

# Health Consultation

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PSC RECOVERY SYSTEMS

FAIRBURN, FULTON COUNTY, GEORGIA

EPA FACILITY ID: GAN000409924

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

## **Health Consultation: A Note of Explanation**

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

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

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HEALTH CONSULTATION

PSC RECOVERY SYSTEMS

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EPA FACILITY ID: GAN000409924

Prepared By:

Georgia Department of Human Resources  
Division of Public Health  
under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

## TABLE OF CONTENTS

<b>GLOSSARY OF ACRONYMS .....</b>	<b>2</b>
<b>STATEMENT OF ISSUES .....</b>	<b>3</b>
<b>BACKGROUND .....</b>	<b>3</b>
<b>Site Description and History .....</b>	<b>3</b>
<b>Demographics.....</b>	<b>5</b>
<b>COMMUNITY INVOLVEMENT .....</b>	<b>5</b>
<b>Community Exposure Survey Results .....</b>	<b>8</b>
<b>Exposure Survey of Animal Illness .....</b>	<b>11</b>
<b>Residential Facility Survey.....</b>	<b>12</b>
<b>DISCUSSION .....</b>	<b>12</b>
<b>Environmental Sampling Data .....</b>	<b>12</b>
<b>Pathway Analysis .....</b>	<b>13</b>
<b>Completed Exposure Pathway .....</b>	<b>13</b>
<b>Evaluation Process.....</b>	<b>14</b>
<b>CHILD HEALTH CONSIDERATIONS.....</b>	<b>16</b>
<b>CONCLUSIONS .....</b>	<b>17</b>
<b>RECOMMENDATIONS.....</b>	<b>18</b>
<b>PUBLIC HEALTH ACTION PLAN .....</b>	<b>18</b>
<b>Actions Completed.....</b>	<b>18</b>
<b>Actions Planned.....</b>	<b>18</b>
<b>REFERENCES.....</b>	<b>19</b>
<b>AUTHORS AND PEER REVIEWERS.....</b>	<b>21</b>
<b>CERTIFICATION.....</b>	<b>22</b>
<b>FIGURE 1: SITE DEMOGRAPHICS.....</b>	<b>24</b>
<b>FIGURE 2: SURVEY RESPONDENTS REPORTING MULTIPLE SYMPTOMS.....</b>	<b>25</b>
<b>FIGURE 3: SURVEY RESPONDENTS REPORTING ILL PETS.....</b>	<b>26</b>
<b>APPENDIX A: EXPOSURE SURVEY .....</b>	<b>28</b>
<b>APPENDIX B: EXPLANATION OF EVALUATION PROCESS .....</b>	<b>29</b>
<b>APPENDIX C: PUBLIC HEALTH HAZARD CATEGORIES .....</b>	<b>31</b>
<b>APPENDIX D: SITE FACT SHEET .....</b>	<b>32</b>
<b>APPENDIX E: PUBLIC COMMENTS.....</b>	<b>35</b>

## **GLOSSARY OF ACRONYMS**

<b>ATSDR</b>	Agency for Toxic Substances and Disease Registry
<b>CVs</b>	comparison values
<b>EPA</b>	U.S. Environmental Protection Agency
<b>GEPD</b>	Georgia Environmental Protection Division
<b>GDPH</b>	Georgia Division of Public Health
<b>mg/kg</b>	milligrams per kilogram
<b>ppm</b>	parts per million

## STATEMENT OF ISSUES

In early July 2006, the Georgia Department of Human Resources, Division of Public Health (GDPH), was asked by the LaGrange Health District to assist in an investigation of potential adverse health effects and concerns about community exposure to an offensive odor generated by a local wastewater treatment facility. This investigation was conducted in cooperation with the Fulton and Fayette County Emergency Management Agencies; LaGrange and Fulton Health Districts; Georgia Department of Natural Resources, Georgia Environmental Protection Division (GEPD); U.S. Environmental Protection Agency (EPA); the Agency for Toxic Substances and Disease Registry (ATSDR), state and local elected officials, and residents.

The purpose of this health consultation is to determine to what extent people have been exposed to hazardous substances, whether that exposure is harmful, and the potential health effects. GDPH reviewed available air, soil, and wastewater sampling data for the site. The information in this health consultation is specifically designed to provide the community with information about the public health implications from exposure to hazardous substances in the environment, and to identify populations for which further health actions may be needed. It is not intended to address liability or other non-health issues.

## BACKGROUND

### Site Description and History

The PSC facility is located about 20 miles south of Atlanta, at 8025 Spence Road in Fairburn, Georgia, off of State Highway 92 (Figure 1; Photograph 1). PSC is located in a well populated area in Fulton County just north of the Fayette County line. PSC is a wastewater pre-treatment plant permitted to process non-hazardous waste. The facility was purchased in 1997 from a private company that bought the facility from Fulton County when the county built a new wastewater treatment plant in the 1980's. Grease from local restaurants is the largest waste stream that PSC processed; it and other waste streams were pre-treated to Fulton County standards and then discharged to the Fulton County wastewater treatment plant. PSC held an Industrial Wastewater Discharge Permit from Fulton County Public Works, and holds a Solid Waste Handling Permit from GEPD. PSC is permitted to hold and transfer containers of hazardous waste at an adjoining facility [1].



Photograph 1: Aerial view of PSC Recovery Systems in Fairburn, GA and nearby homes.

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From June 21 through June 28, 2006, the plant processed 38 tanker trucks of wastewater from an insecticide manufacturing plant in Alabama. On or around June 29, PSC received four more trucks from the plant. PSC detected an excessive odor while off-loading the first truck into one of the facility's holding tanks. Subsequent sample analyses showed the presence of the pesticide ethoprop and its breakdown product, n-propyl mercaptan at levels that did not conform to the Waste Profile Sheet. PSC reloaded the truck and, along with the remaining tanker trucks, the rejected material was returned to the client [2].

Ethoprop is an organophosphate insecticide. There is no suspected exposure pathway to ethoprop as a result of this incident. Propyl mercaptan is a manufacturing precursor, a product contaminant, and a degradation product of ethoprop. It has a strong wild onion-like odor, and exposure to the odor has been reported to cause headaches, nausea, and irritation of skin, eyes, and mucus membranes [3]. These effects are not permanent, and should decrease within a short time after the odor ceases. Propyl mercaptan exposure at levels likely to occur outside an occupational setting is not known to cause long-term adverse health effects [4].

Beginning June 29, 2006, numerous community complaints about an intense odor and health effects were reported to government officials. Air samples taken on and off site of the facility on several occasions since early July have not found propyl mercaptan in air at or above a level that may pose a health hazard<sup>1</sup>. However, the foul odor from the propyl mercaptan lingered off and on in surrounding neighborhoods for several weeks, and many people reported symptoms known to be associated with exposure to the offensive odors. By March, 2007 health complaints had dramatically decreased and are rarely received by any agency.

PSC treated the holding tank which received the malodorous wastewater with a hypochlorite solution (e.g. bleach) to reduce the odor coming from the holding tank; however, the reaction between bleach and mercaptan was likely to be energetic and may have produced more off-gassing in the short term [5, 6]. PSC subsequently treated the equipment with potassium permanganate. Residual material from clean-up was reportedly removed on July 24, 2006 [2]. However, the odor lingered, and PSC continued clean up and treatment activities. On July 20, the Fulton County Department of Health and Wellness declared a "critical health incident" and banned the source of the odor from the county.

Because of continuing complaints of odor and illness, on July 29 GEPD ordered the plant closed, but the plant appealed the decision and remained in operation. GEPD obtained wastewater samples from PSC on August 15, 2006, and ethoprop was identified in one sample taken from the bottom of a storage tank. Subsequently, GEPD issued a Consent Order requiring PSC to submit a detailed plan to remove all residual ethoprop from the plant by September 13, 2006 [7]. In addition, the Consent Order imposed a fine and required PSC to no longer accept shipments containing mercaptan, as well as unfamiliar waste streams that may create an odor problem unless the waste is physically and chemically similar to other wastes treated by PSC in the past without incident [7].

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<sup>1</sup> An action level is a concentration that, when exceeded, may pose a health hazard. When an action level is detected in the environment, EPA and other risk managers evaluate the exposures potentially occurring in that vicinity in order to implement appropriate protective measures. Based on the similarity for toxicity with methyl mercaptan, ATSDR recommends an ambient (outdoor) air action level for n-propyl mercaptan of 0.5 parts per million [6].

EPA investigators tracking the PSC shipment discovered that the rejected wastewater shipment to PSC had been transferred to a railcar at the Alabama facility. On August 27, EPA took samples of the railcar wastewater. The analysis results of those samples do not necessarily represent the exact chemical composition of the wastewater from the PSC facility because the railcar used to store the waste may have contained residues from previous contents. Also, hypochlorite was added at PSC in an attempt to deodorize the waste, and chemical reactions may have taken place over time [8]. Results of the railcar contents analyses indicated a much larger percentage of ethoprop in the tanker trucks than was documented on the original Waste Profile Sheet.

In November 2006, a contractor for the Fulton County Department of Health and Wellness obtained twenty surface soil samples from various residential properties within a two-mile radius of PSC. The purpose of the sampling event was to determine if ethoprop may have escaped the PSC facility and settled in the surrounding community. The samples were analyzed in a state-certified laboratory and ethoprop was not detected in any surface soil sample [9].

In late 2006, PSC withdrew its request for renewal of its Industrial Wastewater Discharge Permit. As of December 22, 2006, PSC was no longer allowed to discharge industrial wastewater to the Fulton County sewer system. Also, PSC is not allowed to transport wastewater generated at the Fairburn plant for disposal at other facilities. Renewal of the discharge permit will be at the discretion of Fulton County. PSC continues to hold a Solid Waste Handling Permit from GEPD allowing it to dewater and solidify nonhazardous industrial sludge, grease trap pumpings, and related animal and vegetable base grease sludges. The resulting solid waste is then transported off site for proper disposal.

On December 15, GEPD required PSC to submit a revised decontamination plan that includes draining, dismantling, and cleaning tanks and all areas contaminated with propyl mercaptan. In January 2007, PSC declared that there is no odor emanating from the facility and submitted rinse water samples to GEPD for analyses [10]. No new complaints of odors have been received by GDPH in 2007.

### ***Demographics***

Using 2000 U.S. Census data, the Agency for Toxic Substances and Disease Registry (ATSDR) calculated population information for individuals living within a 1-mile, and 5-mile radius of the PSC site (Figure 1). The population within one mile of PSC is approximately 500 people, and within a 5-mile radius of the site is over 44,000.

### **Community Involvement**

Complaints (besides offensive odors) included both human and pet illness, several pet deaths, and a few reports of affected wildlife. Immediately following the incident, the Fayette County Emergency Management Agency developed an exposure survey form and distributed it throughout the community (Appendix A). The survey was also accessible through the following websites: the Fayette County government, the Fulton County Department of Health and Wellness, the GDPH, and the newly formed South Fulton/Fayette Community Task Force advocacy group. Completed survey forms were sent to the GDPH through September 1, 2006. In addition, follow-up interviews were conducted by GDPH staff with several survey respondents upon request, and with those reporting the most serious illnesses.



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A public meeting was held on July 19, 2006 to address community concerns regarding the offensive odors from PSC. Representatives for county, state, and federal agencies, elected officials, TV and print media, and local residents attended the meeting. Results from the public meeting included:

- 1) the Fulton County Commission agreed to explore ways of closing PSC until the mercaptan problem is resolved;
- 2) PSC initiated a toll-free claims line to process claims for damages from the community, and
- 3) GEPD would request that GDPH evaluate the reported health problems [1].

In late July, GDPH staff was contacted by a resident representing one community directly adjacent to PSC. This community is primarily Spanish speaking. The representative organized a public meeting for Saturday afternoon, inviting GDPH staff who planned to attend. The representative later canceled the event. No other requests from this representative or others in Spanish-speaking communities have been received by GDPH. Both the Fayette County Emergency Management Agency and the South Fulton/Fayette Community Task Force have made contact with the various communities in the areas around PSC, and no unique concerns or health effects have been identified among non-English speaking populations.

On July 30, residents rallied and collected over 300 signatures for a community petition demanding action to remove the source of the odor, and to exchange information about the odors and health effects (Photograph 2)



Photograph 2: Residents gather signatures on a petition.  
(Source: *The Fayette Citizen*)

In the evening of August 15, GDPH, Fayette and Fulton County Public Health, and State Representative Virgil Fludd co-sponsored a Public Availability Session (PAS) at Sandy Creek High School in Tyrone. Approximately 250 people attended. Representative Fludd moderated a panel session in the auditorium. The panel members were:

- Connie Biemiller, South Fulton/Fayette Community Task Force
- Dr. Lois Speaker, private consultant
- Dr. Steven Katkowsky, Fulton County Department of Health and Wellness
- Chief Allen McCullough, Fayette County Emergency Management Agency
- Jim Ussery, GEPD
- Dr. John Horan, GDPH
- Dr. Robert Geller, Georgia Poison Center
- Robert Safay, ATSDR

Several of the panel members presented information. Ms. Biemiller gave an update for the Task Force, emphasizing their strong interest in having PSC shut down. Dr. Speaker, a retired chemist, presented information on the toxicology of organophosphate pesticides. Dr. Katkowsky reviewed the actions his department had taken to protect public health. Mr. Ussery discussed the actions GEPD had taken, including the recent Consent Order. Following the presentations, the panel answered several questions from the audience. In response to a question about what Public Health was doing, Dr. Horan reported that GDPH was analyzing the completed exposure surveys gathered from the community. The PAS portion of the meeting had organization and agency representatives at tables located in the gymnasium, available to gather and document community concerns, answer questions, and provide information about the services their agency provides. Several GDPH staff provided their direct contact information, a brochure, "*The Health Effects of Odors*", health consultation definition and site-specific activity fact sheets, and interviewed numerous individuals with concerns about human and animal health effects. In addition, more exposure surveys were distributed and collected at several tables.

On September 18, the South Fulton/Fayette Community Task Force held a public meeting with U.S. Congressman David Scott at his office. In attendance were representatives from various agencies including GDPH and GEPD staff, and several residents. Ms. Biemiller and others representing the community appealed to Representative Scott to shut down the PSC facility until the source of the odor was eliminated and investigations were completed. In response, on October 16 Congressmen Scott and Westmoreland wrote letters to the EPA Administrator requesting temporary closure of the PSC facility and for EPA to review the initial clean-up activities. EPA responded to the Congressmen in early November; summarized the regulatory and public health activities to date, and concluded that there was no basis upon which EPA could take action to stop operations at the facility.

GDPH worked with the Christian City community in Fayette County to collect exposure survey forms from residents. Christian City is a non-profit, 500-acre housing complex for approximately 1,100 people located just over four miles from the PSC facility. On October 10, GDPH staff met with the Chief Executive Officer of Christian City to collect completed surveys, gather concerns, and provide and share contact and resource information.

On December 5, GDPH staff attended a community meeting. State Representative Virgil Fludd again organized the meeting and hosted approximately 150 people. Several state and local agency officials were present, as were staff from U.S. Congressional representatives' offices. Several speakers, including GDPH and Fulton County Department of Health and Wellness staff addressed:

- PSC facility permits
- Community Task Force activities
- The exposure survey report published by GDPH in late October
- Soil sampling results
- Letters to EPA and replies from that agency
- Class action lawsuit

The meeting was intended primarily for updates and information sharing. No new specific requests for information or action were made to GDPH or other public health staff.

In late 2006, GDPH received very few complaints regarding odor or health effects. GDPH will continue to gather and document health concerns and review information from individuals, elected officials, the media and other county, state, and federal agency staff.

In addition, GDPH opened a public comment period from May 15 to July 31, 2007. The public comment process gives the public-particularly the community near the site-an opportunity to review the results of the health consultation and the GDPH’s conclusions and recommendations, and to provide additional information and comments. Responses to public comments are addressed in Appendix E of this health consultation.

**Community Exposure Survey Results**

GDPH received survey forms representing 622 persons. The median reported age was 41 years: 349 females and 255 males. Symptoms were reported among 599 (96%) persons, including headache (462, 74%), burning eyes (359, 58%), cough/sore throat (335, 54%), nausea/vomiting (303, 49%), and difficulty breathing (283, 45%) (Table1). In addition, many persons reported a foul odor, and 254 (41%) persons reported other symptoms and conditions, including chest congestion or tightness, skin irritation, diarrhea, and fatigue (Table 2). Most persons reported multiple symptoms (Table 3). The survey also collected information on “other” symptoms, whether medical attention was sought, and whether blood was “drawn and tested for toxins” or “any toxins found in lab work” [4].

**Table 1. Reported Symptoms among Survey Respondents, by Gender**

Symptoms	TOTAL n=622		FEMALE* N=349		MALE* n=255	
	n	% of total	N	% of female	n	% of male
Headache	462	74.3	268	76.8	180	70.6
Burning eyes	359	57.7	203	58.2	146	57.3
Cough/Sore throat	335	53.9	182	52.1	141	55.3
Nausea/Vomiting	303	48.7	176	50.4	113	44.3
Difficulty breathing	283	45.5	163	46.7	110	43.1
Nosebleed	85	13.7	45	12.9	36	14.1
Other	254	40.8	141	40.4	102	40.0

\*Gender not reported for 18 respondents

**Table 2. Reports of “Other” Symptoms and Conditions by Survey Respondents**

Symptoms or Conditions	n	% of Total (n=622)
Skin or Eye <sup>1</sup>	57	9.2
Nose, Throat, or Respiratory <sup>2</sup>	56	9.0
Gastrointestinal <sup>3</sup>	41	6.6
Malaise, Aching, Weakness <sup>4</sup>	36	5.8
Nervous system <sup>5</sup>	33	5.3
Urinary system <sup>6</sup>	10	1.6
Cardiovascular <sup>7</sup>	3	0.5
Other <sup>8</sup>	8	1.3

<sup>1</sup> e.g., rash, itching all over, severe eye irritation, can’t wear contacts

<sup>2</sup> e.g., sinus problems, burning throat, chest congestion, asthma attack

<sup>3</sup> e.g., abdominal cramping, diarrhea

<sup>4</sup> e.g., sluggish, lethargic, constant tiredness

<sup>5</sup> e.g., slurred speech, dizziness

<sup>6</sup> e.g., blood in urine

<sup>7</sup> e.g., rapid pulse, elevated blood pressure

<sup>8</sup> e.g., chemical taste in mouth

**Table 3. Multiple Symptoms Reported among Survey Respondents, by Gender**

Number of Symptoms	TOTAL n=622		FEMALE* n=349		MALE* n=255	
	n	% of total	n	% of female	n	% of male
2 symptoms	135	21.7	74	21.2	60	23.5
3 symptoms	121	19.5	62	17.8	57	22.4
4 symptoms	106	17.0	60	17.2	43	16.9
> 4 symptoms	170	27.3	100	28.7	61	23.9

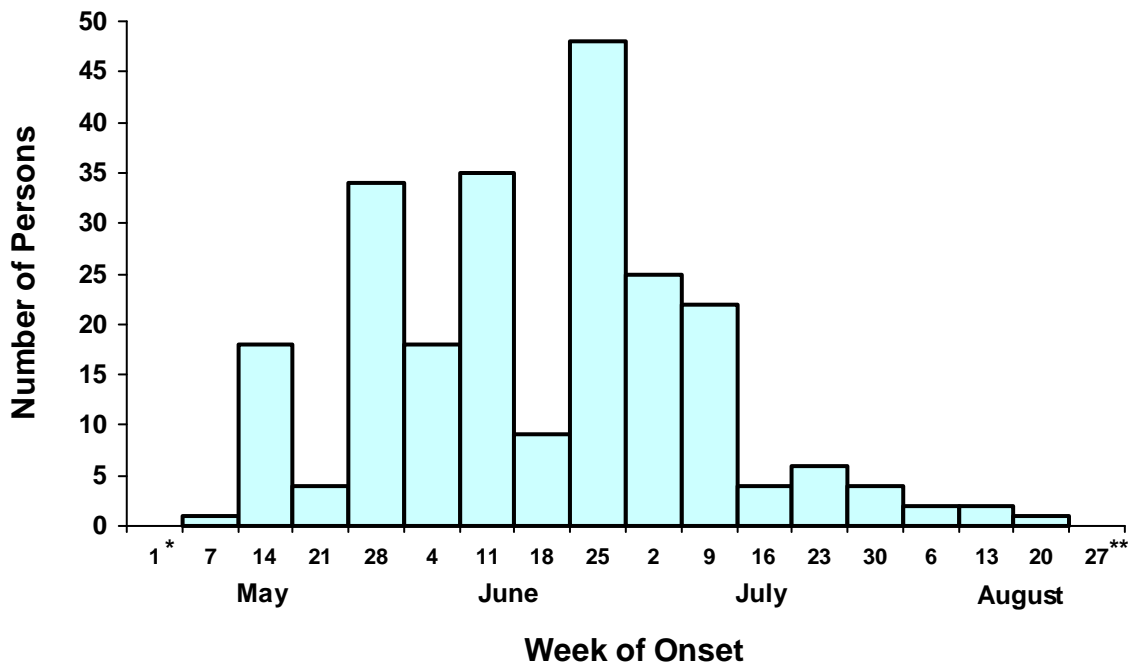
\*Gender not reported for 18 respondents

One hundred eighty-seven persons reported seeking medical attention, including 134 who sought care from private physicians. Twenty-six persons reported having had blood drawn and tested for “toxins”. Three of those initially reported toxins were found, but during follow up one had

negative test results and two had medical diagnoses that are not clearly linked to toxic chemical exposure [4].

GDPH defined a case of acute illness as a person having at least two of the symptoms listed on the survey form - nausea/vomiting, nose bleed, difficulty breathing, cough/sore throat, burning eyes - with onset between May 1 and August 31. Three hundred fifty-three persons had two or more of the specified symptoms with onset during May through August (See Graph 1 below). Among those reporting gender, 196 were female and 146 were male. The most common symptoms were headache (309, 88%), burning eyes (254, 72%), cough/sore throat (240, 68%), nausea/vomiting (213, 60%), and difficulty breathing (209, 59%). Among the 233 cases reporting estimated date of onset, 41% occurred between the weeks of June 25 - July 9, and 82% between the weeks of May 28 - July 9. Figure 2 shows residence location of those for which address information was available; approximately 60% lived within three miles of the PSC plant [4].

**Graph 1. Persons Reported with At Least Two Specified Symptoms<sup>§</sup>, by Estimated Week of Onset, Fayette and Fulton Counties, May 1-August 31, 2006<sup>§§</sup>**



<sup>§</sup>Persons reporting at least two of the following symptoms: headache, nausea/vomiting, nosebleed, difficulty breathing, cough/sore throat, and burning eyes.

<sup>§§</sup>This figure includes 233 persons whose survey forms provided a specific or estimated onset date. It does not include persons for whom onset date was not reported or could not be estimated from the forms (e.g., on some forms only the month of onset was noted).

\*Dates include May 1-6

\*\*Dates include August 27-31

Follow-up interviews were conducted with seven survey respondents who had reported particularly prominent symptoms. The health problems these persons experienced involved different organ systems - neurologic, respiratory, gastrointestinal, urologic – and their illnesses did not exhibit a consistent pattern that would be typical of a common-source exposure [4].

**Exposure Survey of Animal Illness**

Through the exposure surveys, emails and phone calls to GDPH and other agency staff, and at public meetings, GDPH received several reports of ill pets and wild animals. In response, GDPH developed an animal illness survey form, and contacted all residents who reported ill pets or wild animals and asked to complete the survey. After analyzing the data from these surveys, there was no evidence of impact to wild animals. A few reports of dead bees and birds were the only reports, and no species- or geographic-specific trends were identified.

A total of 36 pets with clinical signs were reported: 29 dogs, 6 cats, and 1 rabbit. The median age of the reported ill animals was eight years. Figure 3 shows the location of survey respondents who reported ill animals; in general, these locations are similar to those from where symptoms were reported in humans.

Of the clinical signs listed on the animal survey form, those most commonly reported were change of behavior (18), diarrhea (17), loss of appetite (15), runny nose (12), and sneezing (12) (Table 4). The most commonly reported change of behavior was lethargy or lack of activity. No twitching or seizures were reported. The reported onsets of clinical signs ranged from the first week of February through the second week of July [4].

**Table 4. Clinical Signs of Pets Reported among Survey Respondents**

	<b>n</b>	<b>% of Total n=36</b>
<b>Clinical Signs</b>	36	100
Change of behavior (lethargy/lazy/lack behavior/somnolence)	18 13	50 36
Diarrhea	17	47
Loss of appetite	15	42
Sneezing	12	33
Runny nose	12	33
Runny eyes	11	31
Wheezing	9	25
Vomiting	9	25
Coughing	8	22
Excess salivation	4	11
<b>Examined by Veterinarian</b>	6	17
<b>Died</b>	8	22

Six animals were examined by veterinarians, and one owner consulted a veterinarian by phone. Of the animals seen by a veterinarian, diagnoses and exam findings included dry skin (treated with a shampoo) (1), an upper respiratory infection and acute adenoiditis (1), chemical poisoning from possible exposure to rat poison or antifreeze (1), heart murmur (1), and pancreatitis (1).

Eight animals died - a rabbit, three dogs, and four cats. Three of the cats were stray kittens estimated to be less than two months old; the fourth cat was aged 13 years, and one of the dogs was aged 12 years. These animals had onset of clinical signs between mid-February and mid-

July. Respondents reported sneezing and runny eyes in 4 (50%) of the animals that died, and runny nose, loss of appetite, and lethargy were reported in 3 (38%) of the animals. One of the dead animals reported had a necropsy performed by a veterinarian; the findings were consistent with a diagnosis of gastric torsion (“bloat”) [4].

Grouping the animals by time of onset, location of residence, or amount of time spent outdoors did not identify a consistent pattern of clinical signs that would suggest common exposure to a toxic chemical [4].

