey. Thirty individuals were current residents of DISH/Clark and one was a previous resident. Fourteen households were surveyed.

Eighty-one percent of the individuals surveyed considered themselves healthy, 15%, sick and 4% both healthy and sick. Thirty-nine percent of the population surveyed reported frequency of illnesses an average of three days per week and five days per month, with a maximum of seven days per week and all days per month.

Twenty-eight of the 31 individuals surveyed experienced odor events. The frequency of odor events occurred up to 7 days per week and 24 days per month. Odors were more predominant when the wind was out of the south, transporting emissions from the area of the compressor stations and gas plants towards the residential areas of DISH.

The individuals surveyed identified the sources of odors as compressor stations, gas processing plants/gas metering stations, natural gas lines, gas wells, sewer system and pastures. The community members identified substantial health impacts due to odor events associated with the compressor stations, gas processing plants and gas metering stations. These sources were identified as being located 50, 100, 600, and 1,000 feet from most of the homes surveyed and 0.5 to 2 miles from other surveyed homes.

A total of 165 medical symptoms and diseases were reported by the 31 individuals who completed the DISH/Clark Health Survey forms. Twenty-three medical conditions were the most prevalent conditions reported by the 31 individuals surveyed. These most prevalent health conditions included sinus problems, throat irritation, allergies, weakness and fatigue, eye irritation, nasal irritation, joint pain, muscle aches and pains, breathing difficulties, vision impairment, severe headaches, sleep disturbances, swollen and painful joints, frequent irritation, skin irritation, wheezing, frequent nausea, ringing in ears, decreased motor skills, loss

of sexual drive, bronchitis, easy bruising and difficulty in concentrating. In addition to these 23 most prevalent medical conditions, the survey identified more than 130 medical conditions and medical symptoms each occurring in a small number of individuals. Two females have neurological conditions - neuromuscular disorder, dystonia and muscular/skeletal disorder. Additional medical conditions occurring in a small number of individuals each, range from lung, liver and kidney disorders, brain disorders, strokes, thyroid problems internal bleeding, frequent nose bleeds, and bone conditions, to high blood pressure, depression, anxiety, tremors, and behavioral changes. Twenty-two of the 31 individuals surveyed (71%) reported having respiratory ailments.

The human health impacts reported during the survey were compared to the health impacts associated with the toxic air emission chemicals detected in the ambient air of DISH in August 2009, in excess of TCEQ Short-term and Long-term Effects Screening Levels. The medical conditions reported by DISH community members in the Health Survey correspond to the health conditions associated with the toxic air pollutants present in the ambient air of DISH during August 2009 in excess of the TCEQ Short-term and Long-term Effects Screening Levels.

Recommendations

In order to further evaluate the health impacts being experienced by DISH community members, The Texas Department of State Health Services should, at a minimum, test the blood of community members for a Comprehensive Metabolic Panel, Hepatic Profile and CBC. In addition, the Health Agency should be requested to evaluate the exposure of residents through the use of biomonitoring parameters for the chemicals of concern in the blood and urine of current and past DISH residents. The overall health impacts being experienced by DISH residents (past and present) should be tracked over time through surveys and follow up consultations.

The Texas Commission on Environmental Quality should establish a process of documenting Odors and Symptoms should be established by which community members can document odor events and associated health impacts. The Odor and Symptom Logs should contain reporting of date, time, location, description of odors, wind speed and direction, health impacts, associated with the odor events, possible sources of the odors, duration of the odor event and duration of health impacts

Increased tracking of operational upsets, spills, releases and permit violations of the compressor stations, gas processing stations, gas metering stations, wells and pipelines in the DISH area should also be put in place by the Texas Commission on Environmental Quality and the Texas Railroad Commission.

A continuous monitoring network should be established by the Texas Commission on Environmental Quality to monitor speciated Volatile Organic Chemicals, Hazardous Air Pollutants, Sulphur compounds and meteorological conditions in the DISH area.

The recommended measures are needed to further define the negative human health impacts being experienced by DISH community members, address appropriate medical intervention and treatment, identify the specific sources of the chemical emissions and pathways of human health exposure, and implement measures needed to reduce chemicals being emitted into the air of the DISH area.

Health Survey of Current and Former DISH/Clark Texas Residents

Name _____

Current Address _____

Previous Address in DISH/Clark, Texas if you no longer live in
DISH/Clark, Texas

Phone Number _____

Age _____ Sex _____

Note: Please fill out a separate survey form for each member in
your household

How long have you lived in DISH/Clark _____ number of years,
from _____ to _____

Did you previously live in DISH/Clark? _____

When did you move from DISH/Clark? _____

How long did you live in DISH/Clark? _____ number of years,
from _____ to _____

How close do you or did you live to a compressor station or
pipeline station? _____

Please indicate the operator of the compressor station nearest to
your home and any other identification information from the
station. _____

How many people live full time _____ or part time _____ in your home?