### ***Residential Facility Survey***

A residential facility that provides care and living accommodations for approximately 1,000 residents is located approximately four miles from PSC. Its facilities include retirement homes for independent living, an assisted living center, a nursing home, and a home for children. Using the same exposure survey form, the residential facility management arranged for staff and residents to participate voluntarily in the survey during August 23 - 31.

Among the 937 adult residents, survey forms were completed for 787 (84%), including 631 women and 156 men. Forty-five (6%) were under 65 years of age, 149 (19%) were ages 65-75 years, and 593 (75%) were 76 years or older. Symptoms were reported by 65 (8%) respondents. The most commonly reported symptoms were cough/sore throat (32, 4%), breathing problems (23, 3%), burning eyes (22, 3%), and headache (19, 2%). Twelve residents sought medical attention, including one who reported being hospitalized overnight with difficulty breathing [4].

Survey forms were completed for all 40 Children’s Home residents. Six children reported symptoms, most commonly headache (3, 8%), breathing problems (3, 8%), and cough/sore throat (3, 8%). None sought medical attention [4].

Of the 413 residential facility employees, 79 (19%) completed survey forms, of whom 21 (27%) reported symptoms. The most common symptoms were headache (17, 22%), cough/sore throat (8, 10%), difficulty breathing (5, 6%), and nausea/vomiting (5, 6%). Three sought medical attention; none were tested for toxic chemical exposures [4].

## **DISCUSSION**

### **Environmental Sampling Data**

On July 4, 2005, GEPD and EPA’s contractor conducted air sampling for mercaptans with Sensidyne precision gas detection tubes specifically designed for mercaptan detection. Eighteen samples were taken from six on- and off-site locations including downwind from the source location on the PSC property. The samples were taken over a ten-hour period of time. All sample results were non-detect, even though odor was reported on site, and a slight odor was reported at two of the off-site locations [5]. The odor threshold for propyl mercaptan is 0.00075 parts per million (ppm), and is much lower than the detection limit of the instrumentation used to measure propyl mercaptan (0.5 ppm).

GEPD obtained six wastewater samples from the PSC facility on August 15, 2006. The samples were analyzed for volatile organic compounds, semi-volatile organic compounds, metals, and pesticides. Most of the constituents analyzed for were not detected in the samples; however, acetone was detected at 250 milligrams per kilogram (mg/kg) and methylene chloride (140

mg/kg) were detected in one wastewater sample. Ethoprop was identified at 150 mg/kg in a sample of sludgy material that had settled in the drainpipe of an empty storage tank [11].

In early September, GEPD analyzed two samples of wastewater collected on August 27 from railcars at the ethoprop manufacturing facility in Axis, Alabama. The material in these railcars was determined to be the wastewater delivered to PSC in late June [8]. The railcar contents consisted of two distinct layers, an upper layer of an organic liquid (like oil) and a lower layer of an aqueous liquid (like water). The depth of each layer was measured, sampled and analyzed. Measurements of the organic layer showed high concentrations of ethoprop (240,000 mg/kg), propyl mercaptan (320,000 mg/kg), and dipropyl disulfide (a breakdown product of ethoprop at 97,000 mg/kg), and also chloroform and toluene. Measurements of the aqueous (liquid) portion of the sample showed concentrations of ethoprop (150 mg/kg) and propyl mercaptan (110 mg/kg) that are consistent with previously reported findings when PSC first sampled the shipment. As noted above, these results may not represent the exact chemical composition of the waste as it existed at the PSC facility.

In November 2006, twenty surface soil samples from various residential properties within a two-mile radius of PSC were analyzed for ethoprop. Ethoprop was not detected in any of the twenty samples (the instrumentation detection level was below the regulatory reporting level of 0.05 ppm) [9].

### **Pathway Analysis**

GDPH identifies pathways of human exposure by identifying environmental and human components that might lead to contact with contaminants in environmental media (e.g., air, soil, groundwater, and surface water). A pathways analysis considers five principle elements: a source of contamination, transport through an environmental medium, a point of exposure, a route of human exposure, and a receptor population. Completed exposure pathways are those in which all five elements are present, and indicate that exposure to a contaminant has occurred in the past, is presently occurring, or will occur in the future. GDPH regards people who come into contact with contamination as exposed. For example, people who reside in an area with contaminants in air, or who drink water known to be contaminated, or who work or play in contaminated soil are considered to be exposed to contamination. Potential exposure pathways are those for which exposure seems possible, but one or more of the elements is not clearly defined. Potential pathways indicate that exposure to a contaminant could have occurred in the past, could be occurring now, or could occur in the future. However, key information regarding a potential pathway may not be available. It should be noted that the identification of an exposure pathway does not imply that health effects will occur. Exposures may, or may not be substantive. Thus, even if exposure has occurred, human health effects may not necessarily result [11].

### ***Completed Exposure Pathway***

GDPH reviewed the site's history, community concerns, health outcome data, and available environmental sampling data. Based on this review, GDPH identified an exposure pathway that warranted consideration (Table 5). Exposure to site-related contaminants at the PSC facility occurred through inhalation of contaminated air. Exposure to contaminated air is the only exposure pathway that includes all five principal elements of a completed exposure pathway discussed above.



**Table 5: Completed Exposure Pathway**

Pathway	Exposure Pathway Elements					Time
	Source	Transport	Point of Exposure	Route of Exposure	Exposed Population	
Air	Movement of contaminants from wastewater treatment plant	Surrounding atmosphere	Air	Inhalation	Residents downwind of wastewater treatment plant	Past

Ethoprop does not readily evaporate and we have no evidence to suggest that the ethoprop would have gotten into the air. Ethoprop tends to break down rapidly in outdoor air (half-life of about 5.6 hours). The vapor pressure of ethoprop at standard temperature and pressure is 0.00038 millimeters of mercury (mm Hg) while the vapor pressure for propyl mercaptan is 154 mm Hg. That means that it is much more likely that propyl mercaptan is going to be in the air than ethoprop.

Dipropyl disulfide does not readily evaporate. Toluene, acetone, and methylene chloride evaporate at a moderate rate; however, based on the sample concentrations, it is unlikely that these vapors were present at a hazardous level in the community or anywhere outside the immediate area around the tanker truck or containment tanks. Chloroform was not detected in previous samples taken at the PSC facility on August 15, 2006. Its detection in the railcar sample may represent a residue from previous contents of the railcar tank, or a product of chemical reactions in the tank over time [8]. Propyl mercaptan evaporates quickly at room temperature and has a very low odor threshold.

Based on reports of an onion-like odor in the nearby community, the epidemiological assessment of reported symptoms, and the scientific literature on the behavior of the chemicals involved, propyl mercaptan odors were released into the air at the PSC plant in late June and may have caused the symptoms reported by some members of the community the community living in close proximity to the PSC facility.

### ***Evaluation Process***

For each environmental medium, in this case, air; GDPH examines the types and concentrations of contaminants of concern. Comparison values (CVs) are concentrations of a contaminant that can reasonably (and conservatively) be regarded as harmless, assuming default conditions of exposure. The CVs generally include ample safety factors to ensure protection of sensitive populations. Because CVs do not represent thresholds of toxicity, exposure to contaminant concentrations above CVs will not necessarily lead to adverse health effects [12]. CVs and the evaluation process used in this document are described in more detail in Appendix B. GDPH then considers how people may come into contact with the contaminants. Because the level of exposure depends on the route and frequency of exposure and the concentration of the contaminants, this exposure information is essential to determine if a public health hazard exists.

In preparing this document, GDPH used the only published comparison value (CV) found for propyl mercaptan--the National Institute for Occupational Safety and Health's recommended exposure limit (REL)--to screen contaminants that may warrant further evaluation. The REL for propyl mercaptan is 0.5 ppm [[www.cdc.gov/Niosh/npg/npgd0526.html](http://www.cdc.gov/Niosh/npg/npgd0526.html)]. This CV is based on

acute exposure indoors over a 15-minute period in an 8-hour workday. Intermediate and chronic exposure CVs are not available from any other agency.

In addition, based on the similarity for toxicity with methyl mercaptan, ATSDR recommends an ambient (outdoor) air action level for n-propyl mercaptan of 0.5 ppm [6]. An action level is a concentration that, when exceeded, may pose a health hazard. When an action level is detected in the environment, EPA and other risk managers evaluate the exposures potentially occurring in that vicinity in order to implement appropriate protective measures.

Propyl mercaptan disperses slowly and it has a tendency to hug the ground. Topography will influence dispersion more than weather conditions, except during strong winds, resulting in low lying areas attracting higher air concentrations. During the initial response by EPA and GEPD, conditions were foggy with an apparent inversion over the area, and the metro air quality indicators were orange to red indicating fairly stagnant air. EPA reported that the homes in the area are about 60 feet lower in elevation than the plant and GEPD reported that the odors tended to follow a creek running through a nearby valley [1]. The odor threshold for propyl mercaptan, which is less than 1 part per billion, is much lower than the detection limit of the instrumentation used in measuring propyl mercaptan in air. Hence, although some members of the community reported that they continued to smell the chemical, neither the CV nor the action level was exceeded.

The influence of odors on the health and comfort of individuals is difficult to evaluate. Unpleasant odors can result in social and behavioral changes, such as diminishing one's sense of well being, enjoyment of daily activities, and ability to perform various tasks. However, odor perception is subjective, and different individuals may react differently to the same type and intensity of odor [13]. Since we do not have actual concentrations of propyl mercaptan in air from which exposure doses can be determined, a toxicological evaluation cannot be quantifiably conducted. However, we can draw empirical conclusions based on the community survey findings.

The community survey results show that during May through August 2006, several hundred people in Fulton and Fayette counties reported a foul odor and/or symptoms consistent with odor effects including eye, mucous membranes, and the upper respiratory tract irritation. These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more symptoms can definitively implicate a specific source or exposure. However, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time. In 1989, persons from a California community exposed to propyl mercaptan following pesticide treatment of a nearby potato field reported similar symptoms [2, 4].

Survey respondents also reported a broad range of other symptoms. It is difficult to state with certainty which of these were or were not caused by exposure to propyl mercaptan. Symptoms with onset following the release at the PSC facility that were similar to those documented in the 1989 exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure. These irritating symptoms were reported to be highly annoying for many persons, and temporarily debilitating for some. It is also possible that exposure to an odorous chemical irritant such as propyl mercaptan could have provoked or contributed to other acute adverse health events related to irritants; e.g., asthma attacks or migraine headaches, in persons

with predisposing conditions. Propyl mercaptan exposure cannot be definitively linked to some of the other reported symptoms and conditions.

It is important to note that while a health survey of an affected population can be a useful tool in the assessment of environmental exposure, care must be taken to make sure that the self-reported data received correctly portrays the actual effects on community residents. Limitations of self-reported survey data can include susceptibility to external factors such as the type and degree of media interest, whether litigation has been initiated prior to the distribution of the survey instrument, and the degree to which the persons affected are linked in terms of community, family, etc.

The survey of pet illnesses was done to assess whether the animals had a set of clinical signs suggesting a possible common environmental exposure. Dozens of pets were reported with acute clinical signs, and several were reported to have died. The data did not show a consistent pattern of clinical signs that could be clearly linked to an environmental chemical exposure; however, it is possible that some clinical signs could have been caused by exposure to propyl mercaptan. Another purpose of the pet illness survey was to determine whether individual animals had either clinical or necropsy evidence of chemical poisoning. One poisoning was reported, which the veterinarian attributed to household exposure. One necropsy was performed, the results of which suggested a condition, bloat, which is not related to chemical intoxication [4].

The survey of the residential facility included a potentially “vulnerable” population of elderly persons and children. Only a small percentage of respondents reported symptoms, suggesting that there was little adverse health impact on this population. An important contributing factor may be the location of the community, several miles from the PSC facility, and not in the same area where many symptomatic persons live. Although elderly persons can be more susceptible to chemicals, if they had little exposure they would be expected to show little effect [4].

## **CHILD HEALTH CONSIDERATIONS**

To protect the health of the nation’s children, ATSDR has implemented an initiative to protect children from exposure to hazardous substances. In communities faced with contamination of the water, soil, air, or food, ATSDR and GPH recognize that the unique vulnerabilities of infants and children demand special emphasis. Due to their immature and developing organs, infants and children are usually more susceptible to toxic substances than are adults. Children are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are also more likely to encounter dust, soil, and contaminated vapors close to the ground. Children are generally smaller than adults, which results in higher doses of chemical exposure because of their lower body weights relative to adults. In addition, the developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages.

Children in the communities near PSC were exposed to propyl mercaptan in air from the odor emanating from PSC in June/July 2006. Children were likely to have received larger doses than adults because they have higher lung surface area/body weight ratios than adults. In addition, they may have been exposed to higher doses than adults because of their shorter stature and because propyl mercaptan is heavier than air and tends to hover closer to the ground. Even a small amount of propyl mercaptan odor can make children feel ill and reduce their quality of life. These effects are not permanent, and should decrease within a short time after the odor ceases.

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## CONCLUSIONS

Based on the exposure survey and environmental sampling data analyses results, GDPH developed the following conclusions and assigned a public health hazard category to the PSC site. A description of public health hazard categories is provided in Appendix C.

1. The release of propyl mercaptan at the PSC facility posed a public health hazard because it may have caused temporary adverse health effects during the time of release in some residents in communities near PSC. For some residents, these exposures may have had a negative impact on their health and quality of life. The federal Agency for Toxic Substances and Disease Registry recommends 0.5 parts per million as an Action Level for propyl mercaptan in air. This is a level below which no permanent health effects (i.e., physiological damage to organs) are expected to occur. During numerous sampling events both on and off site, no measurements exceeding this level were found. Symptoms may result from exposure to the odor of propyl mercaptan, but are expected to cease when the odor is eliminated. Therefore, since exposures were below the action level and we do not expect any continuing or long-term adverse health effects from this past exposure, the site currently poses no apparent public health hazard.
2. The very unpleasant, onion-like odor associated with propyl mercaptan can cause the symptoms reported including eye, mucus membrane, and respiratory system irritation; and headaches and nausea.
3. GEPD monitored clean-up activities to eliminate residual ethoprop at the PSC facility, the source of the propyl mercaptan.
4. Ethoprop does not readily evaporate and we have no evidence to suggest that the ethoprop got into the air. Therefore, we believe that the ethoprop posed No Public Health Hazard to area residents.
5. Ethoprop tends to break down rapidly in outdoor air (half-life of about 5.6 hours). In the breakdown process, some chemicals that have strong odors may be produced such as mercaptans. These by-products are less toxic than the parent pesticide.
6. As ethoprop broke down in the equipment at the facility, propyl mercaptan could be released to the air. The odor of propyl mercaptan was likely to be present as long as the ethoprop continued to break down.
7. Dipropyl disulfide does not readily evaporate and therefore is unlikely to have been inhaled to have posed a health risk to the community.
8. Toluene, acetone, and methylene chloride evaporate at a moderate rate. It is unlikely that toluene vapor was present at a hazardous level in the community or anywhere outside the immediate area around the tanker truck or containment tanks.
9. Chloroform was not detected in samples taken from the PSC facility previous to August 15, 2006. Its detection in the railcar sample may represent residue from previous contents of the railcar, or a product of chemical reactions in the tank over time.

If PSC operates within current permit guidelines and restrictions, and is in compliance with state and federal regulations, ongoing operations should not pose a current or future public health hazard to the community.

## **RECOMMENDATIONS**

There are no recommendations at this time

## **PUBLIC HEALTH ACTION PLAN**

### **Actions Completed**

- On July 3, 2006, EPA's Region 4 Emergency Response and Removal Branch sent a representative to the PSC facility accompanying by a representative from the ATSDR in response to community complaints of the odor in the area.
- EPA's contractor took air samples and analyzed them for mercaptans on the evening of July 3 and on the morning of July 4. GEPD also collected air samples for mercaptans at the facility on July 3.
- GDPH staff attended several public meetings to address community concerns regarding the offensive odors from PSC.
- GDPH collected community surveys to assess health complaints and published the results in October 2006.
- GDPH developed a site-specific fact sheet for the community
- The Fulton County Department of Health and Wellness conducted surface soil sampling from various residential properties within a two-mile radius of PSC .
- PSC agreed not to accept any future shipments of mercaptan containing waste or other unfamiliar waste streams that may pose significant odor problems in the surrounding community.

### **Actions Planned**

- If additional data and/or information become available, it will be reviewed by GDPH and appropriate actions will be taken.
- GDPH will respond to all requests for information regarding health issues associated with the PSC site.

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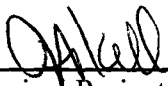
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## CERTIFICATION

This PSC Recovery Systems site health consultation was prepared by the Georgia Division of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial Review was completed by the Georgia Division of Public Health.

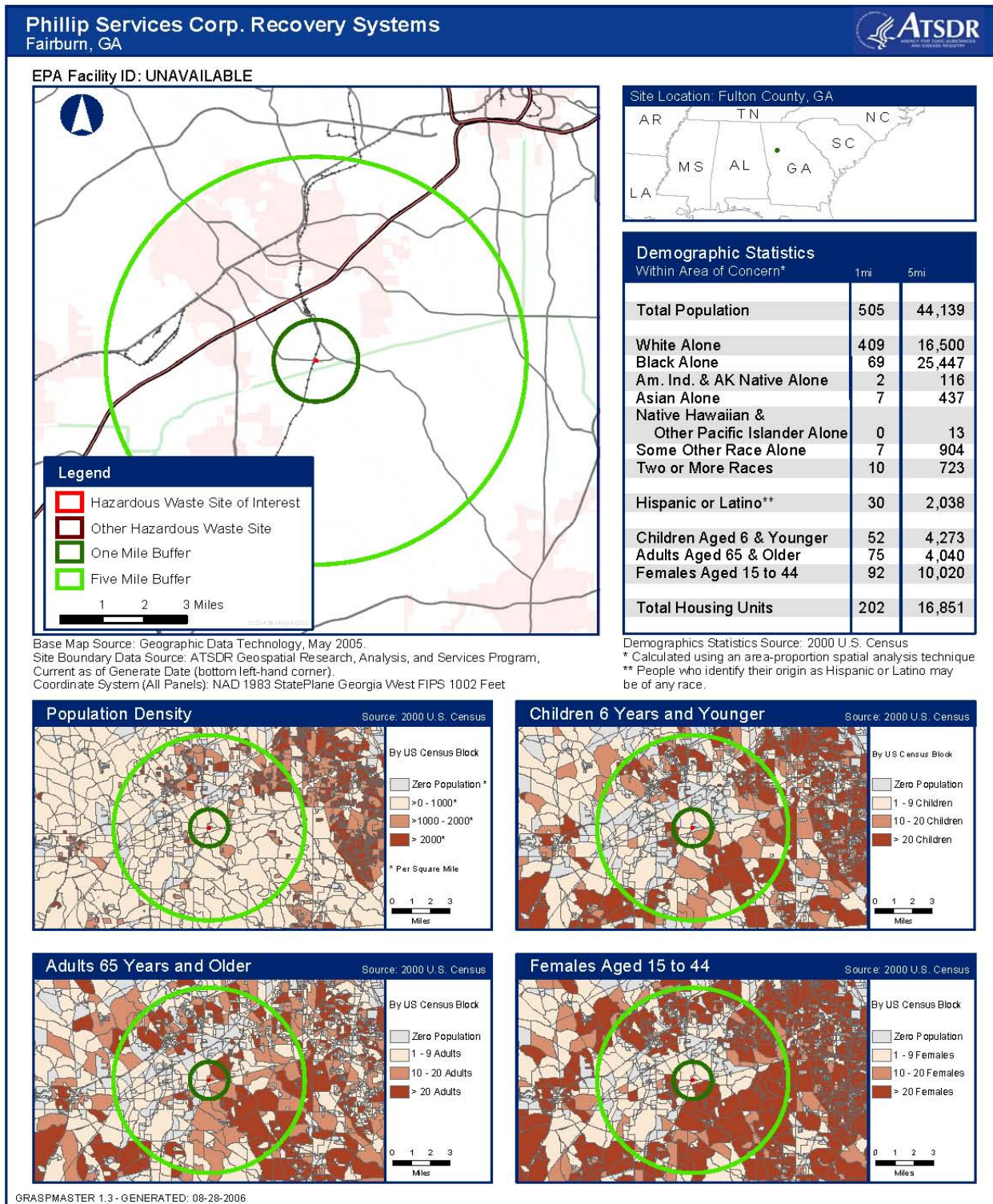
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Technical Project Officer, CAT, CAPEB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

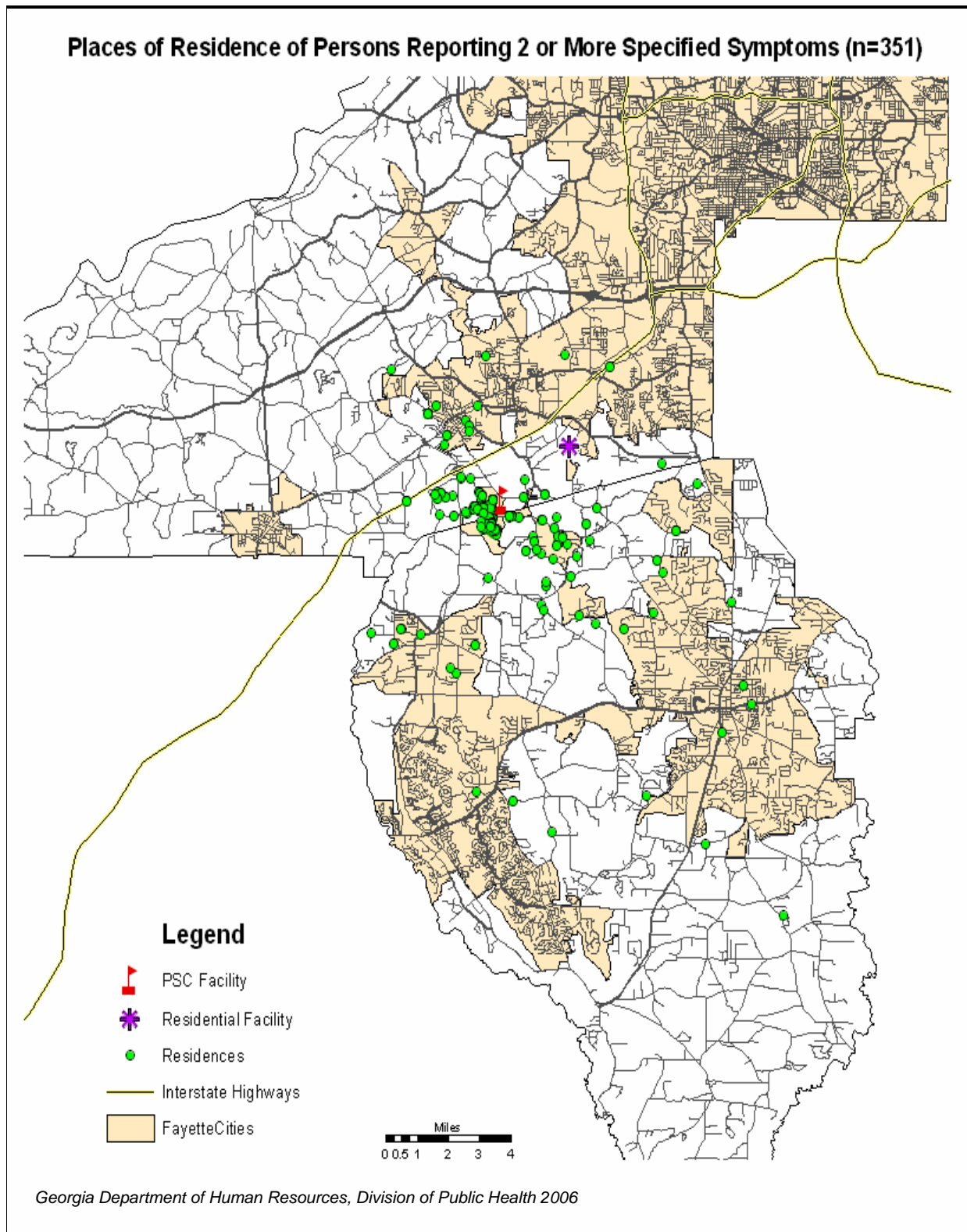
  
\_\_\_\_\_  
Team Lead, CAT, CAPEB, DHAC, ATSDR

**FIGURES**

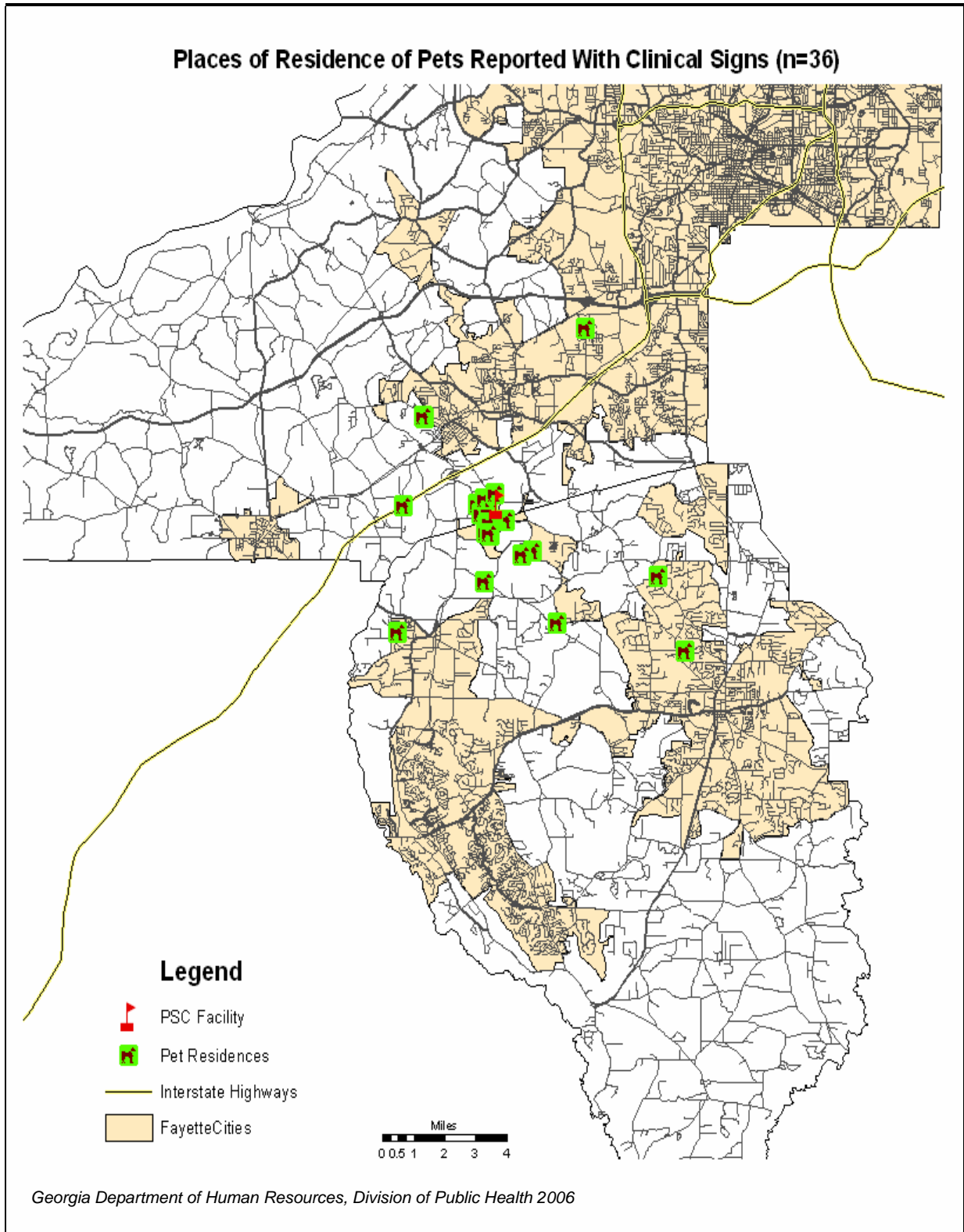
**FIGURE 1: Site Demographics**



**FIGURE 2: Survey Respondents Reporting Multiple Symptoms**



**FIGURE 3: Survey Respondents Reporting Ill Pets**



**APPENDICES**

**APPENDIX A: Exposure Survey**



Fayette County  
Community ... Possible Exposure Report

**Please Mail To:** Fayette County Dept. of Fire & Emergency Services  
Attn: Lt. Scott Roberts  
140 Stonewall Avenue, West, Suite 214  
Fayetteville, Georgia 30214

Date \_\_\_\_\_  
Name \_\_\_\_\_  
Address \_\_\_\_\_ Closest Cross Street \_\_\_\_\_  
Phone \_\_\_\_\_ District \_\_\_\_\_ LL \_\_\_\_\_ (Office Use)

Gender M / F      Age \_\_\_\_\_  
What do you feel you were exposed to? \_\_\_\_\_

**Route of Exposure**

- Inhalation
- Oral Intake
- Absorption

Date of Exposure (Initial) \_\_\_\_\_  
Length of Exposure \_\_\_\_\_

Are you currently or have you had any symptoms? Y/N

When did your symptoms begin? \_\_\_\_\_

Did you seek medical attention? Y/N

If yes, where were you seen? Private Medical Doctor, ER, Public Health

Did you have blood drawn and tested for toxins?

Were there any toxins found in lab work? Y/N

If yes, what was found? \_\_\_\_\_

Have you had any of the following symptoms? (Check all that apply)

- Headache
- Nausea / Vomiting
- Nose Bleed
- Difficulty Breathing
- Cough / Sore Throat
- Burning Eyes
- Other \_\_\_\_\_

## **APPENDIX B: Explanation of Evaluation Process**

### **Step 1--The Screening Process**

In order to evaluate the available data, GDPH used comparison values (CVs) to determine which chemicals to examine more closely. CVs are contaminant concentrations found in a specific environmental media (for example; air, soil, water) and are used to select contaminants for further evaluation. CVs incorporate assumptions of daily exposure to the chemical and a standard amount of air, soil, or water that someone may inhale or ingest each day. CVs are generated to be conservative and non-site specific. The CV is used as a screening level during the health consultation process where substances found in amounts greater than their CVs might be selected for further evaluation. CVs are not intended to be environmental clean-up levels or to indicate that health effects occur at concentrations that exceed these values.

CVs can be based on either carcinogenic (cancer-causing) or non-carcinogenic effects. Cancer-based CVs are calculated from the U.S. Environmental Protection Agency's (EPA) oral cancer slope factors for ingestion exposure, or inhalation risk units for inhalation exposure. Non-cancer CVs are calculated from the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels, EPA's reference doses, or EPA's reference concentrations for ingestion and inhalation exposure. When a cancer and non-cancer CV exist for the same chemical, the lower of these values is used as a conservative measure. The chemical and media-specific CVs used in the preparation of this health consultation are listed below:

The NIOSH **Recommended Exposure Limit (REL)** is a 15-minute time-weighted average inhalation exposure that should never be exceeded at any time during a workday.

### **Step 2--Evaluation of Public Health Implications**

The next step in the evaluation process is to take those contaminants that are above their respective CVs and further identify which chemicals and exposure situations are likely to be a health hazard. Separate child and adult exposure doses (or the amount of a contaminant that gets into a person's body) are calculated for site-specific scenarios, using assumptions regarding an individual's likelihood of accessing the site and contacting contamination.

#### **Non-cancer Health Risks**

The doses calculated for exposure to individual chemicals are then compared to an established health guideline, such as an ATSDR minimal risk level (MRL) or an EPA reference dose (RfD), in order to assess whether adverse health impacts from exposure are expected. Health guidelines are chemical-specific values that are based on available scientific literature and are considered protective of human health. Non-carcinogenic effects, unlike carcinogenic effects, are believed to have a threshold, that is, a dose below which adverse health effects will not occur. As a result, the current practice to derive health guidelines is to identify, usually from animal toxicology experiments, a no observed adverse effect level (NOAEL), which indicates that no effects are observed at a particular exposure level. This is the experimental exposure level in animals (and sometimes humans) at which no adverse toxic effect is observed. The known toxicological values are doses derived from human and animal studies that are summarized in ATSDR's *Toxicological Profiles* ([www.atsdr.cdc.gov/toxpro2.html](http://www.atsdr.cdc.gov/toxpro2.html)). The NOAEL is modified with an uncertainty (or safety) factor, which reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the human population. The magnitude of the uncertainty factor considers various factors such as sensitive subpopulations (e.g., children, pregnant women, the elderly), extrapolation from animals to humans, and the completeness of the available data. Thus, exposure doses at or below the established health guideline are not expected to cause adverse health effects because these values are much lower (and more human health protective) than doses, which do not cause adverse health effects in laboratory animal studies.

**Minimal Risk Levels (MRLs)** are developed by ATSDR for contaminants commonly found at hazardous waste sites. The MRL is developed for ingestion and inhalation exposure, and for lengths of exposures:



acute (less than 14 days); intermediate (between 15-364 days), and chronic (365 days or greater). ATSDR has not developed MRLs for dermal exposure (absorption through skin).

**Reference Doses (RfDs)** EPA developed chronic RfDs for ingestion and RfCs for inhalation as estimates of daily exposures to a substance that are likely to be without a discernable risk of deleterious effects to the general human population (including sensitive subgroups) during a lifetime of exposure.

If the estimated exposure dose to an individual is less than the health guideline value, the exposure is unlikely to result in non-cancer health effects. If the calculated exposure dose is greater than the health guideline, the exposure dose is compared to known toxicological values for the particular chemical and is discussed in more detail in the text of the health consultation. A direct comparison of site-specific exposures and doses to study-derived exposures and doses found to cause adverse health effects is the basis for deciding whether health effects are likely to occur.

It is important to consider that the methodology used to develop health guidelines does not provide any information on the presence, absence, or level of cancer risk. Therefore, a separate cancer risk evaluation is necessary for potentially cancer-causing contaminants detected at this site.

### **Cancer Risks**

Exposure to a cancer-causing chemical, even at low concentrations, is assumed to be associated with some increased risk for evaluation purposes. The estimated risk for developing cancer from exposure to contaminants associated with the site was calculated by multiplying the site-specific doses by EPA's chemical-specific cancer slope factors (CSFs) available at [www.epa.gov/iris](http://www.epa.gov/iris). This calculation estimates a theoretical excess cancer risk expressed as a proportion of the population that may be affected by a carcinogen during a lifetime of exposure. For example, an estimated risk of  $1 \times 10^{-6}$  predicts the probability of one additional cancer over background in a population of 1 million. An increased lifetime cancer risk is not a specified estimate of expected cancers. Rather, it is an estimate of the increase in the probability that a person may develop cancer sometime in his or her lifetime following exposure to a particular contaminant under specific exposure scenarios. For children, the theoretical excess cancer risk is not calculated for a lifetime of exposure, but from a fraction of lifetime; based on known or suspected length of exposure, or years of childhood.

Because of conservative models used to derive CSFs, using this approach provides a theoretical estimate of risk; the true or actual risk is unknown and could be as low as zero. Numerical risk estimates are generated using mathematical models applied to epidemiologic or experimental data for carcinogenic effects. The mathematical models extrapolate from higher experimental doses to lower experimental doses. Often, the experimental data represent exposures to chemicals at concentrations orders of magnitude higher than concentrations found in the environment. In addition, these models often assume that there are no thresholds to carcinogenic effects--a single molecule of a carcinogen is assumed to be able to cause cancer. The doses associated with these estimated hypothetical risks might be orders of magnitude lower than doses reported in toxicology literature to cause carcinogenic effects. As such, a low cancer risk estimate of  $1 \times 10^{-6}$  and below may indicate that the toxicology literature supports a finding that no excess cancer risk is likely. A cancer risk estimate greater than  $1 \times 10^{-6}$ , however, indicates that a careful review of toxicology literature before making conclusions about cancer risks is in order.

## **APPENDIX C: Public Health Hazard Categories**

### **Public Health Hazard Categories\***

Depending on the specific properties of the contaminant, the exposure situations, and the health status of individuals, a public health hazard may exist. Using data from health consultations, sites are classified using one of the following public health hazard categories:

#### **Category 1: Urgent Public Health Hazard**

Sites that pose a serious risk to public health as a result of short-term exposures to hazardous substances.

#### **Category 2: Public Health Hazard**

Sites that pose a public health hazard as a result of long-term exposures to hazardous substances.

#### **Category 3: Potential/Indeterminate Public Health Hazard**

Sites for which no conclusions about public health hazard can be made because data are lacking.

#### **Category 4: No Apparent Public Health Hazard**

Sites where human exposure to contaminated media is occurring or has occurred in the past, but the exposure is below a level of health hazard.

#### **Category 5: No Public Health Hazard**

Sites for which data indicate no current or past exposure or no potential for exposure and, therefore, no health hazard.

*Source: Agency for Toxic Substances and Disease Registry*

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## APPENDIX D: Site Fact Sheet



# FACT SHEET

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## *Propyl Mercaptan and Ethoprop in Air*

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**This fact sheet provides information about propyl mercaptan and ethoprop in outdoor air, and the potential health effects from low level exposures.**

### **What is the odor in my neighborhood and what is being done about it?**

The Georgia Department of Human Resources, Division of Public Health, and partner agencies, are investigating the potential for adverse health effects from exposure to chemicals from a release incident which took place in Fairburn, Fulton County, Georgia. On or around June 29, 2006, the PSC Recovery Systems facility received a shipment of industrial wastewater. The contents of one truck were tested and found to have an excessive odor (caused by propyl mercaptan), and the shipment was returned to the client. A Waste Profile Sheet and subsequent sample analyses showed the presence of propyl mercaptan and ethoprop. There is no suspected exposure pathway to ethoprop as a result of this incident. Air samples taken on and off site of the facility on several occasions since July have not found propyl mercaptan in air at or above levels known to pose a health hazard. However, the foul odor from the propyl mercaptan has lingered in surrounding neighborhoods for months, and many people have reported symptoms known to be associated with exposure to the offensive odors.

### **What is propyl mercaptan?**

Propyl mercaptan is a colorless liquid and has an irritating onion or skunk-like odor. It is formed naturally and found in manure gas from domestic animals and in various crude oils. Propyl mercaptan is also formed during manufacturing of the pesticide ethoprop, and when ethoprop breaks down. Although some mercaptans are commonly added to odorless compounds like natural gas to make them detectable by scent, propyl mercaptan is not added to ethoprop as an odorant.

Propyl mercaptan evaporates quickly at room temperature and disperses fairly quickly in outdoor air. The chemical is heavier than air and may hover near ground level in cool, damp areas protected from the wind, such as low-lying, shaded areas or creek beds. Propyl mercaptan vapor can irritate skin, eyes, and mucus membranes; and the very unpleasant, onion-like odor associated with propyl mercaptan can cause symptoms including headache and nausea.

### **What is Ethoprop?**

Ethoprop (O-ethyl-S-S-dipropyl phosphorodithioate) is an organophosphate insecticide. It is used for a variety of food and nonfood crops, including sugarcane, potatoes, corn, tobacco, and for golf course and industrial lawn applications. Ethoprop is normally applied in a liquid or in granular form. Ethoprop may vaporize to air, but this is much less of a risk as an exposure route than

inhalation of contaminated dust or through skin contact with the liquid or granular product. In air, ethoprop vapor will break down rapidly (half-life of 5.6 hours) by reaction with sunlight.

Exposure to ethoprop vapor in air can cause cholinesterase inhibition in humans; that is, it can overstimulate the nervous system causing nausea, dizziness, and confusion. There is no strong evidence that exposure to ethoprop in any form causes cancer.

### **What are the health effects from this incident?**

Based on results from environmental sampling, a preliminary analysis of reported symptoms, and the scientific data on the behavior of the chemicals involved, propyl mercaptan was released into the air at the PSC plant in late June and most likely caused symptoms reported in the community following this incident, including headache, burning eyes, cough/sore throat, nausea/vomiting and difficulty breathing. These health effects are likely from exposure to propyl mercaptan at low levels in outdoor air, and are expected to cease when the odor is eliminated. Some people have reported recurring odor, which is probably from release of propyl mercaptan into the air as residual ethoprop breaks down in the equipment at the PSC facility. The odor occurs as ethoprop breaks down and propyl mercaptan is released. Ethoprop does not readily evaporate and we have no evidence to suggest that the ethoprop would have gotten into the air. Therefore, we believe that the ethoprop does not pose a health threat to area residents.

The influence of odors on the health and comfort of individuals is difficult to evaluate. Even a small amount of propyl mercaptan odor can make individuals feel ill and reduce their quality of life. These effects are not permanent, and should decrease within a short time after the odor ceases.

### **Have I been exposed to harmful vapors?**

- The federal Agency for Toxic Substances and Disease Registry recommends 0.5 parts per million as an Action Level for propyl mercaptan in air. This is a level below which no permanent health effects (i.e., physiological damage to organs) are expected to occur. During numerous sampling events both on and off site, no measurements exceeding this level have been found. Symptoms may result from exposure to the odor of propyl mercaptan, but are expected to cease when the odor is eliminated.
- The vapor pressure of ethoprop at standard temperature and pressure is 0.00038 millimeters of mercury (mm Hg) while the vapor pressure for propyl mercaptan is 154 mm Hg. That means that it is much more likely that propyl mercaptan is going to be in the air than ethoprop.
- Ethoprop tends to break down rapidly in outdoor air (half-life of about 5.6 hours). In the breakdown process, some chemicals that have strong odors may be produced such as mercaptans. These by-products are less toxic than the parent pesticide.
- As ethoprop breaks down in the equipment at the facility, propyl mercaptan is released to the air. The odor of propyl mercaptan is likely to be present as long as the ethoprop continues to break down.

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#### **For More Information, Contact:**

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2 Peachtree Street, 13<sup>th</sup> Floor  
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(404) 657-6534**

**[www.health.state.ga.us/programs/hazards](http://www.health.state.ga.us/programs/hazards)**

**Other websites:  
[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)**

Sources: Agency for Toxic Substances and Disease Registry, email to U.S. Environmental Protection Agency, 8/15/06; National Library of Medicine, Hazardous Substances Data Bank records for *Propyl Mercaptan* and *Ethoprop*, California Environmental Protection Agency, *Ethoprop Risk Characterization Document*, 10/31/95; U.S. Environmental Protection Agency, *EPA Ethoprop Facts*, 6/02.

*DPH06/149HW*

## APPENDIX E: Public Comments

The public comment process gives the public-particularly the community near the site-an opportunity to review the results of the health consultation and the GDPH's conclusions and recommendations, and to provide additional information and comments. In review of the document, community members may provide input on such issues as: Is the document clear and understandable? Has GDPH taken into account all relevant site information known to the community? Has GDPH identified and responded to the community concerns? The public comment period was open from May 15 to July 31, 2007.

GDPH received a total of 242 comments from a number of parties including, the South Fulton/Fayette County Task Force (SFFCTF), attorneys for parties involved in generating and accepting the MOCAP wastewater, medical/epidemiologist consultants retained by one of the parties, and individual community members. When comments received were addressed, page numbers referred to in *italics*, when cited, refer to the public comment health consultation released May 14, 2007. Comments received are presented in the order of which they were received.

**1. Comment:** Amvac Chemical Corporation's {(AMVAC) a manufacturer of ethoprop} principal comment revolves around the fact that the draft Health Consultations creates, perhaps unintentionally, a misleading impression that all (or even most) of the reported complaints and alleged health effects in the Fairburn area are associated with AMVAC's shipments to PSC. Such a conclusion is a factual impossibility. Surveys collected by both DHR and private-party plaintiff's counsel, consistently show that a substantial percentage of individuals reporting odor and/or health complaints report the onset of such effects prior to any shipment of any material from AMVAC to PSC.

**Response:** The health consultation clearly states that beginning June 29, 2006; numerous community complaints about an intense odor and health effects were reported to government officials. The pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time. Many persons reported detecting the odor and experiencing symptom onset prior to the June 29 events reported by the PSC facility. Propyl mercaptan received and handled at the plant on June 29 could not have been the cause of adverse health effects before that date. PSC did not respond to our request for detailed information about materials received and processed at the plant in May and June 2006.

**2. Comment:** The draft health consultation reports "symptoms" experienced in the area lead the reader to potential conclusions that such symptoms are assumed to be connected to AMVAC shipments. As is clear from DHR's October 24, 2006 report, however, close to 50% of these reported symptoms had onset dates well before June 20, the first time any material from AMVAC was ever delivered to PSC.

**Response:** Please see response to Comment 1.

**3. Comment:** AMVAC agrees with the draft reports conclusion that “[t]he health problems these persons experienced...did not exhibit a consistent pattern that would be typical of a common source exposure.” Likewise, the draft report correctly notes that “the onset of clinical signs ranged from the first week of February through the second week of July.” AMVAC recommends that in addition to these statements, the report explicitly recognize that the variability in onset dates strongly indicates that AMVAC shipments were not a common source of exposure, and were not associated with at least a substantial portion of the reported symptoms.

**Response:** As stated in the response to Comment 1, propyl mercaptan received and handled at the plant on June 29 could not have been the cause of adverse health effects before that date.

**4. Comment:** AMVAC notes that the following sentence on p. 13 of the report cannot be squared with the foregoing facts and is, at the very least, extremely overbroad: “Based on results from the environmental analyses, the epidemiological assessment of the reported symptoms, and the scientific data on the behavior of the chemicals involved, propyl mercaptan was released into the air at the PSC plant in late June and most likely caused the symptoms reported by the community.” Since (i) approximately 50% or more of the symptoms reported in the community predated late June, and (ii) more than 50 % of the odor onset dates reflected in the surveys collected by the plaintiffs’ counsel were before June 20, this statement is both unsubstantiated and inaccurate.

**Response:** Although propyl mercaptan received and handled at the plant on June 29 could not have been the cause of adverse health effects before that date, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time.

**5. Comment:** Given Conclusion No. 1, that the release of propyl mercaptan at the PSC facility posed a public health hazard, and Conclusion No. 2, that propyl mercaptan odor can cause the symptoms reported, the document leaves the distinct impression that DHR/ATSDR conclude that AMVAC’s shipments were associated with all or most of these symptoms. That is a factual impossibility.

**Response:** Please see responses to Comments 1 and 4.

**6. Comment:** AMVAC thus respectfully requests that any final Health Consultation report (i) reflect more explicitly that surveys reflect a substantial portion of complaints prior to June 20, 2006, (ii) remove or modify any and all conclusions that imply or directly suggest that AMVAC’s shipments of propyl mercaptan-containing materials account for all symptoms generally described in the document; and (iii) include a clear statement that the Agency does not conclude that the symptoms generally reported are associated with AMVAC shipments.

**Response:** The health consultation clearly states on pages 10 and 14 that a substantial portion of complaints were reported prior to June 20, 2006. Similarly, the health consultation clearly states that survey respondents reported symptoms consistent with odor effects including eye, mucous membranes, and upper respiratory tract irritation. These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more symptoms can definitively implicate a specific source or exposure. However, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time. Survey respondents also reported a broad range of other symptoms. It is difficult to state with certainty which of these were or were not caused by exposure to propyl mercaptan. Symptoms with onset following the release at the PSC facility that were similar to those documented in the 1989 exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure. These irritating symptoms were reported to be highly annoying for many persons, and temporarily debilitating for some. It is also possible that exposure to an odorous chemical irritant such as propyl mercaptan could have provoked or contributed to other acute adverse health events related to irritants; e.g., asthma attacks or migraine headaches, in persons with predisposing conditions. Propyl mercaptan exposure cannot be definitively linked to some of the other reported symptoms and conditions.

**7. Comment:** It is our recommendation that this totally inadequate effort to fool Georgia citizens be rejected and discarded as incomplete and a misrepresentation of the facts surrounding health impacts from the May, 2006 chemical release. From beginning to end, it is clear that there has been no attempt to find the root cause, which is the goal of all troubleshooting.

**Response:** This health consultation is a result of all available information presented to GDPH by various agencies and community citizens. This information includes environmental sampling data analyses results, exposure survey results, as well as the findings of various regulatory agencies investigations of the incident at PSC.

**8. Comment:** During the most critical threat period, authorities knew next to nothing about the technical nature of the stink, the threat, or what was happening. They did not have vital chemical information or a plan to find it. The best they knew was to tell the community that: ‘The stink is indeed most unpleasant and might aggravate some of your pre-existing conditions, but it is not harmful. When it goes away, as it will soon, all the associated problems will go away to’. This - on the word of a single ‘interested party,’ the company that was responsible to the stink.

**Response:** Please see response to Comment 45.

**9. Comment:** Then SF/FC Task Force has carried out hundreds of hours of high-level literature searching and interpretation, interviewing workers and affected neighbors. We have made ourselves and our information bank available to agency personnel. None of



the reams of correct information we produced has been used in this report to make it more complete and more correct.

**Response:** Please see response to Comment 7.

**10. Comment:** Every trivial document, from every agency, is treated as “fact” with no regard to its adequacy, timeliness, or appropriateness. Huge gaps in data acquisition are overlooked and similar gaps in logic fail to support the limited conclusions reached.

**Response:** The public health assessment process involves the evaluation of multiple data sets. These include available environmental data, exposé data, health effects data (toxicologic, epidemiologic, medical, and health outcome data), and community health concerns. Utilizing all available information regarding the PSC site, GDPH drew health based conclusions after carefully analyzing the available information.

**11. Comment:** “There are no recommendations at this time”. This tells the world that the authors have no interest in finding out what happened and ensuring that it never happens again.

**Response:** We stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006. The wastewater was removed; the tanks that held the wastewater have been decontaminated and will be dismantled and removed from the property in November 2007. There are no further recommendations for the protection of public health from the events that occurred in late June 2006.

**12. Comment:** This report has a very clear purpose: to avoid having to make real decisions or to take real action.

**Response:** The purpose of this health consultation was to determine to what extent people have been exposed to hazardous substances, whether that exposure was harmful, and the potential health effects of that exposure. To this end, the health consultation answered all these questions, and public health conclusions were made based on all the available information.

**13. Comment:** Based on the literature concerning odors, odorants, and odor-associated health complaints, I recommend that the draft HC give increased emphasis to the limitations and pitfalls of relying on self-reported data from populations chosen primarily on the basis of residing in a general geographical area.

**Response:** Please see response to Comment 15.

**14. Comment:** As noted in the draft HC, we were dealing with non-specific, common symptoms that have a multitude of etiologies and have not, for the most part, been objectively verified. These limitations are particularly significant in this case since the

survey questionnaires were sent out some time after it was widely known that a class action lawsuit had been filed which included many, if not all, of the survey respondents.

**Response:** It's true that reported symptoms were nonspecific and many reports were not objectively verified. Self-reported information (without subsequent verification) is commonly used for public health surveillance and/or epidemiologic investigations.

The survey included persons who chose to participate; it was not designed to be representative of the community as a whole, or to address selection biases such as the one suggested in Comment 14.

However, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility and similar to those documented in the 1989 exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure.

**15. Comment:** Perhaps the HC should include a paragraph giving a brief overview of the limitations of such surveys. This would allow the reader to put such data into a proper context.

**Response:** This is a good point. The following paragraph was included in the discussion section on page 15 of the health consultation:

It is important to note that that while a health survey of an affected population can be a useful tool in the assessment of environmental exposure, care must be taken to make sure that the self-reported data received correctly portrays the actual effects on community residents. Limitations of self-reported survey data can include susceptibility to external factors such as the type and degree of media interest, whether litigation has been initiated prior to the distribution of the survey instrument, and the degree to which the persons affected are linked in terms of community, family, etc.