Occupational Exposure

List your occupations over the last 20 years

Occupation/Company	Years (from-to)
_____	_____
_____	_____
_____	_____
_____	_____

Were you exposed to chemicals in your work place? Yes No

Please list the chemicals and the number of years and range of years for each chemical:

Chemical	Number of Years	Years (from-to)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Were you exposed to chemicals from family members work places that were carried into your home Yes No

Please list the chemicals and the number of years and range of years for each chemical:

Chemical	Number of Years	Years (from-to)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Smoking History

Do you smoke? Yes No

Did you smoke in the past? Yes No

How many years have you smoked? _____

How many packs per day? _____

Do other members of your household smoke? _____

Healthy or Sick

Do you consider yourself HEALTHY or SICK (please circle one)

How frequently are you sick? _____days/week _____days/month

Do you have access to Doctors? Yes No

Do you have access to Other Health Care Providers? Yes No

Where do you go for medical assistance when you are sick?

Odors and Health Symptoms

Do you experience odors in the air? Yes No

How frequently do you experience the odors?

No. of times per day _____

No. of days per week _____

No. of days per month _____

Please describe the odors _____

Do you experience different odors when the wind is blowing from different directions? Yes No

Please describe the different odors associated with the different wind directions: _____

Do you think you know where or what facility the odors are coming from? Yes No

Please describe the sources of odors you are experiencing

Health Impacts Associated with Specific Odors

Please list health impacts you experience associated with specific odors:

Odor

Health Impact

Please list the length of time the health impacts associated with odor events last.

Health Impact

Length of Time Persist

[illegible]

Please fill out one of these forms for each person living part time or full time in your home. Include the symptoms listed above.

Medical Symptoms

- | | |
|---|---|
| ☐ skin rashes | ☐ frequent shortness of breath |
| ☐ skin irritation | ☐ persistent hoarseness |
| ☐ hives | ☐ asthma |
| ☐ boils | ☐ sinus |
| ☐ changes in skin color | ☐ shortness of breathe |
| ☐ swollen painful joints | ☐ abnormal chest x-ray |
| ☐ persistent skin problems | ☐ abnormal lung function test |
| ☐ sores that won't heal | ☐ bleeding from rectum |
| ☐ discolored areas of skin | ☐ change in bowel habits |
| ☐ discoloration of teeth | ☐ persistent indigestion |
| ☐ dry, cracked red skin | ☐ persistent abdominal pain |
| ☐ dermatitis | ☐ black stool |
| ☐ burns on skin | ☐ red blood in stool |
| ☐ burns on eye | ☐ vomiting blood |
| ☐ conjunctivitis | ☐ abdominal pain |
| ☐ contact dermatitis | ☐ frequent nausea |
| ☐ nasal irritation | ☐ vomiting |
| ☐ throat irritation | ☐ diarrhea |
| ☐ peeling hands and arms | ☐ weight loss |
| ☐ eczema | ☐ loss of appetite |
| ☐ thickening of skin layer | ☐ blood in urine |
| ☐ allergies | ☐ sugar in urine |
| ☐ eye burning | ☐ discolored urine |
| ☐ arthritis | ☐ discharge from nipple |
| ☐ blue lips, nose or skin | ☐ menstrual disturbances |
| ☐ loss of sense of smell | ☐ bloody vaginal discharge |
| ☐ excessive sweating | ☐ birth defects in children |
| ☐ difficulty breathing | ☐ stillborn children |
| ☐ shortness of breathe | ☐ infertility |
| ☐ wheezing | ☐ increased fatigue(tired) |

- ___persistent cough
- ___chronic cough
- ___coughing up blood/sputum
- ___irregular/rapid heart beat
- ___frequent chest pains
- ___slow heart beat
- ___blurred vision
- ___blindness in either eye
- ___severe pain in eyes
- ___chronic eye irritation
- ___difficulty in vision
- ___decrease in vision
- ___frequent tearing of eyes
- ___swelling of eyes
- ___kidney stones
- ___frequent urination
- ___difficulty in starting urine
- ___abnormal PAP smear
- ___abnormal Mammogram
- ___seizures
- ___hallucination
- ___loss of memory
- ___dizziness
- ___severe headaches
- ___forgetfulness
- ___depression
- ___fainting
- ___trembling of eyelids
- ___trembling of hands/arms
- ___tingling of hands
- ___weakness of hands
- ___falling or stumbling
- ___decreased motor skills
- ___compulsive behavior
- ___sleep disorders
- ___frequent irritation
- ___easy bruising
- ___many pinpoint dots on skin
- ___abnormal blood test
- ___loss of sense of taste
- ___joint pain
- ___muscle aches or pains
- ___lumbar pain
- ___disorientation
- ___weakness
- ___tremors
- ___nerve damage
- ___loss of sense of smell
- ___muscular pain
- ___stroke
- ___ringing in ears
- ___difficulty hearing
- ___deafness
- ___hearing loss
- ___lumps or swelling in neck
- ___lumps or swelling in armpit
- ___lumps or swelling in groin
- ___lumps in breast
- ___frequent infections
- ___metallic taste on cough
- ___poor wound healing
- ___gingivitis
- ___redness or swelling of gums
- ___severe salivation
- ___discoloration of gums
- ___high blood pressure
- ___low blood pressure
- ___prolonged bleeding
- ___frequent nose bleeds
- ___yellowing of skin or eyes
- ___fevers of unknown cause
- ___uncontrolled eye movement