**16. Comment:** I am concerned that certain "conclusions" in the draft HC are not consistent with the rest of the draft and are not supported by the available evidence. For example, on page 13 of the draft HC, the following statement appears:

"Based on results from environmental data analyses, the epidemiological assessment of reported symptoms, and the scientific data on the behavior of the chemicals involved, propyl mercaptan was released into the air at the PSC plant in late June and "*most likely*" caused "*the symptoms reported by the community*" (emphasis added).

This conclusion says too much and is inconsistent with the remainder of the report. As the draft HC recognizes on page 14.

"These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more symptoms can definitively implicate a specific source or exposure".

This statement is clearly correct. Therefore, any language in the draft HC which suggests that "*the symptoms*" were "*most likely caused*" by propyl mercaptan is incorrect, as in

the language at the top of page 15 (“*were likely due to propyl mercaptan exposure*”), and two statements in Conclusion 1 on page 16 (“*the release of propyl mercaptan....likely caused temporary effects*”), and (“*these exposures likely had a negative impact...*”) All of these statement should be changed. The most that can be said, based upon all the evidence, is that some residents in communities near PSC may have experienced some temporary symptoms as a result of smelling the propyl mercaptan.

**Response:** We did state this in our conclusions. Although propyl mercaptan was not measured above an action level at PSC, the odor threshold, the distinctive odor, and as a known degradation product of ethoprop; the presence of propyl mercaptan in the community for a period cannot be disputed. We also stated that although survey respondents reported a broad range of other symptoms, it was difficult to state with certainty which of these were or were not caused by exposure to propyl mercaptan. However, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility and similar to those documented in the 1989 exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure.

**17. Comment:** I believe it is unlikely that many, if any, residents experienced symptoms because the levels were simply too low. This belief is supported by the fact that there is no evidence that any of the workers at PSC, who would have been expected to have been the most directly exposed, suffered any of the symptoms complained of by the residents. This fact should be noted in the HC.

**Response:** We disagree with the statement about low exposure levels and probable absence of symptoms. The outbreak reported by Ames and Stratton (Acute health effects from community exposure to N-propyl mercaptan from an Ethoprop (MocapR)-treated potato field in Siskiyou County, California. Arch Environ Health 1991;46(4):213-17.) provides evidence of the symptoms that can occur in community residents who experience non-occupational exposure to propyl mercaptan.

We do not have information about presence or absence of symptoms in the workers at PSC. We agree that information could be useful. If the workers or the company had provided that information, we would have included it in the report.

**18. Comment:** According to the draft HC, the survey reported health effects during the period May through August 2006. However, based upon my knowledge of the facts, there was no propyl mercaptan at the PSC facility until late June, and no “odor incident” until June 29. Yet, the same “pattern” of symptoms was reported to have occurred in early May. If this is true, then the “pattern” of symptoms would seem to represent background conditions. Such a conclusion is plausible given the fact that we are dealing with common symptoms, occurring during the summer time in Atlanta. However, since the draft does not report the *normal* summertime incidence rate of the reported symptoms, it is impossible to determine the true rate of increased symptoms, if any, during the period covered by the report. Having an understanding of that background “pattern” would appear to be essential before any conclusions regarding new-onset symptoms could be drawn, and this important concept should be discussed in the HC.

**Response:** We do not have information on the usual summertime incidence or pattern of the reported symptoms. The pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time; and we agree that this finding alone is not sufficient to prove propyl mercaptan caused those symptoms.

Many persons reported detecting the odor and experiencing symptom onset prior to the June 29 events reported by the PSC facility. Propyl mercaptan received and handled at the plant on June 29 could not have been the cause of adverse health effects before that date. PSC did not respond to our request for detailed information about materials received and processed at the plant in May and June 2006.

**19. Comment:** Your studies were conducted in the presence of several limitations, and some mention of the limitations should be included in the final report. For one thing, your survey relies on self-reported data about non-specific, common symptoms that can have multiple etiologies rather than a distinct syndrome of known etiology; even the “exposure” data are self-reported, since none of the environmental testing detected any propyl mercaptan.

**Response:** Please see response to Comment 15. Also:

The community survey results show that during May through August 2006, several hundred people in Fulton and Fayette counties reported noting a foul odor and/or symptoms consistent with irritation of eyes, mucous membranes, and the upper respiratory tract. These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more of them can definitely implicate a specific source or exposure.

Survey respondents also reported a broad range of other symptoms. It is difficult to state with certainty which of these were or were not caused by exposure to propyl mercaptan.

It is plausible that exposure to a noxious chemical irritant such as propyl mercaptan could have provoked or contributed to other acute adverse health events related to irritants, e.g., asthma attacks or migraine headaches, in persons with predisposing underlying conditions. Propyl mercaptan exposure cannot be definitively linked to some of the other reported symptoms and conditions.

**20. Comment:** Media publicity and the filing of a lawsuit has the potential to confound your results by influencing who in the community chooses to respond to your survey; it is quite possible that persons included in the class action lawsuit were more likely to participate in your survey, so your sample might not be representative of the community as a whole.

**Response:** The survey included persons who chose to participate; it was not designed to be representative of the community as a whole, or to address selection biases such as the one suggested in Comment 20.

**21. Comment:** Surveying the residential facility was a good idea as a means of getting a more complete response: a survey of the PSC employees that were closest to the site of exposure might also have been helpful.

**Response:** Agree. It would have been useful to have information about PSC employees' exposure and symptoms.

**23. Comment:** No case definition for the survey is clearly and completely stated according to the epidemiological standard of person, place and time. I infer from the last paragraph on page 9 that a person had to have experienced "two or more of the specified symptoms with onset during May through August" to be considered a possible case. Since you make this transition in reporting survey results rather abruptly, it would be helpful if you provided the complete case definition according to the elements of person, place, and time early in the section on the community survey results and explained that, of the 622 respondents, 353 (57%) fit that case definition (if this is, in fact, correct).

**Response:** The case definition was inserted at the beginning of the last paragraph on page 9 of the Health Consultation - "We defined a case of acute illness as a person having at least two of the symptoms listed on the survey form - nausea/vomiting, nose bleed, difficulty breathing, cough/sore throat, burning eyes - with onset between May 1 and August 31." Neither the survey form nor the case definition included restrictions on geographic location (place). As evident in Figure 2, most persons who met the case definition and provided address information lived within several miles of the PSC plant.

The DPH received survey forms representing 622 persons; 353 (57%) of them had two or more of the specified symptoms with onset during May – August and thus met the case definition.

**24. Comment:** The only reference I find to the case definition isn't until near the end of page 14 when you state "These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more symptoms can definitively implicate a specific source or exposure." Not only is this an incomplete case definition, but it comes too late in the report.

**Response:** Please see response to Comment 23.

**25. Comment:** I am also confused about how much data you have regarding the date of onset. The last paragraph on page 9 goes on to say "Among the 233 cases reporting estimated date on onset," and I am again left drawing my own conclusions about this subset of respondents. Is this 233 out of 622 (37%) or 233 out of 353 (66%)? The first sentence of the paragraph implies that you have a date of onset during May through

August reported by 353 respondents, but then the number drops to 233 in the middle of the paragraph.

**Response:** Of the 353 persons who met the case definition, 233 (66%) reported estimated date of onset. Others reported only the month of onset.

**26. Comment:** You also break the dates of onset into June 25 – July 9 (41%) and May 28 – July 9 (82%). What about the other 18%? Did any have dates of onset earlier than May 28 or only after July 9?

**Response:** Yes, among the other 18%, approximately half reported onset before the week of May 28, and approximately half reported onset after the week of July 9. To illustrate our case definition, please see Graph 1, which was inserted on page 10 of the health consultation.

**27. Comment:** My understanding from reading the description of when the odor was first released at the PSC site is that June 29, 2006, would be the date of onset of greatest interest in trying to associate self-reported symptoms with the odor from propyl mercaptan. Although you don't have dates of onset for most of your respondents, I would suggest that you could present a graph (epi curve) for those that you do have. The dates of onset before June 29 would provide a visual representation suggestive of the background rate of the symptoms being reported, and we could get a better idea about the extent of this 'public health event' with one graph.

**Response:** Please see Graph 1, which was inserted on page 10 of the health consultation.

**28. Comment:** In reporting the results of the Residential Facility Survey, the percentages of symptoms reported by children have been calculated using the wrong denominator. Since survey forms were completed for all 40 children, 40 should be the denominator throughout the paragraph, which would be consistent with how you have reported data previously: Six children (15%) reported symptoms, most commonly headache (3, 8%), breathing problems (3, 8%) and cough/sore throat (3, 8%).” Using 6 as the denominator so that the percentage calculates as 50% is misleading, but I believe this was a simply an oversight at the time the draft was written.

**Response:** Agree, and thank you for pointing out this mistake. The paragraph can be rewritten like this –

“Survey forms were completed for all 40 Children's Home residents. Six reported symptoms, most commonly headache (3, 8%)\*, breathing problems (3, 8%)\*, and cough/sore throat (3, 8%)\*. None sought medical attention.”

\* The percent reported here is different from the percent reported in the October 24, 2006, document, “Survey of Adverse Health Events, Fairburn, Georgia, and Neighboring Areas, 2006.” In that document, this percent was based on the number of children with the specific symptom divided by the total number of children with symptoms (6); the percent should have been based on the number of children with the specific symptom divided by the total number of children for whom survey forms were completed (40).

Also, the following paragraph has a similar mistake that should be corrected:

“Of the 413 residential facility employees, 79 (19%) completed survey forms, of whom 21 (27%) reported symptoms. The most common symptoms were headache (17, 22%),

cough/sore throat (8, 10%), difficulty breathing (5, 6%)\*, and nausea/vomiting (5, 6%)\*. Three sought medical attention; none were tested for toxic chemical exposures [4].”

\* The percent reported here is different from the percent reported in the October 24, 2006, document, “Survey of Adverse Health Events, Fairburn, Georgia, and Neighboring Areas, 2006.” In that document, this percent was based on the number of employees with the specific symptom divided by the total number of employees with symptoms (21); the percent should have been based on the number of employees with the specific symptom divided by the total number of employees who completed survey forms (79).

**29. Comment:** Since a survey is a descriptive study rather than an analytic study, one must be very careful about drawing cause and effect conclusions, particularly when the syndrome being investigated is not well-defined and consists of common nonspecific symptoms with essentially no clinical findings. I believe you overstate your findings substantially in this statement on page 13 of the draft HC: “Based on results from environmental data analysis, the epidemiological assessment of reported symptoms, and the scientific data on the behavior of the chemicals involved, propyl mercaptan was released in the air at the PSC plant in late June and most likely caused the symptoms reported by the community”. This statement is not only inconsistent with other statements throughout the report, it implies that cause and effect conclusions can be determined by a descriptive survey alone.

**Response:** The community survey results show that during May through August 2006, several hundred people in Fulton and Fayette counties reported noting a foul odor and/or symptoms consistent with irritation of eyes, mucous membranes, and the upper respiratory tract. These symptoms are nonspecific, and neither the individual symptoms nor the case definition based on two or more of them can definitely implicate a specific source or exposure. However, the pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time. In 1989, persons from a California community exposed to propyl mercaptan following pesticide treatment of a nearby potato field reported similar symptoms. Please also see response to Comment 16.

**30. Comment:** What environmental data? All the results I’ve seen reported did not detect any propyl mercaptan or ethoprop in the community.

**Response:** That is correct. Propyl mercaptan odor is very distinctive and can be discerned by the human nose at levels of 750 parts per trillion (0.000750 ppm). This level is much more sensitive than analytical detection limits. During the multi-agency emergency response activities at PSC, propyl mercaptan was determined to responsible for the malodors at the facility. Sensidyne precision gas detector tubes calibrated for the measurement of mercaptans in the 0.5 to 10 ppm range were to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility.

**31. Comment:** My understanding of the epidemiological assessment is that symptoms consistent with but not limited to exposure to the odor of propyl mercaptan occurred in the community. Since this is a descriptive survey and not an analytic study such as a case

control or cohort study, no epidemiologic conclusion regarding cause and effect can be drawn.

**Response:** The pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility during that time. We agree that this finding alone is not sufficient to prove propyl mercaptan caused those symptoms. Also, please see information in response to Comment 19.

**32. Comment:** I believe you are more accurate in your statement on page 14 when you admit that you are drawing empirical conclusions. The most that can be said, based on all the environmental analyses and the scientific data on the behavior of the chemicals involved, some of the symptoms reported by the community in late June may have resulted from smelling propyl mercaptan that was released into the air at the PSC plant.

**Response:** Yes, we agree.

**33. Comment:** I have a minor point regarding inconsistencies in how long you continued to receive complaints from the community. The last line of paragraph 3 on page 4 of the draft HC says, “By March 2007, health complaints had dramatically decreased and rarely received by any agency”. Then, the last line of the fourth paragraph on page 5 says, “No new complaints of odors have been received by GDPH in 2007.” Finally, the first line on page 8 says, “In late 2006 and into 2007, GDPH received very few complaints regarding odor or health effects.” This may simply be a function of the difference between reports of health complaints versus complaints of odors, but I found myself unsure what, if anything had been reported in 2007 related to the “odor incident” from the summer of 2006.

**Response:** The first line on page 8 has been modified to correctly state, “In late 2006, GDPH received very few complaints regarding odor or health effects.”

**34. Comment:** The draft HC does not quantify or limit the self-reported survey data. As you know, there was widespread media coverage of this incident last summer prior to the survey, much of it sensational, unscientific and incorrect. In addition, and also prior to the survey, a class action lawsuit was filed which purported to include every person who claimed to be affected by the incident. Thus, even more so than in other cases of self-reported survey data, the potential for confounding bias is inherent here. Some mention of these limitations would seem appropriate.

**Response:** Please see response to Comment 15.

**35. Comment:** The draft HC relies upon a postulated “pattern” of symptoms that were reported to have their onset during the period from May to August of 2006. Any symptoms which began prior to late June (likely June 29, the date of the odor incident, or at the earliest June 20, the date of the first shipments from AMVAC) could not possibly be attributable to propyl mercaptan odors from PSC, because PSC has never received or



treated any propyl mercaptan wastes at its Fairburn facility other than the AMVAC shipments received in late June of last year. Thus, any pattern or incidence of symptoms prior to that time would seem to represent the background pattern and incidence of these symptoms, all of which are largely non-specific, common symptoms with myriad etiologies.

**Response:** Yes, we agree.

**36. Comment:** Since neither agency contacted PSC personnel regarding the survey or the HC – none of the over 30 employees who worked at the facility last summer suffered any apparent ill effects from the propyl mercaptan or its odor. These employees were at “ground zero,” wore no PPE when receiving and handling the AMVAC shipments, and yet experienced none of the symptom patterns outlined in the draft HC. If there were any real causal connection between last summer’s odor incident and the symptoms reported in the DHR survey, one would expect the same symptoms to have appeared in these employees. But, they did not. It seems this should have been considered and noted, as well.

**Response:** GDPH was not provided with specific statements from, nor directly contacted by, any current or former employees of PSC during this investigation. Therefore, information reportedly provided by employees could not be verified and was not included in the health consultation.

*This comment is related to the first paragraph of the statement on the back of the Health Consultation cover page entitled ‘Health Consultation: A Note of Explanation’*

**37. Comment:**

All of these actions and more should have been carried out at the time of the event, without delay, and certainly without waiting 11 months for this report to appear! The American public requires an explanation of why preparing the Health Consultation took so long while the community was being actively exposed every day to a very dangerous material, why no protective or palliative measures were taken, and why there was no plan in place to take protective measures when they were needed, rather than beginning to conceptualize them almost a year later! In the event, since ATSDR summarizes this “Consultation” by stating that it has no recommendations, the unaware reader might assume that ASTDR has decided that there was no exposure! However, ASTDR does stipulate the exposure, which makes the rest of the document, with its denial, its slavish following of the lead provided by the manufacturer’s attorney and its lack of a plan and recommendations to protect the public, an impenetrable enigma.

**Response:** The ‘Health Consultation: A Note of Explanation’ simply states what a health consultation is and what additional public health actions may be recommended as a result of evaluating actual exposures at a site. This statement accompanies the cover page of every health consultation published by the U.S. Department of Health and Human Services and is independent of the site-specific content of a health consultation for which public comments were solicited.

*Comments 38-42 are related to the second paragraph of the statement on the back of the Health Consultation cover page entitled 'Health Consultation: A Note of Explanation'*

**38. Comment:** Great boilerplate, except that none of it was actually done. What kind of “health education”? How about developing and rehearsing scenarios for optimal government agency reactions to future threats? To develop such scenarios would require the agencies’ coming to grips with the realities of what happened in Fairburn in the spring and summer of 2006.

**Response:** The ‘Health Consultation: A Note of Explanation’ simply states what a health consultation is and what additional public health actions may be recommended as a result of evaluating actual exposures at a site. This statement accompanies the cover page of every health consultation published by the U.S. Department of Health and Human Services and is independent of the site-specific content of a health consultation for which public comments were solicited.

**39. Comment:** Why did the authorities not notify the public that they were being repeatedly exposed to acute dosages of organophosphate (OP) nerve agent, that they needed to be evacuated posthaste, and that their health should be carefully monitored thereafter, including cholinesterase testing? Rather than inform and protect the public, the intent has obviously been to keep them in the dark as much as possible and not worry about their protection. This is in line with the keep-them-in-the-dark policy spelled out (in almost threatening terms) in a September 15, 2006 e-mail to the agencies from the manufacturer’s attorneys! The attorney’s policy was faithfully followed by the agencies and is accurately reflected in this Health Consultation.

**Response:** We stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**40. Comment:** As for health care providers, a very informal survey indicates that these busy professionals knew even less about emissions from the PSC plant and the possibilities for OP poisoning than the general public. OP poisoning is not included in the usual diagnostic panels, even in these days of supposed alertness against chemical attack (from abroad!)

**Response:** For a number of reasons explained in various responses throughout this section, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**41. Comment:** The additional information already provided to ATSDR by the South Fulton and Fayette Community Task Force confirms without question that ATSDR needs to revise, amend or replace this document and the “conclusions” (i. e., declarations that do not rest on any scientific work) presented therein. We have brought and continue to bring to the agencies large amounts of relevant information (obtained through diligent searching and informed study of the scientific literature, Freedom of Information Act material and Georgia Open Records) to the attention of ATSDR. These contributions to

enhanced understanding have been ignored by ATSDR in packaging the opinions (largely those prescribed by the manufacturer's attorney) found in this report.

**Response:** GDPH utilized all available documentation gathered from various agencies, citizens, the manufacturer of MOCAP, and PSC in formulating this health consultation and drawing conclusions from the available documentation.

**42. Comment:** The Task Force objects in the strongest possible terms to the opinions of the manufacturer's attorney being published as fact and without acknowledgement under the imprimatur of ATSDR/CDC with the collaboration of EPA/DNR/DPH/EPD.

**Response:** Please see response to Comment Nos. 38 and 39.

*Comments 43-48 are related to the first paragraph under the Statement of Issues section on page 3 of the Health Consultation.*

**43. Comment:** In fact, the first complaints of the Big Stink (i.e., ethoprop emission) were made to officials more than a month earlier, on Memorial Day weekend. Some residents reported smelling mercaptan even earlier, in mid-May. This earlier date has since been confirmed by employees and former employees of PSC. Yet, all of the agencies have joined in supporting this erroneous claim by PSC management.

**Response:** Whether the company handled waste containing propyl mercaptan in mid May does not alter our conclusion that there was a temporary health hazard from exposure to the odor of propyl mercaptan in air, and no long term health effects are expected that exposure.

Furthermore, GDPH was not provided with specific statements from, nor directly contacted by, any current or former employees of PSC during this investigation. Therefore, information reportedly provided by employees could not be verified and was not included in the health consultation.

**44. Comment:** In addition to the testimony of the neighborhood, we have several recorded conversations with former employees in which they state unequivocally that deliveries of this "wastewater" started in May 2006. Once having encountered that particular stench, it is unlikely that one would forget when it first happened!

**Response:** GDPH was not provided with specific statements from, nor directly contacted by, any current or former employees of PSC during this investigation. Therefore, information reportedly provided by employees could not be verified and was not included in the health consultation.

**45. Comment:** The Health District was concerned about exposure to an odor, but did not require or demand that the investigators get to the bottom of the incident, which might well have included exposure to odorant chemicals like ethoprop that could be health-threatening or even life-threatening. The agencies seem never to have considered the potential effects of the chemicals associated with the odor. This is illogical and bodes ill

for the nation's efforts to protect itself against terrorism! The goal of every troubleshooting operation is to identify the root cause(s) of the problem and establish protocols that will prevent recurrence. In this case, authorities are actually not acknowledging that there is or was a problem!

**Response:** The root cause of the odor was determined during the initial response from various agencies on July 3, 2006. The USEPA on-scene coordinator (OSC) indicated that day that mercaptans can could send people to the hospital and, at high enough concentrations, kill animals or people, although it was not likely that it could occur in an open environment. Note that this comment was made during the initial response and that subsequent data indicate that the level would not likely result in permanent health effects.

**46. Comment:** A Material Safety and Data Sheet (included in Appendix) for the "washwater" had been developed by manufacturer AMVAC in April 2006, just months before the exposure. It was supplied with these shipments to PSC and warned of both toxicity and flammability issues. Why then did the agencies not immediately start looking at the potentially harmful chemicals? Why was aggressive ambient air monitoring not initiated early on, in fact as soon as the shipments began? Why was the population not removed from danger ASAP?

**Response:** A Material Safety Data Sheet (MSDS) is not included in the Appendix. However, manufacturers of products containing any type of hazardous chemicals are required by law to supply MSDS's to vendors of their products as part of the Community-Right-to-Know provisions in CERCLA and these in turn are to be placed where employees may view them. In addition, MSDS's are made for products only, not waste material. A waste profile sheet was supplied with the shipment to PSC.

Contrary to the remaining questions in this comment, on July 3, 2006, agency response units determined that propyl mercaptan was responsible for the odor being generated at the facility from the degradation of ethoprop containing wastewater placed in a holding tank June 29, 2006. At that time, propyl mercaptan was determined to possess similar toxicological effects as methyl mercaptan (commonly used in natural gas), with health effects beginning at 50 ppm. ATSDR recommended an action level of 0.5 ppm and appropriate air sampling equipment was selected to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility. Because the action level was not exceeded, responsible agencies determined that, although the odor was irritating and offensive, evacuation of the population surrounding the PSC facility was unnecessary.

**47. Comment:** Proper air testing was never done during the many weeks during which the stench was a fact of life throughout the area around the PSC plant. Why wasn't an ambient air-sampling program immediately initiated, along the lines of the sampling in Danvers, MA around December 2006? Similar plans have been instituted to determine health risk to other communities as well. Given that NO ONE had real data about the event except for one MSDS and one Waste Profile Sheet showing that there is the potential for toxic exposure, why was no air sampling plan of substance instituted to

determine the dangers? Why did the agencies NOT respond immediately to the potential for organophosphate poisoning as soon as they saw the MSDS? EPA and NOSHA have standard tests for organophosphates, outlined in EPA and NOSHA manuals and policy procedure guides. Why were these not used as soon as there was a hint that ethoprop might be present?

**Response:** During the multi-agency emergency response activities at PSC, propyl mercaptan was determined to possess similar toxicological effects as methyl mercaptan (commonly used in natural gas), with health effects beginning at 50 ppm. ATSDR recommended an action level of 0.5 ppm and appropriate air sampling equipment was selected to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility. EPA and ATSDR, two agencies very experienced in responding to chemical incidences of all sorts, determined that an ambient air-sampling program was not necessary because levels of propyl mercaptan were many times lower than levels known to cause adverse health effects.

Moreover, the agencies experienced in chemical incidence response also determined that based on the level and physical characteristics of ethoprop in the wastewater, organophosphate poisoning was not considered to be a threat to the community.

**48. Comment:** Why did the agencies only do simple Draeger quick-pull air testing, which very briefly collects a sample that can be readily distorted. Twenty-four hour SUMMA or EMFLUX timed canister sampling are standard for EPA. These were never done during the entire long period during which the stench was out and about. The canisters are available to the public through a number of sources. Certainly, EPA had access to them! Lab Commerce, Inc carries them in stock, available for immediate delivery. There was NO excuse for not using the 8-24 hour recommended tests, taking into account various factors like half-lives of ethoprop, mercaptan, metabolites MI – MIV and other breakdown products; humidity, barometric pressure; and wind direction.

**Response:** Please see response to Comment 47.

*Comments 49- 53 are related to the second paragraph under the Statement of Issues section on page 3 of the Health Consultation.*

**49. Comment:** Which agency was in control of collecting sampling data for the site and making it available to the public and to the troubleshooters carrying out the essential root cause investigation? These scientists and technicians certainly had the mandate to be all over that site right away, collecting all potentially relevant information. The magnitude of the disaster should have expedited their immediate access to any and all resources: the most sophisticated equipment and the most capable scientists, working around the clock. At the same time, leaders in the Security community should have been implementing a decision to evacuate – not in September or December, but in early June, as soon as possible after the first putrid emissions. Were Homeland Security officials ever notified of the situation? Were they informed of ethoprop’s similarity to Sarin, the nerve gas GB?

If so, by whom, to whom, when and how did they respond? The community at risk certainly never heard from Homeland Security!

**Response:** This comment seems to imply that this was terrorist event, which it certainly was not! Disposal of waste and wastewater, whether it is hazardous or non-hazardous, occurs everyday in the United States in accordance with provisions set forth by the USEPA and State environmental agencies. PSC is a non-hazardous wastewater pre-treatment/disposal facility. On June 29, 2006, the offloading of ethoprop containing wastewater into a tank at the facility was responsible for the generation of the malodorous mercaptan that prompted the response of all agencies involved. This was not a chemical spill, or accident that emergency response personnel normally respond to when such incidences occur. The agencies and personnel who responded to odor complaints stemming from PSC are all very experienced in handling chemical incidences and used their combined experience and resources to initiate response actions they deemed appropriate given the nature of the wastewater disposed at PSC.

**50. Comment:** If this was the design, it failed miserably. What information on hazards does this Health Consultation provide? What populations does it identify? What further actions are recommended? What is the plan for ‘next time’? There will undoubtedly be “next times”, whether they involve stench, are odorless or smell like roses and whether they are initiated by the enemy without or the enemy within

**Response:** To answer these questions, please refer to pages 3 through 17 of the health consultation.

**51. Comment:** From the outset, the agencies knew from the MSDS and the Waste Profile Sheet what the public did not learn for 54 days of repeated poisonings after the first big blast: the “washwater” to be “treated” contained the organophosphorus nerve agent/insecticide ethoprop. Why didn’t the agencies immediately start testing plasma pseudocholinesterase and red blood cell ACE levels? No one was ever tested, nor told about the tests by any agency. These are the only known tests for OP poisoning; at the least, they would have offered guidance to medical providers as well as giving the agencies a basis on which to decide whether the population should be evacuated.

**Response:** The agencies and personnel who responded to odor complaints stemming from PSC are all very experienced in handling chemical incidences and used their combined experience and resources to initiate response actions they deemed appropriate given the nature of the wastewater disposed at PSC. Ethoprop in the washwater (0.015%) did not escape the confines of the wastewater, so testing was not necessary.

**52. Comment:** With regard to evacuation: Dr. Frank J. Bove, a highly respected ATSDR epidemiologist with no apparent connection to this project, nevertheless, on September 7, 2006, offered his colleagues detailed recommendations that read in part: “. . . it is not clear what treatment would be appropriate other than REMOVAL FROM EXPOSURE [i.e., evacuation, emphasis ours] and treating the symptoms as I AM SURE THE RESIDENTS ARE ALREADY DOING.” [But the citizens never evacuated,

because authorities continued to assure and reassure them that the noxious odors were harmless, the symptoms were benign, they were in no danger and the odor, while a nuisance, would soon go away, leaving no ill health effects]. . . .

**Response:** Propyl mercaptan levels were far below the action level and no permanent, long-term health effects were likely from exposure, the agencies concluded that evacuation was not necessary. We stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006. Please also see response to Comment 79.

**53. Comment:** “We KNOW (we added this emphasis to Dr. Bove’s statement) that exposure to N-propyl mercaptan and to Ethoprop cause irritant symptoms such as those being reported. So no study is needed, and THERE IS NO GOOD REASON TO DOUBT THE COMMUNITY REPORTS OF HEADACHE, BURNING EYES, COUGH OR SORE THROAT, NAUSEA OR VOMITING, DIFFICULTY BREATHING, NOSEBLEED, ETC. . . .” Note that Dr. Bove acknowledges here the great diversity of symptoms and the variations in their seriousness that is characteristic of OP poisoning. He recommends against pouring resources into unnecessary and meaningless “studies,” but goes straight for the bottom line, protection of the people of the community. It is also notable that Dr. Bove speaks of the community and its illness reports with respect, rather than dismissing the reports out of hand as exaggerations or fabrications of malingerers, which seems to be a common attitude among his colleagues.

**Response:** The pattern of symptoms reported from late June through August is consistent with exposure to propyl mercaptan reportedly present at the PSC facility and similar to those documented in the 1989 exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure.

*Comments 54- 58 are related to the first paragraph under the Site Description and History section on page 3 of the Health Consultation.*

**54. Comment:** Is this description (wastewater pre-treatment plant permitted to process non-hazardous waste) supported by any records? It’s true that the EPA definition of “non-hazardous” waste allows low levels of certain materials that are hazardous at higher levels. In this case, however, there was NO monitoring of the material being “treated”, and NO testing for anything except pH and some metals, so it would be impossible to know whether a material was hazardous or nonhazardous.

**Response:** To review operating parameters and conditions required by PSC’s solid waste handling permit, please contact GEPD’s Solid Waste Management Program at 404-362-2692.

**55. Comment:** We have never been given information about what really happens at PSC when the grease or wastewater or hazardous materials or nonhazardous materials are “processed”. Are chemicals used? Which chemicals, in what quantities, under what conditions? Are they hazardous or nonhazardous? What are the products of reaction? How would a reaction be controlled? Do materials become hazardous or nonhazardous

as a result of “treatment,” and where do they end up? What are the “Fulton County standards” that the “treated waste” must meet before being dumped into the local water supply? How is it ensured that the treated waste always meets these standards? Where are the records showing whether materials or methods present hazards to the public? What and where are the plans for protecting the public in case of accident? How will authorities communicate with the public to minimize their exposure in case of accident?

**Response:** This comment is beyond the scope of this health consultation. To address these questions, please refer to the Comment 54’s response and/or contact PSC directly.

**56. Comment:** This plant was originally designed for the aerobic treatment of grease and sewage. It has never been retrofitted for “treatment” of other types of chemicals. None of the current “processing” was an intended use when the plant was built. Apparently, none of the current processing was being regulated prior to this incident.

**Response:** Again, this comment is beyond the scope of this health consultation. To address these questions, please refer to the Comment 54’s response and/or contact PSC directly.

**57. Comment:** There wouldn’t be any “hazardous waste” at PSC if it followed the guidelines that say PSC is “not permitted to accept or process hazardous waste at its Fairburn facility”? The agencies have acknowledged that PSC is considered to be a “self regulating” system, which sounds suspiciously like “honor system,” a bad business in business! No one knows what might be in any given delivery, and it can’t be believably argued that none of those deliveries is hazardous. The so-called “permitted non-hazardous use” of the PSC facility has never been monitored by any agency, although it has been generally known that PSC was storing hazardous waste for transfer. The storage area is not secured and is not on a surface that could be contained should there be a spill. In fact, the PSC sits on a flood plain between Whitewater Creek and a tributary, and is flooded by every significant rain.

**Response:** Again, this comment is beyond the scope of this health consultation. These questions may be directly addressed by the GEPD Solid Waste Management Program, the regulatory entity overseeing PSC’s everyday operations.

**58. Comment:** For years before this incident, there were frequent and numerous neighborhood complaints about foul odors emanating from the PSC facility. EPA has been chronically negligent in not monitoring this site. Self-monitoring is not proof that PSC was in compliance, and being in compliance is not synonymous with safe operation.

**Response:** Please see response to comment 57.

*Comments 59- 77 are related to the first paragraph on page 4 under the Site Description and History section of the Health Consultation.*

**59. Comment:** For some reason, PSC and the agencies decided and have continued to insist that June 21 was the very first occasion upon which ethoprop/mercaptan odor could



have been detected in the Fairburn area, and that June 29 was the date of the first Big Stink. The vast number of public complaints shows a much longer time line. Given that the June report was demonstrably false, why should the PSC story be accepted by the agencies, while the reinforced testimony of the public's many stories was totally discounted?

**Response:** According to AMVAC shipping documents, the first shipment of MOCAP washwater arrived at PSC June 21, 2006. We have no evidence that MOCAP washwater from the AMVAC facility had been shipped prior to June 21, 2006. PSC did not respond to our request for detailed information about materials received and processed at the plant in May and June 2006.

**60. Comment:** Perhaps the attempt to change the date is meant to absolve EPD of its month-long failure to respond to citizen complaints that were pouring into its offices in every possible format, from telephone calls to personal visits by committees of residents. The actual date of first detection may be even earlier than May 28, the Memorial Day weekend on which the stench swamped the community over an estimated 200 square miles. We have testimony from a person working at PSC who substantiates the public's claims that there were deliveries of the "Mocap (ethoprop) washwater" in May. Why do NO reports show May deliveries? The Memorial Day date is thoroughly confirmed by a host of witnesses, in conflict with PSC's insistence on June 29 for the date of the first Big Stink.

**Response:** Whether the company handled waste containing propyl mercaptan in mid May does not alter our conclusion that there was a temporary health hazard from exposure to the odor of propyl mercaptan in air, and no long term health effects are expected that exposure.

Furthermore, GDPH was not provided with specific statements from, nor directly contacted by, any current or former employees of PSC during this investigation. Therefore, information reportedly provided by employees could not be verified and was not included in the health consultation.

**61. Comment:** Did anyone from any agency investigate the number of tankers and dates of delivery? It seems that the only reports are after-the-fact data supplied by PSC. There is NO supporting proof. In spite of this, the PSC data has been taken as gospel by the agencies! The number of deliveries in June, as reported by PSC to Fulton County, does not match the number that PSC later admitted to EPD. Why was there such a discrepancy? Is some ethoprop missing?

**Response:** This comment is beyond the scope of this health consultation. These questions may be directly addressed from the GEPD, the regulatory entity overseeing PSC's everyday operations.

**62. Comment:** The Memorial Day date is backed up as well by the data of veterinarian and epidemiologist Larry T. Glickman of Purdue University. Dr. Glickman is a widely

known and respected expert on the use of companion animals in surveillance against bioterror or chemical attack.

**Response:** On pages 9 and 10, the health consultation acknowledges and summarizes the results of symptoms reported, including those reported in late May. Graph 1 has been added on page 10 to illustrate these findings.

**63. Comment:** According to ATSDR office e-mail (obtained through the Open Records Act), the ATSDR team responsible for this “report” learned from a former colleague about Dr. Glickman’s fascinating and very relevant work in early September. The first ATSDR reaction was to try to interfere with the funding for the research (shown by e-mails)! Failing that, they became Dr. Glickman’s new best friends, giving him the impression (shown by e-mails) that they were as eager as he to disseminate his findings to the public of Fayette and Fulton counties! The agencies never referred to Dr. Glickman’s research in discussions with the Task Force or the public. We did not find out about these studies until June 2007, and then only because certain e-mails appeared in the returns from our Open Records request. There is no mention of Dr. Glickman or of his work in the Health Consultation. So much for CDC’s commitment to “the timely dissemination of data to those who need to know!”

**Response:** The symptoms initially reported by veterinarians in the area and summarized by Dr. Glickman in an October 27 email are not unexpected for exposure to propyl mercaptan odors, and these symptoms are summarized in the health consultation to further support self reported symptoms from people. In addition, the pet illness assessment survey developed and distributed by local and state agencies captured similar information about pet symptoms. Dr. Glickman's final results did not provide new or additional information.

**64. Comment:** There is no credible definition of “processing” and there is disagreement among the agencies’ databanks about whether four or 38 or some other number of highway tankers arrived and were or were not unloaded and were or were not sent through a PSC “processing.”

**Response:** Processing, in the scope of a waste handling facility, is a generic term used for a means of the handling or the treatment of waste received at a facility.

According to shipping ‘Bills of Lading’, PSC received 38 tanker trucks from the AMVAC facility between June 20 and June 28, 2006. All of the wastewater contained in these tanker trucks was off-loaded and processed through PSC’s facility. On or around June 29, PSC received four more trucks from the plant. After the first tanker truck’s contents were off-loaded, a strong odor prompted testing, which showed that this wastewater did not match what was stated on the waste profile sheet. PSC then reloaded the content back into the tanker truck and it, along with the remaining tanker trucks (which were not off-loaded), was rejected and the material was returned to AMVAC.

**65. Comment:** There is lack of clarity on this point, and it's hard to tell where this originates. Either the insecticide was manufactured at Bayer Chemical and packaged into dosage form 'next door' at AMVAC or it was manufactured and packaged at AMVAC. The enormous amount of ethoprop stored in the railcar in Alabama was in organic solution. When the agencies finally properly analyzed this solution (in August, after it had undergone a very hard life for many months without any chain of custody being kept), analysis showed it to be almost  $\frac{1}{4}$  (240,000 ppm, 24%) ethoprop. An absolutely shocking amount of very dangerous material was, for all practical purposes, sitting around loose, totally vulnerable.

**Response:** This comment would be better addressed by other agencies including the U.S. Department of Transportation and/or by the manufacturer of MOCAP. It is beyond the scope of what this health consultation addresses, namely; was there exposure to a toxic chemical, and if so, would this exposure place the exposed community at risk for adverse health effects?

**66. Comment:** We have never been given any information on why, how, when and where the insecticide was put into aqueous solution. One might make an educated guess that the organic solution was "too hot to handle," with such a high concentration of nerve agent that trying to dispose of it would set off alarms for even Alabama's environmental laws. Therefore, a means had to be found to throw the ethoprop out (quite literally) under the guise of a "nonhazardous washwater," prepared by incorporating one small, carefully calculated and measured sample of the organic ethoprop solution into each of a series of highway tankers loaded with clean water. At some point, large (judging from the amount of chloride in the samples) and less carefully measured amounts of bleach were tossed in to cut the mercaptan stink.

**Response:** Please see response to Comment 65.

**67. Comment:** These loads were destined for transmittal along the interstate highway system to PSC in Fairburn, GA to be distributed, without chemical decontamination of the threat agent, the OP bond, by whatever means around the environs of Fairburn, GA. In any case, either aqueous solution or dilute dispersion was the format in which ethoprop was shipped by highway from AMVAC to PSC, 300 miles.

**Response:** Again, please see response to Comment 65.

**68. Comment:** The economics around the so-called "washwater" are revealing. There is no way that an economically viable organic manufacturing reaction would produce well over 95% water, so this is not byproduct or "wastewater". Similarly, a reaction might result in a small amount of byproduct halides that require washing out, but more than a very small amount would break the bank in a very short time. This is not 3 million gallons of "washwater."

**Response:** This comment would best be addressed by the manufacturer of MOCAP and is beyond the scope of this health consultation.

**69. Comment:** If you have a very hazardous material with slight water solubility, you might try to get away with disposing of it as dilute aqueous solution, especially in a state (Georgia) with little or no environmental regulation and enforcement. But consider the cost!

**Response:** This comment seems to state an opinion rather than address the paragraph for which it was meant to address.

**70. Comment:** Here is a water solution or dispersion that EPD claims is “harmless.” In that case, it would make economic sense to simply spray or pour out the 3 million gallons onto the local petunias in beautiful Axis, AL. Instead, the manufacturer contracted with PSC for disposal in Georgia. PSC subcontracts with various truckers to transport the “harmless washwater” 300 miles from Axis to Fairburn, sending the tankers back empty to pick up the next loads.

**Response:** Please see response to Comment 69.

**71. Comment:** Although PSC’s “processing” almost certainly does nothing at all to decontaminate the OP bond, there is certain to be a significant “processing cost” added to the transportation and handling costs. All in all, this whole undertaking must be ruinously expensive, far outside the realm of ordinary COB (the cost of doing business). The decision to pay for it must have been driven by powerful motives, and there is no way those motives included the desire to pour harmless water on Georgia petunias.

**Response:** Again. Please see response to Comment 69.

**72. Comment:** WHY WAS THIS HUGE AMOUNT OF WATER OF DILUTION GENERATED IN THE FIRST PLACE? WHY WAS IT SENT TO GEORGIA FOR “DISPOSAL?”

**Response:** This comment is beyond the scope of this health consultation and should addressed with the manufacturer generating this wastewater.

**73. Comment:** What sort of “analytical tests?” These appear to have just been “sniff tests: no description or definition is given for them or the standard they were measured against - by sniff? Actually, it makes little difference, since the human nose can detect propyl mercaptan and ethoprop at extraordinarily low concentrations. As anyone in the area can testify, even a very faint mercaptan odor is “excessive”. It is critical to remember that the odors of ethoprop and propyl mercaptan are precisely the same, because propyl mercaptan is a dynamic moiety of the ethoprop molecule, easily attaching and detaching.

**Response:** Propyl mercaptan is a product of ethoprop degradation, and by itself, is insoluble in water, and readily evaporates into the atmosphere. Based on the fact that ethoprop does not readily vaporize (go from liquid to vapor form), we do not believe that community residents were exposed to ethoprop.

**74. Comment:** The “Waste Profile Sheet” is the summary of contents sent according to law with every highway tanker!

**Response:** This comment does not seem to address the paragraph for which it was meant to address.

**75. Comment:** “Subsequent analyses” by whom, where, using what methods? Actually, analyses were unnecessary, since ethoprop and n-propyl mercaptan both were listed on both the Waste Profile Sheet and the Material Safety Data Sheet for “Mocap washwater”. Throwing away 3 million gallons of water containing ethoprop was the whole point of the contract.

**Response:** PSC personnel analyzed the wastewater.

**76. Comment:** As to the huge – 3 million gallons - amount of “washwater” specified in the AMVAC-PSC contract. This amount could not have been washwater. It was water of dilution, and the difference is important. Extreme dilution of the ethoprop brought the concentration card into play. Now, if challenged by environmental laws, the companies and EPD could at least make an argument that the supposed “washwater” was too dilute to be anything but “harmless,” which is what EPD itself told the public! Now the companies and EPD would argue that the illegal operation of throwing an active nerve agent into the environment was at least “less illegal” because a lot of water was being thrown out at the same time. In fact, PSC’s long “cooking” operation probably wiped out this defense by concentrating any ethoprop still left in the water after the initial powerful venting on arrival at PSC.

**Response:** This comment would be better addressed by environmental regulatory authorities. Wastewater from the June 29, 2006 off-loading was not processed. It was neither aerated, nor heated.

**77. Comment:** Some, but not all, of the rejected material was returned to the client. The exception is at least 1,100 gallons of offloaded liquid that could never be accounted for. {Personal communication from Pete Nelms, Fayette County Emergency Management Agency}.

**Response:** On July 10, 2006, PSC discovered that a valve connecting the tank where MOCAP washwater was off-loaded to another adjacent tank had malfunctioned and approximately 1400 gallons of MOCAP washwater had leaked into the adjacent tank. On July 13, 2006, the wastewater contained in the adjacent tank was transferred to a tanker truck and sent back to the AMVAC facility. GEPD was present to observe this transfer.

*Comments 77- 85 are related to the second paragraph on page 4 under the Site Description and History section of the Health Consultation.*

**78. Comment:** Ridiculous. Nothing works as an insecticide unless there’s an exposure path, that is, a way for the insecticide to interfere with the victim’s body chemistry and

physiology! Dr. Frank J. Bove of ATSDR affirms in his e-mail of September 7, 2006 that “there is an exposure path.” Why must manufacturers and agricultural workers wear moon suits and have special training to use ethoprop? Why does the agency-devised Sampling Plan for the analysis of the Alabama railcar contents include elaborate protective gear and protocols? In both cases, the answer is that they could be exposed, and exposure is known to be dangerous. Voluminous reports in the literature (See attached partial bibliography) show the dangers of ethoprop, which is rated as a material of concern by the EPA itself, because it is readily absorbed through the skin and is extremely toxic in this delivery form (Human Health Risk Assessment, Ethoprop, Kit Farwell, Office of Pesticide Programs, 1999).

**Response:** The health consultation strictly considers the concentration of ethoprop found in the AMVAC wastewater shipped to PSC for treatment. Sampling confirmed this concentration to be approximately 150 parts per million (ppm). Personal protective gear worn while applying ‘MOCAP’ on fields is required because the concentration of ethoprop approaches 15% (or 150,000 ppm), not 0.015% ethoprop contained in the wastewater. One part per million is roughly equivalent to one drop of ink in one drum of water (40 gallons).

**79. Comment:** “No suspected exposure paths” is almost an oxymoron. Until they have been investigated experimentally, all paths are suspect! That’s what science entails! In this case, the agencies do not report any experimental investigation of potential exposure paths, nor do they report that their declaration is based upon a thorough review of the literature, i.e., other workers’ experimentation. Since there also was no proper air testing, the agencies have offered NO scientific basis on which to affirm the absence or the existence of any exposure path. [In fact, there are reports in the literature of incidents in which victims had been exposed to airborne exposure carried from crop applications several miles away]. Since there are no studies of long-term low-dose exposure to ethoprop, how can it be stated that there was NO exposure path?

**Response:** As stated in the health consultation, ethoprop does not readily evaporate into the environment and we have no evidence to suggest that the ethoprop would have gotten into the air. In addition to vapor pressure and half-life considerations, let’s look at some other properties of ethoprop:

- Based on the concentration of ethoprop found in the wastewater at PSC (150 mg/L), ethoprop would be completely dissolved in the wastewater. Ethoprop is soluble in water at 843 mg/L at 21°C (69.8°F). At concentrations above this ethoprop would not be soluble in water.
- Manufactured liquid ethoprop product has a boiling point between 186.8 to 195.8°F where it is transformed into its vaporous form. The boiling point of water is 212°F. This boiling point would not apply to the wastewater because the known concentration of ethoprop in this wastewater was approximately 150 mg/l of water, which is 0.015% ethoprop. Being that ethoprop is 100% soluble in water at this concentration, the ethoprop molecule is bound to water by hydrogen

bonding. Therefore, for vaporization to occur, the wastewater in the tank would literally have to be boiled before the ethoprop was released into the atmosphere. We know this did not occur.

- However, evaporation is a process that can occur by which molecules in a liquid state (e.g. water) spontaneously become gaseous (e.g. water vapor), without being heated to boiling point. It is the opposite of condensation. Generally, evaporation can be seen by the gradual disappearance of a liquid, when exposed to a significant volume of gas. The reason a liquid evaporates is that its molecules are in motion in random directions and at random speeds and the energy of that movement can be compared to the heat needed to boil that liquid. On average, the molecules do not have enough energy to escape from the liquid, or else the liquid would turn into vapor quickly. When molecules collide, they transfer energy to each other in varying degrees, based on how they collide. Sometimes the transfer is so one-sided that one of the molecules ends up with enough energy to be considered higher than the energy required to reach the boiling point of the liquid. If this happens near the surface of the liquid it may actually “fly off” as gas and thus “evaporate”. For molecules of a liquid to evaporate, they must be located near the surface, be moving in the proper direction, and have sufficient kinetic energy to overcome liquid-phase intermolecular forces. Only a small proportion of the molecules meet these criteria, so the rate of evaporation is limited.
- To put things in perspective, let us assume a worst case scenario whereby the entire contents of the first tanker truck that delivered its load on June 29, 2007 was emptied in a holding tank and boiled until all the wastewater was vaporized. The volume off-loaded according to the Bill of Lading was 4442 gallons, or 16,811 liters. Knowing that the ethoprop concentration was approximately 150 mg/l, the entire holding tank would have held 2,521,650 mg (2.5 kilograms) of ethoprop. Assuming that the wastewater was boiled off - 1000 liters of water vapor would occupy one cubic meter of air. Given that the nearest residence is approximately 690 feet, or 210 meters, from the PSC facility, and assuming vertical and horizontal atmospheric dispersion to be 210 meters, the volume of air contained within this space is approximately 9,261,000 cubic meters of air. Atmospheric dilution of the concentration of ethoprop evaporating from the boiling tank would reduce the concentration of ethoprop to 0.27 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) ethoprop in air at the nearest residence for potential exposure to occur.
- Toxicological endpoints have been determined by the U.S. EPA for occupational, acute (short-term) inhalation exposure to ethoprop. The No Observed Adverse Effect Level (NOAEL) for inhalation exposure in dogs was determined to be 0.025 milligrams per kilogram per day ( $\text{mg}/\text{kg}/\text{day}$ )<sup>2</sup>. The Lowest Observed Adverse Health Effects Level (LOAEL), also in dogs, occurred at 0.075

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<sup>2</sup> Inhalation absorption is assumed to be equivalent to oral absorption (100%) for risk assessment purposes [14].

mg/kg/day where plasma cholinesterase inhibition was the endpoint observed [14].

- Hypothetical exposure dose calculations based on the boiling-off scenario were made using the airborne concentration of 0.27 mg/m<sup>3</sup> at the closet residence to PSC. The calculation was based on a 70 kg man breathing 15.2 m<sup>3</sup> of air per day with the homeowner occupying his residence 12 hours per day. The exposure dose calculated using this scenario is 0.03 mg/kg/day. This exposure dose is slightly above the NOAEL and below the LOAEL. This purpose of this exercise is to illustrate the fact that even under the worst case conditions, which did not happen, community exposure to airborne ethoprop would have been at or below the NOAEL. Therefore, adverse health effects from exposure to airborne ethoprop at a concentration known to have been contained in a PSC holding tank would be unlikely.
- The contents of the first tanker truck that was off-loaded June 29, 2007, was pumped back into the tanker truck and sent back to AMVAC on July 13, 2006. This wastewater did not undergo processing in PSC's aeration basin. Unfortunately, approximately 1400 gallons had leaked into an adjacent holding tank, prolonging the mercaptan odor that had permeated the Fairburn community.

We agree that airborne applications of MOCAP using dust croppers can absolutely lead to an exposure pathway that may lead to adverse health effects. However, the concentration of ethoprop in field application is roughly 15%, or 150,000 ppm ethoprop, not 150 ppm as was the case in the wastewater.

**80. Comment:** NOTE THE ABRUPT CHANGE OF SUBJECT AWAY FROM ETHOPROP TO THAT CONVENIENTLY ODOROUS RED HERRING (MERCAPTAN)!

This switch of focus from ethoprop to mercaptan has been done repeatedly throughout this document and in all agency communications with the media. The shell game has been perfected, and the ethoprop pea is hidden so swiftly that ethoprop hardly seems a factor to the unwary. Obviously, the manufacturer wants to be distanced from ethoprop and is using mercaptan as a substitute factor. There is no discussion of exposure pathways for propyl mercaptan! This is in line with the AMVAC attorney's e-mailed scenario earmarking mercaptan as the villain.

**Response:** Please see response to Comment 79. We concluded that that exposure to propyl mercaptan did occur. This is explained on pages 13 and 16 of the health consultation.

In addition to propyl mercaptan having a much higher vapor pressure than ethoprop enabling its rapid evaporation, let's look at some other properties of propyl mercaptan:

- Propyl mercaptan is insoluble in water
- Propyl mercaptan has a specific gravity of 0.841 making it lighter than water



- Propyl mercaptan has a vapor specific gravity of 2.6 making it heavier than air, which has a vapor specific gravity of 1.0.