- | | |
|---------------------------------------|----------------------------------|
| ___extreme drowsiness | ___sores or ulcers in mouth |
| ___changes in personality | ___dry eyes |
| ___severe anxiety | ___tension |
| ___learning problems | ___problems in judgment |
| ___behavioral changes | ___suicidal thoughts |
| ___difficulty in drawing | ___agitation |
| ___difficulty in concentration | ___spelling difficulties |
| ___memory problems | ___recall problems |
| ___inability to recall numbers | ___reduced muscle strength |
| ___feeling weak and tired | ___noises in ears |
| ___difficulty carrying out activities | ___loss of ability to see colors |
| ___appetite disturbances | ___amnesia |
| ___sleep disturbances | ___depression |
| ___loss of sexual drive | |
| ___balance difficult | |
| ___slurring of speech when tired | |
| ___staggering | |
| ___falling | |

Diseases

- | | |
|--------------------------------------|----------------------------|
| ___Kidney Disease | ___Ulcers of Stomach |
| ___Kidney Cancer | ___Ulcers of GI tract |
| ___Kidney Problems | ___Gastrointestinal Cancer |
| ___Kidney Stones | ___Sensory Loss |
| ___Hypertension | ___Vision Impairment |
| ___Bladder Disease | ___Peripheral Neuropathy |
| ___Bladder Cancer | ___Nerve Damage |
| ___Blood in Urine | ___Neuritis |
| ___Frequent Urinary Track Infections | ___Nervous System |
| ___Liver Cancer | ___Brain Tumor |
| ___Liver Disease | ___Brain Disorder |

___Cirrhosis of Liver
___Liver Problems
___Liver Enlargement
___Jaundice
___Hepatitis
___Portal Hypertension
___Esophageal Varices
___Angiosarcoma of Liver
___Hermangiosarcoma
___Cancer of Pancreas
___Diabetes
___Diabetes Mellitus
___Diabetes Insipidus
___Endocrine Disturbances
___Bile Duct Disease
___Gall Stones
___Stomach Cancer
___Esophageal Cancer
___Spleen Enlargement
___Duodenal Cancer
___Colon Cancer
___Cancer of Small Intestine
___Bone Fractures
___Tremors
___Dementia
___Amnesia
___Cerebral Palsy
___Tuberculosis
___Bronchitis
___Pleurisy
___Pulmonary Edema
___Asthma
___Emphysema
___Pleural Plaques
___Spots on Lungs
___Calcifications in Lungs

___Parkinson's Disease
___Abnormal EEG
___Thyroid Cancer
___Thyroid Trouble
___Enlarged Thyroid
___Anemia
___Polycythemia
___Leukopenia
___Aplastic Anemia
___Hemolytic Anemia
___Hodgkin's Lymphoma
___Non-Hodgkin's Lym.
___Lymphosarcoma
___Aleukemia
___Perlelukemia
___Multiple Myeloma
___Pancytopenia
___Eruthroleukemia
-----Ovarian Cancer
___Musculo-Skeletal Dis.
___Osteoporosis
___Osteomalacia
___Contact Dermatitis
___Pre-Cancerous Skin
___Skin Cancer
___Eczema
___Skin Rash
___Malignant Melanoma
___Raynaud's Disease
___Schleroderma
___Lupus
___Rheumatoid Arthritis
___Gout
___Sarcoidosis
___Heart Disease
___Vascular Disease

☐ Asbestosis
☐ Silicosis
☐ Pneumoconiosis
☐ Lung Cancer
☐ Mesothelioma
☐ Bronchial Cancer
☐ Masopharyngeal Cancer
☐ Sinonasal Cancer
☐ Nasal Cancer
☐ Oral Cancer
☐ Gingivitis
☐ Cancer of Larynx
☐ Cancer of Trachea
☐ Conjunctivitis
☐ Damage to Nerves or Eyes
☐ Corneal Disease
☐ Cataracts

☐ Cardiovascular Disease
☐ Cardiac Arrhythmia
☐ High Blood Pressure
☐ Neuroblastoma
☐ Reticulum Cell Sarcoma
☐ Breast Cancer
☐ Ovarian Cancer
☐ Cervical Cancer
☐ Uterine Cancer
☐ Endometrosis
☐ Scrotal Cancer
☐ Prostate Cancer
☐ Bone Cancer

Have you had a child/children born with:

birth defects	Yes	No
learning disorders	Yes	NO
neurological disorders	Yes	No
behavioral disorders	Yes	No
memory disorders	Yes	No

Have you had a still born child/children Yes No

If available please provide dates of diagnosis for the diseases checked on the form:

Other symptoms or diseases not listed on the form:

Form completed by:_____

Information provided by:_____

Date: _____

Please mail or drop off the completed Health Survey Form at the DISH Town Hall.

DISH Town Hall
5413 Tim Donald Rd.
DISH, TX 76247