Because propyl mercaptan is insoluble in water, and is lighter than water; it will float on water. Moreover, propyl mercaptan has a high vapor pressure which readily evaporates in such a holding tank environment. The lingering odor that the community was exposed to was especially persistent because propyl mercaptan is heavier than air so it has a tendency to hug the ground.

**81. Comment:** There is a variety of possible exposure pathways for both ethoprop and mercaptan, and the probability is high that if you have one, you have the other. (See Farwell, *ibid.*) Certainly the initial blast when the highway tanker was opened would be loaded with both mercaptan and ethoprop! Both MSDS sheets and the literature describe exposure paths by land, sea and air ad nauseum. In addition to these, the “treatment” methods at the PSC plant would have a high probability of producing aerosols and blowing them into the environment as fogs. Aerosol particles are of optimal size and hydrophilic/lipophilic balance to be absorbed into either the lower lungs or into the skin, carrying their load – in this case, organophosphates – with them. [For a fuller discussion, see the independent Section B (the Task Force’s independent Analysis Summary document of this incident, to be sent separately).] Pressure-driven venting and aerosolization should both be experimentally investigated as methods for distribution in cases like this.

**Response:** Exposure pathways are determined by identifying environmental and human components that might lead to contact with contaminants in environmental media (e.g., air, soil, groundwater, and surface water). On-site spillage of the tanker truck contents is not known to have occurred. Therefore, soil, surface water, and groundwater exposure pathways are eliminated from this health consultation.

Aerosolization is an ingenious method of packaging, for instance, where an active product is pressurized in a given container and can be released by pressing on or tilting an actuator. We do not believe that the process of aerosolization took place at PSC under the circumstances by which this wastewater was disposed of. In addition, the content of the holding tank was not processed in the aeration basin, which naturally agitates the contents of the aeration basin.

**82. Comment:** “Should”? This is the language of speculation, not science. Is there documentation for this fond hope?

**Response:** The context of this word is based on the fact that propyl mercaptan was not detected above the action level of 0.5 ppm, which is 100 times below levels known to cause occupational health effects based on studies of methyl mercaptan, a closely related molecule. Please see footnote at the bottom of page 4 of this health consultation.

**83. Comment:** Does this deny that high mercaptan levels can cause long-term health problems? This contradicts numerous literature reports (see Bibliography), including Reference 3 of this Health Consultation.

**Response:** To date, information on chronic toxicity of propyl mercaptan is not available.

**84. Comment:** The Material Safety and Data Sheet from Chevron Phillips emphatically does not share the ATSDR's "Pollyanna" view of propyl mercaptan. To quote in small part from its MSDS for isopropyl mercaptan: "Clear liquid, repulsive odor . . . highly flammable liquid and vapor, vapor may cause flash fire . . . This material presents a fire hazard, can burn with explosive violence . . . harmful or fatal if swallowed, can enter lungs and cause damage, once in lungs it is very difficult to remove and can cause severe injury or death, do not get in eyes, on skin or in clothing. May cause nausea, dizziness or headache, causes eye irritation, highly toxic to aquatic organisms. A vapor suppressing foam may be used to reduce vapors. Do not use concentrated or dry bleach. Do not attempt to neutralize or deodorize bulk liquid mercaptan. U.S.A. regulations require reporting spills of this material that could reach any surface waters. Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water."

**Response:** The MSDS refers to pure product; that is, manufactured propyl mercaptan. Propyl mercaptan contained in the holding tank(s) was a product of ethoprop degradation and was highly dilute.

**85. Comment:** Was the noxious, potentially harmful emission reported to the proper authorities? To whom? When?

**Response:** Yes. Complaints about strong odors being emitted from PSC from numerous community members prompted a multi-agency response that began on July 3, 2006.

*Comments 86- 91 are related to the third paragraph on page 4 under the Site Description and History section of the Health Consultation.*

**86. Comment:** The PSC reports give the date of June 28th but the many public complaints substantiate that the period of exposure was far longer than is being reported by the agencies. Previous PSC workers and citizens all state that the smell was present starting in mid May! Why has PSC's "starting date" been given more credibility by the agencies than the "starting date" of hundreds of citizens? PSC's date is included in the AMVAC attorney's e-mail of instructions to the agencies.

**Response:** Many persons reported detecting the odor and experiencing symptom onset prior to the June 29 events reported by the PSC facility. Propyl mercaptan received and handled at the plant on June 29 could not have been the cause of adverse health effects before that date. We have 'Bills of Lading' for all shipments received from the AMVAC facility in June. The tanker trucks that arrived on June 29, 2006 were subsequently rejected for processing by PSC and returning to AMVAC. PSC did not respond to our request for detailed information about materials received and processed at the plant in May and June 2006.

**87. Comment:** Tests were evidently done with Draeger tubes of uncertain tuning and sensitivity; the proper canister testing was not done at the time of the emissions, because the essential equipment was said to be “out of state, and therefore not available at that time to GEPD”. It was never acquired for this program, which emphasizes its low priority for EPD.

**Response:** During the multi-agency emergency response activities at PSC, propyl mercaptan was determined to be responsible for the malodors at the facility. Sensidyne precision gas detector tubes calibrated for the measurement of mercaptans in the 0.5 to 10ppm range were used to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility. EPA and ATSDR, two agencies very experienced in responding to chemical incidences of all sorts, determined that an ambient air-sampling program was not necessary because levels of propyl mercaptan were many times lower than levels known to cause adverse health effects.

**88. Comment:** Documentation of concentrations is needed, especially for the early days when the emissions were extremely intense. But there was no sampling during that critical time, when it was important to identify all materials that might have constituted a threat to the health of the residents. The concentration of oxygen in normal, breathable air is about 21%; oxygen-replacing pollutants like propyl mercaptan and other gases threaten health even though they might not be poisonous.

**Response:** Please see response to Comment 87.

**89. Comment:** The foul odor from propyl mercaptan AND ETHOPROP. It is critical to include the actual source of the odor.

**Response:** Please see response to Comment 87.

**90. Comment:** Numerous residents (guinea pigs?) were still reporting symptoms associated with exposure to propyl mercaptan? On the one hand, these reports make it indisputable that the ethoprop poison was still wreaking havoc in the community. On the other hand, it is apparent that the numerous reports did not inspire the agencies to spring into action and immediately implement (1) treatment for those afflicted; (2) cessation of the exposure to prevent more illness. Perhaps the guinea pigs would have been treated more humanely if they had not been able to talk?

**Response:** GEPD and PSC responded to reports about continuing odors by conducting cleanup and removal activities for ethoprop residue breakdown products including propyl mercaptan, which was identified in an on-site wastewater storage tank, and the source of the odor. There is no evidence that exposure to ethoprop occurred or was occurring in the community. There is no "treatment" for exposure to foul odors. The symptoms subside when the odor ceases, and exposure to the odor of propyl mercaptan at concentrations emanating from PSC does not cause long-term health effects. In this case, the only way to eliminate exposure to the mercaptan odor was removal of the source.

**91. Comment:** Again, there was no proper air monitoring that took into consideration time of “treatment”, wind directions, humidity, temperature of air, etc. When the quick pull tests were done, any experienced technician should have known that testing where there was no odor would give a non-detect result for propyl mercaptan. A number of factors could interfere and produce a sample that was not consistent with the results from other times. The 24 hour SUMMA test should have been done!

**Response:** Please see response to Comment 87.

*Comments 92- 96 are related to the fourth paragraph on page 4 under the Site Description and History section of the Health Consultation.*

**92. Comment:** Refer to the Chevron Phillips MSDS quote, with which PSC was required by law to have been thoroughly familiar: “Do not use concentrated or dry bleach”!

**Response:** Yes, that is correct.

**93. Comment:** What cleanup? What reagents were used and how was the cleanup performed? In what containers? Monitored how? Validated how?

**Response:** This comment is beyond the scope of this health consultation. To address these questions, please contact PSC directly.

**94. Comment:** What were these activities, who were the responsible scientist/engineers, how were the “activities” decided upon and monitored? At least three weeks after the initial incident?

**Response:** PSC was responsible for this activity under the oversight of GEPD.

**95. Comment:** This is deliberately cryptic. What did they name as” the source of the odor”? Ethoprop was the actual source. No reference is given.

**Response:** The source of the odor – propyl mercaptan - has been discussed throughout the health consultation and in various responses to public comments.

**96. Comment:** Why wasn’t an ambient air monitoring plan started during all of these weeks? Why did it take over a month for the agencies to declare a “critical health incident”?

**Response:** Please see response to Comments 47 and 87.

*Comments 97- 102 are related to the fifth paragraph on page 4 under the Site Description and History section of the Health Consultation.*

**97. Comment:** This is an egregious error of fact. The plant was closed for all of two days. U. S. Congressman David Scott closely questioned Georgia’s EPA representative on this point during a meeting at his office on September 18, 2006. EPA representative Franklin Hill stated that the administrative judge handling the case had declared that the plant should be shut down. PSC attorneys responded that they would appeal any such order, whereupon GEPD representatives negotiated a settlement without allowing or inviting community involvement! A Consent Order was signed, \$100,000 was handed over to a “cleanup” fund, and PSC Fairburn was back in business!

**Response:** Regulatory environmental Administrative procedures (Hearings, Appeals, and Settlements) are under the jurisprudence of GEPD. The purpose of the Site Description and History section of the health consultation is to provide background information based on available information. As stated, PSC operations were ordered to cease, PSC appealed, and the plant remained operational.

**98. Comment:** Wasn’t this a sludge sample, not wastewater?

**Response:** Yes, the sample containing ethoprop was sludge, or a ‘tank bottom’.

**99. Comment:** This proves that there was absolutely no decontamination, no chemistry done on this sample to deweaponize the –O=P bond. It’s highly likely that all of the “material of concern” poured into PSC’s vats since the middle of May had been allowed to carry its poisonous burden to the Gulf of Mexico, the oysters of lower Florida, and the water taps of many towns along the Chattahoochee River. Ethoprop has a half-life of 14 months in neutral water!

**Response:** The purpose of a health consultation is to relay information about health risks related to a specific site. Wastewater pertaining to the June 29, 2006 shipments was not released outside the facility.

**100. Comment:** Without specifying any chemistry for decontamination or outlining how the removal was to be monitored and validated. This was just a mere Slap-on-the-Wrist. It should have read “ethoprop.” It’s impossible to parse any sense out of this tangled and strange “regulation”.

**Response:** The methodology of ethoprop decontamination is usually proposed by a facility or their contractor. Approval or rejection of the proposed methodology is determined by the environmental regulatory agency, in this case, GEPD.

**101. Comment:** If a citizen had done the testing described in this manner, without a proper chain of custody OR using proper technical testing methods, the agencies would discount all of the data. Why are we expected to believe agency data that is flawed in both method and custody?

**Response:** Sampling, transportation of the samples, and chain-of-custody were accomplished following regulatory Standard sampling procedures.

**102. Comment:** The last of the contaminated tanks were removed months after September 13, 2006.

**Response:** The tanks that held the wastewater have been decontaminated and were scheduled to be dismantled and removed from the property in November 2007. However, prior to PSC initiating the dismantling, the attorney for the citizen Class Action Lawsuit filed a request for injunction against the removal. The reason for this request was to preserve the evidence in the tanks until the judge rules on the Lawsuit. Therefore, the tanks are still at PSC.

*Comments 103-109 are related to the sixth paragraph on page 4, which continues on page 5 under the Site Description and History section of the Health Consultation.*

**103. Comment:** Why? Did it get lost? Had it gotten lost?

**Response:** In the United States, commercial facilities have a “cradle to grave” liability for the wastes they generate.

**104. Comment:** After this multi-ingredient witches’ brew had been sitting in the South Alabama summer sun for 50 days!

**Response:** This comment does not seem to solicit a response.

**105. Comment:** Why analyze at this point in time? To what purpose? How could the results be interpreted and to what regulatory situations could they be linked, in view of the corrupted chains of custody, mishandling by numerous untrained personnel, switching between containers, contamination by a variety of chemicals and so many other factors?

**Response:** This comment would be more appropriately addressed by the US. EPA

**106. Comment:** This is a misrepresentation of the actual physico/chemical situation as reported by the agencies themselves in Reference 8. They report that the railcar was about 30% filled with ethoprop-saturated oils before the returned washwaters were added to top it off! One-third full is far outside the realm of a “residue!” In point of fact, as nearly as I can tell, the analysis results are meaningless. They represent the expenditure of a great deal of time and dedicated effort and a great waste of resources. Period.

**Response:** Please see response to Comment 105.

**107. Comment:** Should be named, probably calcium or sodium hypochlorite.

**Response:** We agree and appropriately changed ‘chemicals’ to ‘hypochlorite’ on page 5 of the health consultation.

**108. Comment:** Oh, no they don’t!!! This is just plain wrong. The Waste Profile Sheets sent with the tanker trucks showed about the same concentration of ethoprop as that

measured in the aqueous layer returned from Georgia. This aqueous layer was added to the oily slop already in the railcar to constitute about 70% of its content when full. Ethoprop is much more soluble in oil than in water and the constancy of its aqueous concentration indicates that both layers were saturated: those two liquid layers could hold no more ethoprop. When finally sampled and quantified according to an elaborate and elegant plan, the concentration of ethoprop in the organic layer was a whopping 240,000 ppm -- an absolutely frightening amount! See Section B (the Task Force's independent Analysis Summary, to be sent separately) of this response for an analysis of the meaning of this number; N-propyl mercaptan was similarly concentrated in the oil at 320,000 mg/kg (320,000 ppm).

**Response:** Thank you for pointing this out. The aqueous layer did contain similar ethoprop concentrations as stated on the Waste Profile Sheet. What was referred to in the health consultation was the much higher concentration of ethoprop found in the organic layer of the railcar contents.

**109. Comment:** Again how can anyone believe these test results, considering the lax chain of custody, delays in testing, and inferior methods? Would the agencies accept this kind of data from a citizens' study?

**Response:** Sampling, transportation of the samples, and chain-of-custody, and data analysis were accomplished following regulatory standard sampling procedures.

*Comments 110 and 111 are related to the first paragraph on page 5 under the Site Description and History section of the Health Consultation.*

**110. Comment:** Why, so many months after the event and presumably knowing that the half-life of ethoprop in soil ranges from 3 to 56 days, bother with sampling the soil? The long delays in action, the failure to use more suitable tests like 24 hour SUMMA, the lack of blood testing and so forth all demonstrate that the agencies did not move with all deliberate speed to identify and troubleshoot the problems and protect the community. Instead, they waited until PSC had ample time to stop the "processing" and do considerable cleanup. This long delay in soil testing is just one of many examples of EPD's waiting beyond a realistic time to undertake discovery.

**Response:** As explained in the response to Comment 79, numerous other responses, and the fact that the wastewater was not spilled onto the ground, we have no evidence that ethoprop (at a 0.015% concentration in water) would have evaporated into the air and contaminated the soil inside or outside the perimeter of the PSC facility. Soil samples were taken in various locations surrounding PSC at the request of many citizens in the Fairburn area to assure area citizens that ethoprop had not escaped the PSC facility.

**111. Comment:** Also, a two-mile radius would be 12.56 square miles, or  $3.25 \times 10^7$  square meters. Assume for argument that depth of sampling cancels out between total area and area of sampling and that each sample comprised a generous 1 square meter of soil. The ratio of soil sampled to total soil would be  $20 \text{ m}^2 / 3.25 \times 10^7 \text{ m}^2$ . It is hardly surprising that no ethoprop showed up, considering the unexplained long delay before

sampling and that all the sampling looked at only  $6.15 \times 10^{-5}$  or 61.5 ppm of the soil within the sampling area.

This perfectly illustrates the saying of astronomer Carl Sagan:  
“Absence of evidence is not evidence of absence!”

**Response:** Please see response to Comment 110.

*Comments 112- 113 are related to the second paragraph on page 5 under the Site Description and History section of the Health Consultation.*

**112. Comment:** That there could be any question of re-permitting this operation is very scary to anyone with minimal common sense, especially someone suffering from serious conditions related to the exposure. The Task Force hopes that the Fulton (and Fayette) County Commissioners will respect the painfully accumulated experience, self-education and knowledge of the Task Force and keep this menace far, far away from the innocent citizens of Fulton and Fayette Counties. Please let us help you and ourselves by including us in the process!

**Response:** This comment is beyond the scope of this health consultation and should be addressed by the Fulton and Fayette County Commissioners.

**113. Comment:** The “treatment” of self-regulated “non-hazardous” product is going on still, with NO verification other than the “honor system”. One current method is the dumping of liquid into a concrete pit, then adding sawdust until the conglomeration will pass a “paint filter” test. What happens if a harmful product with a high vapor pressure and low flash point is exposed to hot summer heat and sun in that concrete pit while being stirred with sawdust? Will there be harmful vapor in the immediate area? Is there any scientific proof that there are NO vapors emitting from these methods of treatment? Where are the studies that show this as a safe method for treating off-spec products? Who verifies that these off-spec products are safe? There is no “safety net” at the PSC plant!

**Response:** PSC is permitted to conduct such activities under the oversight of GEPA. The operational parameters of PSC’s solid waste treatment permit are public information and may be viewed by contacting GEPA’s Solid Waste Management Program at 404-362-2692.

*Comments 114- 118 are related to the third paragraph on page 5 under the Site Description and History section of the Health Consultation.*

**114. Comment:** Again, the odor is an unusually repulsive symptom (propyl mercaptan) of the underlying disease (ethoprop). EPA has not dealt with the much more threatening ethoprop or with the need for chemical decontamination of the ethoprop organophosphorus bond. Moreover, not every poisonous chemical has a nasty odor as a warning sign. We would be lucky if it did! There is no consideration in the Health Consultation that an entire community could be felled by a poisonous chemical without ever smelling a thing! The research of Dr. Larry Glickman is directed toward filling this gap by using the health status of companion animals as signals that can alert us to



environmental challenges. At Memorial Day 2006, he observed a rise in selected health problems – eye inflammation and respiratory problems – among dogs living 10 to 20 miles from the PSC plant. There is an irony here. When human residents reported the problems of Ethoprop Emission and mercaptan odor to the agencies, their reports were discounted and no meaningful action was taken. Perhaps the dogs will discover reporting channels that will lead to effective emergency planning and timely action!!

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**115. Comment:** With the events of last summer, PSC revealed a willingness to operate far outside the restrictions of its permits, to repeatedly lie by omission about what it was exposing the community to, and its ignorance about handling the dangerous materials it had brought aboard in enormous quantities. This operation has no place in our community! (Dr. Frank J. Bove of ATSDR said in his e-mail of September 7, 2006: “What is needed if this plant is to continue operation, (which is a decision the community should make, underlining ours) is a stringent monitoring program by EPD to ensure that this does not happen again.”) Our experience indicates that implementation of a stringent monitoring program by EPD is very unlikely.

**Response:** GEPD has oversight and monitoring responsibilities for all facilities permitted in the State of Georgia to treat, store, and dispose of industrial waste.

**116. Comment:** One aspect of plant operation that seems to have been ignored by everyone is the training and protection of the workers. We have been informed that most are illegal, illiterate aliens who do not speak English and never complain because they fear losing their jobs. Obviously, they would be unable to read and interpret a Material Safety and Data sheet! As a general rule, companies that deal with chemicals not only furnish workers with gear that is optimal for the particular application; they also run regular, required drills and safety training. As a user of tremendous amounts of varied chemicals, PSC should have particularly tight protocols and inspection and enforcement routines.

**Response:** We agree.

**117. Comment:** With this facility located in a burgeoning community on a water source for Fayette County, with no total site containment, with the storage of many products, with the lack of scientific testing and supervision on an ongoing basis, the potential for an even more serious event than the Ethoprop Emission Event is always present at PSC. PSC IS A FANTASTIC EXAMPLE OF A DISASTER WAITING TO HAPPEN.

**Response:** To decrease the chance of environmental disasters in the U.S., many federal regulations have been enacted over the last 35 years stipulating the handling, storage, treatment, and transportation of industrial wastes. The GEPD has oversight and monitoring responsibilities for all facilities permitted in the State of Georgia to treat, store, and dispose of industrial waste.

**118. Comment:** Since the census of 2000, numerous neighborhoods have been built, some within a few hundred feet of the back door of PSC processing areas. The actual population is probably double that given.

**Response:** We realize that there are more people living in the area now, than what the census data provide. We also realize that the closest subdivision to PSC is approximately 1000 feet southwest of PSC.

*The following comment is related to the first paragraph under the Community Involvement section on page 5.*

**119. Comment:** It is the understanding of the task force that five of the sickest patients were chosen for these “follow-up interviews”. It needs to be public knowledge that none of these patients were ever examined by a Department of Health physician... EVER. No medical tests were performed on these people. No samples were taken from them. The “follow-up interviews” were PHONE CALLS from Dr. Horan.

**Response:**

Most of the interviews were done by telephone; one was done in-person. Dr. Horan did not do physical examinations of these persons.

*The following comment is related to the second paragraph under the Community Involvement section on page 6.*

**120. Comment:** It must also be known that this was a sham. They took the information and probably used it for their own defense. I personally called the number and have never heard another thing back from them. The questions must be asked, “How many in our community registered with PSC’s hot line as damaged parties? Where are those records?”

**Response:** We were merely stating what was resolved during that public meeting.

*The following comment is related to the third paragraph under the Community Involvement section on page 6.*

**121. Comment:** The Mexicans are afraid of being deported and will do anything to stay. They are and were just as sick, if not more sick, than other residents because many of them worked in the plant. There was a story in a Hispanic newspaper that reported Mexican children in a trailer park suffering from blood coming out of their eyes.

**Response:** In late July, GDPH staff was contacted by a resident representing one community directly adjacent to PSC. This community is primarily Hispanic. The representative organized a public meeting for Saturday afternoon, inviting GDPH staff who planned to attend. The representative later canceled the event. No other requests from this representative or others in Spanish-speaking communities have been received by GDPH. Both the Fayette County Emergency Management Agency and the South Fulton/Fayette Community Task Force have made contact

with the various communities in the areas around PSC, and no unique concerns or health effects have been identified among non-English speaking populations.

*Comments 122-124 are related to the first paragraph on page 7 under the Community Involvement section of the Health Consultation.*

**122. Comment:** But no one told frightened residents what to do!

**Response:** Organization and agency representatives were available to gather and document community concerns, answer questions, and provide information about the services their agency provides.

**123. Comment:** The massive community involvement, Dr. Glickman's data about animal sickness in the area during the time of the incident, and the many people who were sick show that there was indeed an exposure path.

**Response:** Indeed, as the health consultation clearly states, community residents were exposed to propyl mercaptan.

**124. Comment:** Several recent studies show that even "grey odor" that contains NO toxins (a fog of aerosolized vegetable oil particles would fall into this category) can have a negative effect on a community. The community was clearly affected, even though the pollutant was never definitely identified or quantified because no proper air monitoring was done.

**Response:** The pollutant was clearly identified as being propyl mercaptan.

*Comments 125-127 are related to the second paragraph on page 7 under the Community Involvement section of the Health Consultation.*

**125. Comment:** "Initial cleanup activities"? What were they? Why weren't they working? How were they validated, and how did EPA ensure that the PSC facilities and surroundings were in fact cleaned up, and that no potentially harmful chemicals lurked in the area. No one has ever specified what these cleanup activities were in terms of the all-important chemical treatments required. See Section B (independent Analysis Summary, to come).

**Response:** Initial cleanup activities included pumping the contents of the first tanker truck that off-loaded its wastewater on June 29, 2006 back into the tanker truck and transporting that waste stream back to AMVAC. Hypochlorite solution was then applied into the holding tank, which seemed to aggravate the odor problem. Enzymes and deodorants would also used to try to mitigate the odor.

**126. Comment:** No proper air testing was done in a sufficiently timely manner to find ethoprop or mercaptan levels high enough to shut the plant down. EPA and OSHA testing for organophosphates in air were not done. In fact NO testing was done for weeks. Given the half life, this was ample delay to allow all evidence to be gone!

**Response:** Air sampling was conducted on July 3, 2006. Please see response to Comment 47.

**127. Comment:** So how could a conclusion of NO action be made? It was MADE SOLELY ON THE BASIS OF THE STORY TOLD BY PSC TO THE AGENCIES AND NOT BY SCIENCE.

**Response:** Based on Federal and State environmental regulations, neither agency had the authority to shut PSC down.

*Comments 128-129 are related to the third paragraph on page 7 under the Community Involvement section of the Health Consultation.*

**128. Comment:** Christian City is a community for aged persons, few of whom ever go outdoors.

**Response:** Think comment does not seem to solicit a response.

**129. Comment:** This area is also not in the direction of the prevailing winds. Was there ever a plotting of the meteorological data vs. the illness rate? NO. Was there a study that included US Foods workers and delivery drivers who complained? NO. What about BP Oil and the hotels at Hwy 74 and Oakley Industrial Boulevard that reported the smells? Were any of these included in the study? Christian City's location in relation to the wind and other factors like the ages of the residents could also contribute to the lack of complaints. Have the possible reasons been studied for this lack of result? Was Christian City a good choice for a target study group that represented the entire population? Were other large test sites (like those mentioned above) used to gather data? NO.

**Response:** Meteorological data and reported illnesses were not compared because reports indicated that illness and odor were experienced by residents living in all directions around the facility.

The symptom survey was made available to the general public on local and state agency websites and on the citizen advocacy group's website. The availability of the survey was promoted in several media reports and residents were encouraged to participate. The survey was not a "study"; it was a way to gather information about what symptoms people were experiencing. The hundreds of surveys collected repeatedly documented similar symptoms.

Christian City was surveyed because the residents may represent a sensitive population. The survey was never intended to represent the total population. Those who did not have symptoms or complaints were not likely to complete a survey. We were not attempting to conduct a study of the population, but to gather a list of symptoms to assess whether exposure to propyl mercaptan odor caused additional symptoms beyond those previously reported in the toxicology literature.

*Comments 130-132 are related to the last paragraph under the Community Involvement section that begins on page 7 of the Health Consultation.*

**130. Comment:** Many people expressed their distrust of the government agencies and their conviction that nothing was being done and nothing would be done to help them. Under these circumstances, it is predictable that they would stop contacting the agencies.

**Response:** We were just stating the outcome of the meeting.

**131. Comment:** The health data gathered only took into consideration a few of the possible indicators of organophosphate poisoning. Also there are NO studies of long-term low-level exposure!

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**132. Comment:** One family that lives within .25 miles of the plant had 5 family members sick and going to doctors for breathing, eye, nerve, and etc. issues, yet they were never contacted by any agency. In fact, PSC called them to tell them they could not be sick, as it was just a bad odor! How many more were ignored or not included in the test?

**Response:** Various agencies distributed information regarding the June 2006 incident to the task force and other members of the community. Contact information was also including in the information given out.

*The following comment is related to first paragraph under the Community Exposure Survey Results section on page 8 of the Health Consultation.*

**133. Comment:** The task force has begged for a blood test to determine whether a person has been poisoned with pesticides. We have been told over and over and over that it can't be done, and that if it could, it would be cost-prohibitive. For the DOH to include this in their report is an absolute insult to all of us.

**Response:** The point of the last sentence in this paragraph is that the survey form included questions about toxins:

“Did you have blood drawn and tested for toxins?”

“Were there any toxins found in lab work?”

The October 24, 2006, report, “Survey of Adverse Health Events, Fairburn, Georgia, and Neighboring Areas, 2006” reported these results: “Twenty-six persons reported having had blood drawn and tested for toxins. Three of them initially reported toxins were found, but in follow up one had negative test results and two had medical diagnoses that are not clearly linked to toxic chemical exposure.”

*Comments 134-136ares related to the fourth paragraph under the Community Exposure Survey Results section on page 10 of the Health Consultation.*

**134. Comment:** According to multiple literature reports, diversity of symptoms and variability in target organs is a striking characteristic of organophosphorus poisoning and in fact an aid in the diagnostic process.

**Response:** Please see response to Comment 131.

**135. Comment:** Again there is no study of long term low level exposure. There are people that were never contacted.

**Response:** Please see response to Comment 131.

**136. Comment:** The exposure symptoms listed on the MSDS show all the different organ systems possibly being involved so how can one say that there was NO common exposure source?

The very varied MSDS reported symptoms are the same as the community experienced in a varied pattern.

**Response:** MSDS's are generated by manufactures for their specific products. MOCAP contains approximately 15 % ethoprop. The concentration of ethoprop contained in the wastewater off-loaded at PSC was 0.015%, or 1000 times lower than what in contained in MOCAP. Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

*Comments 137-141 are related to the first paragraph under the Exposure Survey of Animal Illness section on page 10.*

**137. Comment:** To the contrary, an experienced wildlife biologist, formerly with the Fish and Wildlife Service and now an environmental activist, did a careful "walk-through" of the woods near the Whitewater Creek flood plain and the PSC plant within a few days of the Memorial Day emissions. He says that everything was silent, the animals either dead or (the lucky ones) able to get away. The wildlife returned gradually over the summer.

**Response:** GDPH developed an animal illness survey form, and contacted all residents who reported ill pets or wild animals and asked to complete the survey. After analyzing the data from these surveys, there was no evidence of impact to wild animals. A few reports of dead bees and birds were the only reports, and no species- or geographic-specific trends were identified.

**138. Comment:** Bees are extremely sensitive to ethoprop. An apiarian who has kept nine hives going for years lost two entire hives in the summer of 2006.

**Response:** Please see response to Comment 137.

**139. Comment:** One Task Force member published an article called "Silent Summer" in Pesticides and You, Winter, 2006-7. The title is self-explanatory. The birds have come

back to the feeders this summer, to her relief – but she still has serious concerns about the renal health of her teenaged son.

**Response:** Regarding birds, please see response to Comment 137. We agree that pesticides are acutely toxic, but we also stand firm in our belief that the community was not exposed to ethoprop. Please also see Comments 79 and 80.

**140. Comment:** This should be a vital clue, to be taken seriously: pets and people made ill over the same geographical area {unless the reports of the people are dismissed as untrue, in which why bother to have the survey in the first place?}

**Response:** Please see response to Comment 137.

**141. Comment:** Again, DOH sees no evidence because they refuse to listen. The wild animals that did not die massively evacuated. Thus, our “silent summer”. There were no frogs, insects or perching birds in the area at all for the entire summer. Dr. Speaker’s information from the Pet Smart veterinarians will corroborate animal issues.

**Response:** Please see response to Comment 137.

*The following comment is related to the fifth paragraph under the Exposure Survey of Animal Illness section on page 11.*

**142. Comment:** That is, eight animals are known to have died. The data of Dr. Larry T. Glickman, an academic veterinarian at Purdue University, shows elevations in respiratory symptoms and eye irritations in dogs at the five animal clinics within 20 miles of PSC. Some families who had sick animals were never contacted. There was no wildlife monitoring.

**Response:** Please see response to Comment 137.

*The following comment is related to the last paragraph under the Exposure Survey of Animal Illness section on page 11.*

**143. Comment:** As noted in a number of sources, diversity of symptomology is the name of the game for OP (organophosphorus) poisoning.

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

*The following comment is related to the first paragraph under the Residential Facility Survey section on page 11.*

**144. Comment:** Most of who are very aged and rarely go outdoors. The facilities also include a hospice for the dying.

**Response:** Christian City was surveyed because the residents may represent a sensitive population.

*Comments 145-153 are related to the first paragraph under the Environmental Sampling Data section that begins on page 11.*

**145. Comment:** 0.05 ppm as a detection limit for propyl mercaptan? With the current variety of techniques and instrumentation, this is unacceptably high. Better equipment is certainly available, by contract with the right company if there's no other way.

**Response:** Adverse health effects from propyl mercaptan exposure begin around 50 ppm. A detection limit 1000 times lower than concentrations known to produce adverse health effects is a sufficient detection limit.

**146. Comment:** What is the lower limit for human detection of propyl mercaptan? Needs documentation.

**Response:** According to the U.S. Coast Guard Chemical Hazards Response Information System (CHRIS), propyl mercaptan has an odor threshold of 0.00075 ppm. This is the equivalent of 75 parts per billion, which is why the odor is so easily detectable by the human nose. To put a part per billion in perspective, it compares to 1 second in 32 years.

**147. Comment:** The plant was most likely NOT processing on July 4th therefore this was not a good day to take samples of air in the community. Any given 10 hours after processing stopped may certainly result in a no detect as the prevailing winds, humidity, and temperature could have degraded the product to the point there was no detect. There was NO test for organophosphates done.

**Response:** AMVAC wastewater from the June 29, 2006 off-loading was placed in a holding tank, not a processing tank, and was subsequently pumped back into the tanker truck that brought the wastewater to PSC. As we know, some wastewater leaked into an adjacent holding tank, but again, the adjacent holding tank was not a processing tank.

**148. Comment:** It was admitted that only two off site locations reported slight odor the day of the testing. This in and of itself suggest that a day when there was no major odor complaint was not a good representation of the problem. Testing should have been done during the times of processing and not during a holiday.

**Response:** AMVAC wastewater from the June 29, 2006 off-loading was not processed. Because propyl mercaptan is insoluble in water, and is lighter than water; it will float on water. Moreover, propyl mercaptan has a high vapor pressure which readily evaporates in such a holding tank environment. The lingering odor that the community was exposed to was especially persistent because propyl mercaptan is heavier than air so it has a tendency to hug the ground. The intensity and dispersion of the odor is also dependent on atmospheric conditions on any given day.

**149. Comment:** Were these timed samples or grab samples?

**Response:** One minute grab samples.



**150. Comment:** Why were these tests not done while the plant was actively receiving the product and immediately after the reports started in May about the odor?

**Response:** This question would be better addressed to PSC, and/or the agencies receiving the odor complaints. Response action was taken on July 3, 2006.

**151. Comment:** The exposure path could have been via air for varied short term low dose exposure periods on a continual basis as emissions were taking place. Testing air during a non emission period would result in a no detect. Further there are NO studies about low level continual exposure.

**Response:** The purpose of the air sampling was not to conduct a study, but to determine if on and off-site exposure to propyl mercaptan was occurring at levels that could cause adverse health effects.

**152. Comment:** The plant would have had less odor and less chemical as the vats were high above the plant with open tops and fans blowing odorizing agents into the air above the vats. The prevailing winds and fog patterns would carry the emission away from the plant.

**Response:** This may be the case; however, propyl mercaptan has a higher vapor density than air, and its vapors would eventually reach ground level.

**153. Comment:** Exposure at ground zero is at times less that in surrounding areas. Was this considered?

**Response:** Air sampling was conducted on-site at the facility and off-site in the community.

*Comments 154-158 are related to the second paragraph under the Environmental Sampling Data section on page 12.*

**154. Comment:** What were the histories and chains of custody of these samples? This “analytical result” must be remarked upon. It seems odd that this sludge had the same concentration of ethoprop as the washwaters on arrival – at least as given by the Waste Profile Sheets accompanying the highway tankers by law. Why is the ethoprop concentration in this sludge identical with the ethoprop concentration of washwaters from seven weeks earlier? The half-life of ethoprop in neutral water is 14 months, the half-life in soil ranges from 3 – 56 days, depending on soil type. This requires input from some experts on OP chemistry.

**Response:** Sampling, transportation of samples, and chain-of-custody were conducted in accordance with standard environmental sampling procedures.

You bring up the point that the ethoprop concentration found in a tank bottom at PSC is very similar to the concentration of ethoprop stated on the Waste Profile sheet. It is also similar to the concentration of ethoprop found in the aqueous layer of the railcar tanker.

We also know that the wastewater remained in the holding tanks. The similarity in ethoprop concentrations is further evidence that this wastewater was not processed and more importantly, that the ethoprop did not vaporize and expose the community.

**155. Comment:** The analytical methods chosen for VOC's (volatile organics) and pesticides were those designed to detect and quantify total VOC and total pesticide. In other words, individual VOC's or pesticides might be in the mixture but interfere with each others' signals, so that a material actually there could give a non-detect reading. As designated in an EPA Report by Kit Farwell (contractor O'Shaugnessy of Dynatech), the best method for ethoprop is EPA 8141A.

**Response:** The analyses run on the samples included the entire spectrum of EPA methods used for making a hazardous waste determination which includes VOC's, semi-volatile organic compounds, metals, pesticides, and PCB's. EPA method 8181A was used to analyze for pesticides; however, ethoprop was not detected using this method, but rather, was detected using EPA method 8270C used for semi-volatile compounds.

**156. Comment:** It is surprising that there are no sulfur or phosphorus analyses, which would have provided a relatively cheap and easy index to the combined mercaptan (contains S, but no P) and ethoprop (contains both P in the organophosphorus core and S in the two sulfide chains). On-site analyses for these at PSC and EPD could have been a useful monitor for following cleanup operations.

**Response:** Hazardous waste determination panels do not include specific analytical methods for sulfur or phosphorous containing compound specifically. The important point is that the analytical methods used did specifically identify ethoprop in tank bottom sludge of one of the holding tanks used at PSC.

**157. Comment:** Testing of ground water at this late date was a waste of time unless a continuing emission was suspected.

**Response:** Groundwater was not tested.

**158. Comment:** The LD50 for ethoprop/mocap is lower than this concentration of 150mg/kg, so the sludge in the tank was a hazardous product. How was it determined that this was sludge buildup and not actual residual product? Given the half life what might the original compound levels have been? This all points to a possible more concentrated compound than the MSDS reported was being supplied.

**Response:** To determine what meets EPA's definition of what is and what is not a hazardous waste; please refer to 40 Code of Federal Regulations Parts 260-262. Alternately, you may contact the GEPD Hazardous Waste Management Branch at 404-656-7802.

*Comments 159-165 are related to the third paragraph under the Environmental Sampling Data section on page 12.*

**159. Comment:** How could have anyone have determined that this was the same wastewater? There is no mention of chain-of-custody tracking and recording for either layer. Also, once the well-traveled aqueous solution had been dumped into the oily solution of very different composition and concentrations that had spent the summer in the railcar, describing the history of the railcar contents became a matter of pure imagination.

**Response:** The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration tracked and conducted the railcar investigation. Representatives of the USEPA conducted sampling of the railcars in accordance with standard sampling procedures.

**160. Comment:** This is simply an impossibility. According to all the paperwork from every agency and PSC source, the deliveries of May through June were aqueous solutions, with no noticeable organic or oily content like that in the railcar.

**Response:** The wastewater was obviously mixed with other waste contained in the railcars.

**161. Comment:** Analyzed to what purpose? – There is no dependable chain of custody, all sorts of opportunities for contamination, there was uncontrolled storage. It is impossible to say what the results might mean, except that a monstrous amount of OP pesticide of largely unknown history had been sitting on a siding in Axis, AL for the entire summer. Also, we could say that this was an extraordinarily dangerous situation for a very large area surrounding the railcar. Should there have been a breach . . . . .  
QUESTION FOR EPA ET AL: WHERE IS THAT RAILCAR? WHERE IS THE ETHOPROP IT CONTAINED?

**Response:** Please see response to Comment 159.

**162. Comment:** The analytical results are certainly consistent with the statements of the Materials Safety and Data Sheet for Mocap Washwater and with the Waste Profile Sheet accompanying the shipment. Despite all its complicated and prolonged travels, the ethoprop in the washwater had hardly decayed.

**Response:** This statement alludes to another point mentioned in Comment 154; that is, that ethoprop remained in aqueous dilution and did not vaporize.

**163. Comment:** In fact, there is no reason for the composition of wastewater from PSC and the composition of the oily layer in the railcar to bear any relationship to each other except that determined by the distribution coefficient of ethoprop between the two solvents (water that had traveled to Alabama and back, and the mixed organic solvents in the railcar). This would be the same whatever their respective histories.

**Response:** This comment does not seem to solicit a response.

**164. Comment:** There is NO chain of custody. There is no record showing the detailed analysis data that often accompanies such an events testing. Please refer to the serious testing specifications and data going back to the 1998 Siskyou County California studies. There are many EPA studies of Ambient Air over the years that indicate that a more serious approach should have been taken as standard protocol.

**Response:** Please see response to Comment 159.

**165. Comment:** This test proves nothing about what was actually delivered to the PSC site. If anything it proves that there could have been anything in the shipments that were to have been controlled within the realm of the MSDS for the “wash water”. No one knows what we really were exposed to. There is NO scientific proof but there are hundreds of citizens with complaints.

**Response:** The Waste Profile sheets and GEPD’s sampling data provide information on what actually delivered to PSC.

*The following comment is related to the fourth paragraph under the Environmental Sampling Data section on page 12.*

**166. Comment:** Why sample the dirt, after all this time? Twenty samples within a two-mile radius, 12.56 square miles, months after the event? How could any results be interpreted?

**Response:** Soil sampling was initiated by the Fulton County Health and Wellness Department based on citizen requests.

*Comments 166-169 are related to the Pathway Analysis section on page 12.*

**167. Comment:** I can’t tell that this paragraph says anything .

**Response:** This comment does not seem to solicit a response.

**168. Comment:** The sheer fact that so many were sick within the area, the long time the odor was around, and the fact that there was such a large number of people up in arms and the fact that there was MOCAP in high levels found show that there was a potential for exposure.

**Response:** The MOCAP concentration in the waste water received by PSC was approximately 0.015%. The prolonged odor, as we have established, was from propyl mercaptan. We do not believe, nor do we have evidence, that anyone was exposed to ethoprop.

**169. Comment:** The simple fact that the product was put through an abnormal aeration and heating could be responsible for a previously unknown exposure path. Was this considered? How can you conclude that there was no exposure given the lack of any studies on exposure of low levels and under these abnormal treating means?

**Response:** Wastewater from the June 29, 2006 off-loading was not processed. It was neither aerated, nor heated. In fact, the holding tank contents were pumped back into the tanker truck which carried the wastewater. The residual and what was leaked into an adjacent holding tank was responsible for the on-going propyl mercaptan odor that the community witnessed.

*Comments 170-171 are related to the first paragraph under the Completed Exposure Pathway section on page 13.*

**170. Comment:** These statements unabashedly contradict each other! Ethoprop is absolutely present in the headspace above the liquid. That's why its odor (identical with mercaptan) can be smelled. How did they rule out exposure to contaminated water, especially since that's the form in which the material arrived, and exposure to contaminated soil, which can occur so readily in a flood plain setting like that of PSC? Exposure to contaminants at PSC could most certainly have occurred by a number of pathways in addition to inhalation, but these have been summarily dismissed without any reason being given. For ethoprop, dermal absorption poses a heightened threat, the reason why EPA places special regulations on it as a "material of concern". There are other routes as well. See the discussion of ethoprop distribution in Section B (independent Analysis, to come).

**Response:** Please see response to Comments 79 and 80. Moreover, headspace only applies to closed systems, not open tanks such as the holding tanks at PSC. Exposure to contaminated soil could not have occurred because the tanker truck contents were never spilled, nor could have dermal exposure occurred because no one that we know of was immersed in the holding tanks containing wastewater.

**171. Comment:** Dermal exposure as well as inhalation exposure were probably experienced by the public, given the burning skin and eyes reported by many. There was no timely study done of the possibilities for any method of exposure. Test and statistical analysis of the air and the PSC treatment method aerating, heating, and blowing through an open vessel could have produced an aerosolized product that was even more hazardous. There has been no simulation of the treatment method and its product to determine the possibilities, so it cannot be stated that there was NO exposure path other than inhaling. The humidity and so forth would have to be plotted to see if product could have formed on the skins of community members during early stages of treatment.

**Response:** We have already stated that inhalation exposure to propyl mercaptan did occur.

*Comments 172-181 are related to the second paragraph under the Completed Exposure Pathway section on page 13.*

**172. Comment:** This is ridiculous. It is also wrong! Ethoprop is not granite, it is a liquid of ordinary temperature and pressure. Statements like this illuminate the dangers of doing "armchair science" unless one is firmly based on the literature, i.e., other laboratories' experimentation. I don't know the definition of "rapidly" here, but with a half-life of 5.6 hours and a fairly large sample to start with, a lot of damage can be done in a few days!

The low vapor pressure tells us that molecules from the surface of an ethoprop reservoir will steadily, if slowly, break their liquid-to-liquid bonds and move into the surrounding environment. This process will continue until (1) no ethoprop is left in the reservoir or (2) the surrounding air becomes saturated with ethoprop, i.e. cannot hold any more.

**Response:** Please see response to Comment 79 and also Comment 162.

**173. Comment:** What's the difference between indoor air and outdoor air? If it's photolysis, that should be part of the discussion, since photolysis requires light, in other words, sunshine is an essential ingredient. How can ethoprop break down in air if it doesn't get into the air at all, as this report has repeated over and over?

**Response:** Please see response to Comment 79 and also Comment 162. The half-life and vapor pressure were given as known characteristics of ethoprop.

**174. Comment:** A half-life ( $t_{1/2}$ ) of 5.6 hours is not all that rapid – If an enclosed volume of air contains 100 g ethoprop at noon, it will still contain a significant amount - 50 g - at 5:30 p.m. and considerably more than 25 g at 11:00 p.m., (since the sun has gone down and is not causing further reaction). Residue of the original 100g will be around for days.

**Response:** Yes, we agree with this comment.

**175. Comment:** And, unfortunately, the products of breakdown, whether by the metabolic or the strictly chemical route, are not all benign, as seems to be indicated in this Health Consultation. Metabolic breakdown results in four daughters, three of which are not well studied, but are probably as poisonous as the mother (because they still contain the O=P bond (See Farwell, EPA Report, 1999). Chemical breakdown with strong reagents must be designed and carefully controlled to decontaminate ethoprop. Otherwise, it continues to threaten our health with the acetylcholinergic entity (O=P) that characterizes ethoprop and Sarin and the rest of their evil family. How much of this non-decontaminated stuff has been spewed into our community by a variety of routes? See Section B (the Task Force's independent Analysis Summary document of this incident, to be sent separately).

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**176. Comment:** Nothing prevents both ethoprop and propyl mercaptan from being in the air simultaneously, although the concentrations will differ. In fact, they almost certainly are both there, since the mercaptan is part of the ethoprop molecule and probably in a state of dynamic equilibrium with it.

**Response:** Please see response to Comment 79 and also Comment 162.

**177. Comment:** Here are excerpts from Spectrum Laboratories Chemical Fact Sheet, [www.speclab.com/compound/c1319448.htm](http://www.speclab.com/compound/c1319448.htm): “Ethoprop’s use as a non-systemic nematocide releases the compound directly to the environment through applications in sprays, granules and other routes of application. . . Screening studies have indicated that biodegradation is the major degradation process in soil . . . Aqueous hydrolysis . . . is not important at pH 7 or less . . . ethoprop is moderately to highly mobile in soil. Its high mobility in sandy soil has a potential for contaminating ground water in areas with high water tables. Volatilization from soil (from the upper 10 cm) may contribute to ethoprop’s disappearance from soil. . . Based upon a reported vapor pressure of  $3.8 \times 10^{-4}$  mm Hg at 20 – 25 deg C [NOT at standard temperature and pressure, i.e., 0 deg C and 760 mm Hg as reported in the Health Consultation], ethoprop can exist in both the vapor and particulate phases in the ambient atmosphere, although the vapor phase will be dominant . . . Particulate phase ethoprop and aerosols released to air . . . will be removed from air physically by dry and wet deposition”. Clearly, volatilization is a complex phenomenon that depends upon the interactions of many factors, not just vapor pressure.

**Response:** We agree with the above statements. Keep in mind that these statements apply to the commercial application of ethoprop, which in the case of MOCAP, is applied to land in granular form containing 15% ethoprop. These statements, for the most part, do not apply to wastewater containing 0.015% ethoprop, except for the statement “aqueous hydrolysis is not important at pH 7 or less”. Please also see responses to Comments 79 and 80.

**178. Comment:** Douglas A. Haith, as one example, says that “The most useful tools for predicting chemical and physical behaviors in the environment are ‘fate and transport models.’ These are mathematical equations of chemical transformations and transport that are converted into computer programs which can be run for any chemical or site of interest. The software user typically provides input data, including weather records, chemical properties and site characteristics [temperature, solar radiation, wind movement], and the program calculates disposition of the chemical. Fate and transport models are routinely used in assessment of air pollution from combustion emissions and water pollution from municipal and industrial wastes, as well as for chemicals applied to agricultural crops.” Why was such modeling not carried out for this incident, where the fate and transport of both propyl mercaptan and ethoprop were vital elements in determining the health and welfare of the population?

**Response:** We agree that fate and transport models are routinely used in assessment of air pollution from combustion emissions and water pollution from municipal and industrial wastes, as well as for chemicals applied to agricultural crops. Agency response units determined that propyl mercaptan was responsible for the odor being generated at the facility from the degradation of ethoprop containing wastewater placed in a holding tank June 29, 2006. At that time, propyl mercaptan was determined to possess similar toxicological effects as methyl mercaptan (commonly used in natural gas), with health effects beginning at 50 ppm. ATSDR recommended an action level of 0.5 ppm and appropriate air sampling equipment was selected to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility. Because

the action level was not exceeded, responsible agencies determined that, although the odor was irritating and offensive, evacuation of the population surrounding the PSC facility was unnecessary.

**179. Comment:** To determine the health impact of inhaled pesticide vapors, Haith has devised a parameter called ‘the “Hazard Quotient” or HQ, the estimated inhaled dose for a 70 kg (154 lb) adult divided by the ‘chronic reference dose’ (Rfd) for the chemical. The Rfd is the level of a chemical in the body which is likely to cause chronic health problems. Pesticide concentrations which produce an HQ greater than one are potentially unsafe or hazardous. By this measure, the HQ for ethoprop was 70.2, with the nearest contender, isazofos, coming in with a poor second, 5.2! Refer to “Modeling Pesticide Volatilization from Turf” by Douglas A. Haith in “Turfgrass and Environmental Research Online”, September, 2002.

**Response:** The RfD, or reference dose, is a USEPA estimate, with uncertainty factors built in, of the daily lifetime dose of a substance that is **unlikely to cause harm** in a human. It is not the level of a chemical in the body that is likely to cause chronic health problems.

We do not know how Douglas A. Haith (Haith) could have arrived at the Hazard Quotient he stated because a published USEPA RfD for ethoprop does not exist! We can ascertain an estimated health guideline by utilizing a known short term inhalation Oral NOAEL of 0.025 mg/kg/day obtained from a study on dogs [14]. This NOAEL can be divided by an uncertainty factor of 100x, based on the uncertainty factor of 10x for interspecies extrapolation and the 10x for intraspecies variability, leaving us with a protective health guideline of 0.00025 mg/kg/day. Using Haith’s Figure 2 in the publication described above, we extrapolate the concentration of ethoprop to be approximately 3 ug/m<sup>3</sup> based on its vapor pressure when ethoprop is applied to turf in its fully concentrated commercial application form.

An exposure dose can be assessed from this information, knowing that the average 70 kg adult male breathes in approximately 15.2 m<sup>3</sup> of air per day. The exposure dose from based on Haith’s information is 0.000065 mg/kg/day. Taking this exposure dose and dividing it by our established health guideline above, the Hazard Quotient is 0.026; much lower than 1. Taking an even more conservative approach, we can also include another 10x uncertainty factor for extrapolating to human species, leaving us with an uncertainty (or safety factor) of 1000. Using this more conservative health guideline (0.000025 mg/kg/day), the Hazard Quotient becomes 2.6; not 70.2 as suggested by the publication mentioned.

Aside from the obvious misinterpreting of a Hazard Quotient mentioned in this article, its application has no bearing on the wastewater containing ethoprop at PSC. The wastewater was not applied to turf in its fully concentrated commercial form, and had an approximate 0.015% ethoprop concentration, not a 15% concentration that is used in commercial applications.



**180. Comment:** Another way of looking at the ethoprop threat: On the “2005 CERCLA Priority List of Hazardous Substances, ethoprop is number 239. For reference, arsenic has first place, trichlorobenzene is number 203, and hydrogen fluoride is number 250.

**Response:** Thank you for this information. Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**181. Comment:** Given the abnormal aeration of the so-called “wastewater” in the digestion tanks, how can one say that ethoprop could not have gotten into the air? Employees are recorded as saying that fans with odorizing agents were placed on top of the open vats, blowing up into the air. The lids on the vats had long since rotted, allowing vapor to escape as the material was heated and aerated. This type of processing of the chemical has not been studied or simulated.

**Response:** Wastewater from the June 29, 2006 off-loading was not processed. It was neither aerated, nor heated. The holding tank contents were pumped back into the tanker truck which carried the wastewater the same day the contents were off-loaded. The residual and what was leaked into an adjacent holding tank was responsible for the on-going propyl mercaptan odor that the community witnessed; however, the wastewater in the adjacent tank was not processed either, but transferred into a tanker truck on July 13, 2006, and returned to the generator of that wastewater.

*The following comment is related to the third paragraph under the Completed Exposure Pathway section on page 13.*

**182. Comment:** There appears to be considerable confusion among the concepts of (1) concentration of an organic material of low boiling point in a liquid; (2) rates of evaporation and the factors controlling them; (3) concentration of an organic material in air; (4) odor threshold; (5) hazard potential. It’s interesting that propyl mercaptan is said here to “evaporate quickly” and said above that it “disperses slowly”. Another oxymoron. See Section B (independent Analysis Summary document, to come).

**Response:** The wording seems confusing, yet it is a matter of semantics. ‘Evaporates quickly’ and ‘disperses slowly’ are used in different context. ‘Evaporates quickly’ describes the water insolubility and vapor pressure properties of propyl mercaptan that relate to its tendency to escape the open holding tanks into the environment. ‘Disperses slowly’ describes the tendency propyl mercaptan to hug the ground and dissipate slowly because its vapor density is approximately 2.5 times that of air. This tendency is the reason the Fairburn community could smell “wild onions’ for such a long period of time despite the source being removed.

*Comments 183-184 are related to the last paragraph under the Completed Exposure Pathway section on page 13.*

**183. Comment:** Everything in the environmental data analyses, epidemiological assessment and scientific data on the chemicals indicates that BOTH PROPYL MERCAPTAN AND ETHOPROP were released into the air by PSC over A PERIOD

MUCH LONGER THAN 60 DAYS during the spring and summer of 2006 and almost certainly caused the symptoms reported by the community, as well as the present and future illnesses connected with those symptoms.

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur, but exposure to propyl mercaptan did occur. Please see responses to Comments 79 and 80.

**184. Comment:** “Most likely” is the language of speculation, not of science.

**Response:** However, it is a term used in public health risk assessments because of the variability in health effects described and/or measured in human beings or animals because of individual uniqueness that encompasses all living species.

*Comments 185-187 are related to the first paragraph under the Evaluation Process section on page 13.*

**185. Comment:** There is no justification for selecting air transport as the only environmental medium through which the ethoprop poison and propyl mercaptan stink were distributed from PSC. Ethoprop can be distributed as a vapor, in water, in a host of organic solvents (remember the railcar “oily layer”), as particles, as aerosols, probably in other modes as well. We cannot rule out any of these in the absence of experimental data!

**Response:** In the case of the PSC wastewater shipment that occurred on June 29, 2006, only inhalation meets all five elements of a completed exposure pathway: a source of contamination, transport through an environmental medium, a point of exposure, a route of human exposure, and a receptor population as stated on page 12 of this health consultation.

**186. Comment:** What do CVs represent, if not toxicity cutoffs?

**Response:** As stated on page 13 of the health consultation: comparison values (CVs) are concentrations of a contaminant that can reasonably (and conservatively) be regarded as harmless, assuming default conditions of exposure. The CVs generally include ample safety factors to ensure protection of sensitive populations. Because CVs do not represent thresholds of toxicity, exposure to contaminant concentrations above CVs will not necessarily lead to adverse health effects.

**187. Comment:** Given the failure to collect air samples in a timely manner, failure to establish a chain of custody, failure to take into considerations critical factors like wind, humidity, etc., these air tests are not up to the standard set by EPA ambient air monitoring at other locations.

**Response:** Air samples were collected in a timely manner. Based on the expertise and experience of a number of agencies involved in the emergency response effort that took place on July 3-4, 2006, appropriate air sampling equipment was selected to and proper

procedures followed to determine if the action level set for propyl mercaptan was exceeded at the PSC facility and outside the PSC facility. EPA and ATSDR determined that an ambient air-sampling program was not necessary because levels of propyl mercaptan were many times lower than levels known to cause adverse health effects.

*The following comment is related to the second paragraph under the Evaluation Process section on page 14.*

**188. Comment:** There's confusion here between REL's and CV's. Why must the acute exposure be indoors? Why must the 15-minute period of acute exposure be in an 8-hour workday? If "this exposure information is essential to determine if a public health hazard exists," why are intermediate and chronic exposure CVs not available from ATSDR itself, if not from other agencies. Eleven months since the initial disaster should have given plenty of time to set up, run and analyze the required experiments.

**Response:** As stated in the health consultation, GDPH used the only published comparison value (CV) found for propyl mercaptan--the National Institute for Occupational Safety and Health's recommended exposure limit (REL). ATSDR and USEPA as federal agencies are not equipped to set up, run and analyze the required experiments on every new chemical that the agency encounters. An elaborate ranking system is established for determining which (of the many thousands of chemicals produced in industry) chemicals are going to be targeted for the development of CVs, MRLs, RfDs, and other risk-based values used in making regulatory and public health decisions. The establishment of these values includes an exhausting review of virtually all research that has been published on each of these chemicals and their effects in biologic systems, and the process may take years to complete for each chemical that ATSDR and EPA evaluate.

*The following comment is related to the third paragraph under the Evaluation Process section on page 14.*

**189. Comment:** This is odd? Why substitute methyl for propyl? Why not set the action level on the basis of experimental work with the propyl mercaptan itself? Has it been demonstrated empirically that methyl mercaptan and propyl mercaptan are toxicologically similar? And what about the ethoprop?

**Response:** Since methyl mercaptan is commonly used as an olfactory additive in natural gas, extensive research has been done specifically on methyl mercaptan. Health effects from exposure methyl mercaptan well documented. Such is not the case with propyl mercaptan. Being that propyl mercaptan is closely related to methyl mercaptan [propyl mercaptan contains two additional methyl groups], similar toxicological effects can be surmised. Please also see response to Comment 188.

*Comments 190-192 are related to the fourth paragraph under the Evaluation Process section on page 14.*

**190. Comment:** How do we know that propyl mercaptan disperses more slowly than other chemicals and what difference does it make in this context?

**Response:** Please see response to Comment 80.

**191. Comment:** Of course it was foggy. PSC was continually aerosolizing material from enormous vats with large surface areas. By definition, a fog is a type of aerosol, so PSC was creating fog conditions all of the time, since their operation is 24/7.

**Response:** Area-wide conditions were foggy on July 3, 2006. We were just reporting conditions on that day.

**192. Comment:** One of the worst-hit homes, in terms of the severity of the illness that appears to be associated with the emissions, is in fact significantly higher than the plant.

**Response:** Topography will influence dispersion more than weather conditions, except during strong winds.

*The following comment is related to the fifth paragraph under the Evaluation Process section on page 14.*

**193. Comment:** Oh no, we can't! It appears that the authors are using the word 'empirical' when they really mean 'estimated'. Empirical conclusions derive directly from experimental data, and experiments are lacking here, for both the propyl mercaptan and the ethoprop. Experiments are needed to develop the essential information, and the sampling population needs to be reviewed and modified. Was an "indoor community" like Christian City sufficiently representative to include in the study? Why were employees of local businesses like US Foods, BP, etc. not included? They all were complaining of symptoms. We agree that empirical data is the best data, but only if it is collected and analyzed by the best methodologies.

**Response:** Again, this is a matter of semantics. Empirical conclusions can also rely on observations alone often without regard for experimentation.

*The following comment is related to the sixth paragraph under the Evaluation Process section on page 14.*

**194. Comment:** WHY? Because Department of Health never dispatched a physician or a nurse to the area to examine the people. This should have been done as soon as symptoms were reported. It was stated to the Task Force by one of the DOH representatives at our winter agency update meeting that the DOH simply does not have the resources to do this type of work.... I ask, what does one physician and one nurse with a stethoscope, a blood pressure cuff and a laptop computer cost? Even for one of the days that people were complaining. A trained doctor and nurse team could have assessed conditions and need at the time and advised on the need for treatment in the area.

**Response:** The Georgia Division of Public Health and local health departments policy includes recommendations that people seek medical care if they were ill. This is a much more effective and efficient way for public health to gather information about health effects. No emergency room visits were reported, and local physicians did not report an excess number of new cases of symptoms, besides those expected from exposure to a foul odor.

*Comments 195-205 are related to the seventh paragraph under the Evaluation Process section on page 14.*

**195. Comment:** “Likely due” is the language of speculation, not of science. It’s okay to speculate, as long as the speculations are not presented as empirically demonstrated facts. The odor of ethoprop cannot be differentiated from the odor of propyl mercaptan, because the odor branch in the molecular structure of both is exactly the same. The Task Force is familiar with the published summary of the California exposure emphasizing the odor instead of the deadly anticholinergic properties of the ethoprop. This is the same denial mechanism we see in operation here – it worked in California, might as well try it in Georgia as well!

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur, but exposure to propyl mercaptan did occur. Please also refer to our response to Comment 79.

**196. Comment:** “Plausible” is also the language of speculation, not of science.

**Response:** “Plausible” is not used in the paragraph referenced by this comment.

**197. Comment:** It is very difficult to deny that the cumulative effects of mercaptan and ethoprop exposure experienced by the community correspond well to the cumulative symptoms described by the Material Safety and Data Sheets for mercaptan and ethoprop.

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur.

**198. Comment:** Can ethoprop exposure be definitively linked to these symptoms? Particularly in organophosphate poisoning, patients may present with a wide, but nevertheless legitimate, diversity of symptoms. Such symptom diversity is one factor that helps experienced physicians cinch the diagnosis of OP poisoning.

**Response:**

It is not possible to make a definitive link between ethoprop exposure and the reported symptoms. At the time of the propyl mercaptan release, ethoprop was also present at the PSC plant. However, based on the fact that ethoprop does not readily vaporize (go from liquid to vapor form), we do not believe that community residents were exposed to ethoprop.

**199. Comment:** DPH set its cutoff date for the health survey at September 1, 2006. There are several serious problems with this.

**Response:** The Georgia DPH released a report on October 24, 2006, “Survey of Adverse Health Events, Fairburn, Georgia, and Neighboring Areas, 2006.” To organize and

summarize the information in the report, it was necessary to set a closing date for receiving survey forms that were included in it.

**200. Comment:** Although many people who lived out of the immediate “stink” range were made ill by (unknowing) exposure to the emissions, they did not associate their illnesses with the plant emissions and therefore did not report them;

**Response:** We can only assess exposure effects from those reported and cannot speculate as to how many people may have had symptoms that they did not report. However, we are aware that the survey respondents represent many others who had symptoms from exposure to the propyl mercaptan odor.

**201. Comment:** Illnesses were counted only if they were reported before September 1, even though new cases have continued to develop after September 1, 2006. From the viewpoint of the “survey”, there are no such cases.

**Response:** The October 24 report from DPH summarized information from survey forms received through September 1. Persons who have concerns about symptoms or illnesses are encouraged to consult their health care providers.

**202. Comment:** DPH has made no effort to identify these new cases or to offer remedies to the sufferers.

**Response:** Please see response to Comment 200.

**203. Comment:** Some diseases and disorders associated with OP poisoning, like delayed polyneuropathy, are characterized by long induction periods during which the progress of the disease is relentless, if subtle. “White matter” damage to the connective tissue in the brains of thousands of Gulf War I veterans was recently proved beyond doubt, as was their doubled rate of ALS. These men had been poisoned by the nerve gas Sarin, an organophosphate relative of ethoprop.

**Response:** Please see response to Comment 200. Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur.

**204. Comment:** The symptoms are exactly the same as listed in MSDS sheets for organophosphates and some are the same as for mercaptans. So how can one conclude that there is NO link? Did any logical analysis of the survey data vs. the MSDS data support this conclusion? You seem to be making sweeping conclusions in the absence of proper testing.

**Response:** Survey respondents reported noting a foul odor and/or symptoms consistent with irritation of eyes, mucous membranes, and the upper respiratory tract. These symptoms are consistent with exposure to propyl mercaptan. Survey respondents also reported a broad range of other symptoms. It is difficult to state with certainty which of these were or were not caused by exposure to propyl mercaptan. Symptoms with onset

following the release at the PSC plant that were similar to those documented in the 1989 community exposure in California, such as headache, burning eyes, etc., were likely due to propyl mercaptan exposure. It is also plausible that exposure to a noxious chemical irritant such as propyl mercaptan could have provoked or contributed to other acute adverse health events related to irritants, e.g., asthma attacks or migraine headaches, in persons with predisposing underlying conditions. Propyl mercaptan exposure cannot be definitively linked to some of the other reported symptoms and conditions.

**205. Comment:** Was there not every possibility of low-dose exposure on multiple occasions? How did you scientifically prove that there was no possibility of such an incident, since there was NO reliable data or testing?

**Response:** Please see response to Comment 204.

*Comments 206-208 are related to the eighth paragraph under the Evaluation Process section on page 15.*

**206. Comment:** As above, patients may present with a wide, but nevertheless legitimate, diversity of symptoms. Such symptom diversity is one factor that helps to cinch the diagnosis of OP poisoning. I deeply regret having told one person not long ago that he might as well go ahead and bury the refrigerated corpse of his dog. He had been saving it in the hope that the agencies would be interested in autopsying and analyzing. We were unable to identify any place to do this until after the dog had already been disposed of. Now that we know about the work at Purdue University, we would certainly have asked them if they would have found it useful.

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur.

**207. Comment:** The illness could have been caused by the propyl mercaptan, but not by the organophosphorus compound that included the mercaptan?

**Response:** At the time of the propyl mercaptan release, ethoprop was also present at the PSC plant. However, based on the fact that ethoprop does not readily vaporize (go from liquid to vapor form), we do not believe that community residents were exposed to ethoprop.

**208. Comment:** On what evidence was this “household poisoning” diagnosis made?

**Response:** The veterinarian who cared for the pet attributed the illness to chemical poisoning from possible exposure to rat poison or antifreeze.

*The following comment is related to the last paragraph under the Evaluation Process section on page 15.*

**209. Comment:** The elderly may have been exposed and may have developed symptoms in response. However, their ongoing symptoms probably overrode the new ones, so that there would have been no alert. I, for example, had muscle twitching that my physician first attributed to a potassium deficiency caused by a new drug. Testing showed that

potassium levels were fine, but the twitching still recurs occasionally. At that time, we did not know about and of course did not consider the possibility of OP exposure, of which twitching muscles are an undeniable symptom. My wife and son and another resident of the area have exactly the same problem. A person who was already sick and on medication would be inclined to dismiss such symptoms as part of their existing illness. Also, considering the lack of information about the repeated ethoprop emissions, they and their physicians probably never have considered the possibility that these symptoms were the direct result of OP exposure.

**Response:** At the time of the propyl mercaptan release, ethoprop was also present at the PSC plant. However, based on the fact that ethoprop does not readily vaporize (go from liquid to vapor form), we do not believe that community residents were exposed to ethoprop.

*The following comment is related to the second paragraph under the Child Health Considerations section on page 15.*

**210. Comment:** What is the evidence for this hopeful statement? We all desperately hope that it's true. Again, hope, not science!

Where is the documentation for any studies proving that low-level repeated exposure to propyl mercaptan results in NO long-lasting ill effects? On the basis of the intra-office e-mails from ATSDR, it appears that virtually all of the cutoffs declared in this document were decided by discussion and negotiation, rather than by scientific experimentation.

**Response:** Studies of low-level repeated exposure to propyl mercaptan do not exist.

*The following comment is related to the first sentence in the Conclusions section on page 16.*

**211. Comment:** There's no record of the category assigned, where is it, what is it?

**Response:** Public Health Hazard Categories are located in Appendix C.

*Comments 212-215 are related to Conclusion one on page 16.*

**212. Comment:** Here is another challenge to our naïveté, déjà vu all over again. There was a release of propyl mercaptan, all by itself, and the mercaptan alone caused all the illnesses in the community, which are defined as trivial, and no one was made ill by the nerve agent ethoprop because it obediently, one might say magically, stayed right where it was supposed to in water solution, even during powerful venting, multiple transfers to different containers, heating, stirring, and whatever else the "treatment" involved. The authors should add to this sentence: **AND, EVEN MORE IMPORTANTLY, THE SIMULTANEOUS RELEASE OF THE NEMATICIDE/INSECTICIDE/CHOLINESTERASE INHIBITOR ETHOPROP.** Why was either of these materials ever "released" What sort of containment precautions did they escape? Which agency is responsible for regulating and enforcing these precautions?

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur. Please see responses to Comments 79, 80 and 181.



**213. Comment:** We can't know that these "adverse health effects" (which have never been specified, what were they?) are "temporary" until they have been tracked for an appropriate time – certainly longer than a few months!

**Response:** Propyl mercaptan exposure at levels likely to occur outside an occupational setting is not known to cause long-term adverse health effects.

**214. Comment:** Do these two sentences actually say that "we expect the symptoms to cease, and because we expect them to cease and we're not going to track them to be sure that they do cease, we hereby declare that the site poses no apparent health hazard? Is this REALLY what is being said?

**Response:** No, they mean exactly what was stated.

**215. Comment:** The ambient air sampling to determine actual exposure while product was being aerated, heated, transferred, etc. was done on a holiday (July 4th). How can one determine scientifically that there were not other time periods when concentrations were above acceptable levels? Humidity, air temperature, wind speed all affect testing by grab samples, and even testing by timed samples if the timed pull was during a non-operating period. This conclusion is not data-based, and lacks the detailed analysis normally required to come to such a conclusion.

**Response:** The agencies that responded the first week of July 2006 did what they felt was necessary based on their professional judgment and many years of combined experience in handling chemical incidences.

*The following comment is related to Conclusion two on page 16.*

**216. Comment:** The same odor from the same source as ethoprop.

**Response:** Propyl mercaptan is a water-insoluble degradation product of ethoprop.

*Comments 217-218 are related to Conclusion four on page 16.*

**217. Comment:** Nonsense. It does vaporize into the air. This is supposed to be science, not religion.

**Response:** Please see response to Comment 79.

**218. Comment:** There is no reason to suspect that ethoprop did not get into the air by straight evaporation, and by other means as well. (This is discussed above, in detail and with references). The attempts to "digest" or "cook" the "wastewater" would concentrate the ethoprop in the remaining liquid, but would also aerosolize ethoprop, water and air. This would be the most likely method of delivery from the open vats to the victims. There have been no studies on aerosolization of ethoprop, although it is a common method of drug delivery and a method frequently used to "weaponize" chemical warfare agents so that they have maximum effect on their victims.

**Response:** Please see responses to Comment 79 and 181.

*Comments 219-222 are related to Conclusion five on page 16.*

**219. Comment:** The mercaptan... but there is no information on the toxicity of three of the ethoprop metabolites.

**Response:** This is a moot point considering the evidence which suggests ethoprop was not likely to escape the confines of the holding tank as described in response to Comment 79.

**220. Comment:** This statement requires documentation! According to Farwell, 1999, toxicity of these metabolites has not been studied, but perhaps this has changed and we missed the reference.

**Response:** Please see response to Comment 219.

**221. Comment:** How can it break down, if it can't get into the air? Outdoor air? Sarcasm aside, a  $t_{1/2}$  of 5.6 hours is not particularly rapid, not fast enough to mitigate the hazard. And since the breakdown products are mostly organophosphate poisons, they also pose a threat. This paragraph is misleading in a number of respects.

**Response:** Our point exactly! If ethoprop does not readily evaporate from its dilute aqueous solution, the  $\frac{1}{2}$  life of ethoprop in air is a moot point.

**222. Comment:** Repeated, day-after-day dosing has never been studied and was not seriously considered in this study. An aerosolized compound can cause a lot of damage within a 5.6 hr half-life. And remember, half of it is still left! Aerosolization is a common method of delivery in chemical and biological warfare attacks. There is NO proof that this was not how it was delivered in continual low or high doses to the community.

**Response:** Please see responses to Comments 79 and 219.

Aerosolization is an ingenious method of packaging, for instance, where an active product is pressurized in a given container and can be released by pressing on or tilting an actuator. We do not believe that the process aerosolization took place at PSC under the circumstances by which this wastewater was disposed of. In addition, the content of the holding tank was not processed in the aeration basin, which naturally agitates the contents of the aeration basin.

*The following comment is related to Conclusion six on page 16.*

**223. Comment:** In air? In water? ( $t_{1/2}$  = 14 months at pH = 7! In lye? In permanganate? What is going on chemically? Where are the products of reaction going? The odor certainly will be present. And so will the danger of the O=P poison! Moreover,

ethoprop and ethoprop breakdown products, including propyl mercaptan, will undoubtedly be dispersed by every possible route throughout the region.

**Response:** Please see responses to Comments 79, 169, 170, 177, and 181.

*The following comment is related to Conclusion eight on page 16.*

**224. Comment:** But it is likely that toluene vapor was a hazard to the workers around the tanker truck or containment tanks?

**Response:** Not at the concentrations likely to be in air. Toluene was detected in the wastewater at a concentration of 2.8 ppm. Assuming conservatively that at this concentration (2.8 mg/L) a liter of water is evaporated and that liter occupies a cubic meter of air. An adult man weighing 70 kg and breathing 15.2 liters of air per day would be exposed to approximated 0.0006 mg/kg per day of toluene. This exposure dose is approximately 200 times below USEPA inhalation RfD of 0.11 mg/kg per day. We also know that this wastewater was not evaporated, nor was it processed.

*The following comment is related to Conclusion nine on page 16.*

**225. Comment:** Meaning?

**Response:** Just that.

*Comments 226-238 are related to the last statement in the Conclusion section on page 17.*

**226. Comment:** This declaration is irresponsible beyond belief, for multiple reasons specified by the Task Force throughout this Health Consultation.

**Response:** USEPA and the GEPD can only apply federal and state regulations to owners/operators of permitted facilities. These regulations are meant to be protective of human health and the environment.

**227. Comment:** Given the following scenario, can the agencies state that they are certain there is no possible current or future threat from PSC:

**Response:** Please see response to Comment 226.

**228. Comment:** PSC sends a pump truck to a chemical plant and pumps its storage tank. The truck driver carries a statement of some sort (Waste Profile Sheet?) that says what is in the product being loaded.

**Response:** Please see response to Comment 226.

**229. Comment:** That product arrives at PSC. Per DNR last week---“Waste profiles are required for all waste received at PSC. The waste profile includes a description of the waste, certification by the generator that the waste does not contain mercaptan-bearing compounds, and a signed statement that the waste is not a hazardous waste. Each

industrial sludge has laboratory data supporting the waste profile. PSC has lab technicians that review waste manifests for each waste load and compare the manifest to the current waste profile prior to accepting the waste.” Who verifies the lab results of the actual product received? Is there any verification? We know that there was very possibly a problem with this same “honor system” for lab analysis during the 2006 event. How can the agencies or the community be sure there will not be another “few loads” that do not conform to the lab standards?

**Response:** It is the facilities responsibility to verify waste received. This verification is stipulated by PSC’s waste handling permit under the oversight of GEPA.

**230. Comment:** Who is to say that the storage tank was not added to after the original lab analysis? Is there a lab at PSC that can actually do a test that guarantees scientifically there is NO hazardous compound in the delivery?

**Response:** This Comment is outside the purview of GDEPH and would be better addressed to GEPA.

**231. Comment:** Let’s assume there is a hazardous compound that is odorless which will evaporate and be delivered by air to an area around the plant over a few hours after dumping. This compound was not found because it was added after the lab took the test at the generator and there is no test for it at PSC.

**Response:** Please see response to Comment 230.

**232. Comment:** The community here or near a land fill could be exposed to any number of similar chemical incidents in a single month. The occurrence described is very similar to what happened last year. There is NO positive proof that there is no hazardous product being absorbed in sawdust at the site.

**Response:** Please see response to Comment 230.

**233. Comment:** It is admitted that the only test of sawdust is the “paint filter test”.

**Response:** Again, please see response to Comment 230.

**234. Comment:** The only specific mentioned product that is to be certified as not being contained is mercaptan.

**Response:** Again, please see response to Comment 230.

**235. Comment:** The Task Force says, “Prove it scientifically or shut the plant.” It has come to light that the ethoprop PSC brought in is still in the community via the soil and water table. One of its by-products, n-propyl mercaptan, is constantly being created by the degradation of the ethoprop. Recent symptoms are proof. The plant needs to be

disassembled to the ground and removed entirely in order for this community to be safe again.

**Response:** On-site spillage of the tanker truck contents is not known to have occurred. Therefore, soil, surface water, and groundwater were not contaminated with ethoprop. Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006.

**236. Comment:** What about the 5-gallon pails and the 55-gallon drums -- are they labeled clearly and keyed to a specific certification of each container by an independent lab or is this the "honor system"?

**Response:** This Comment is outside the purview of GDPH and would be better addressed to GEPD.

**237. Comment:** There is NO scientific system to guarantee that there are NO hazardous products received.

**Response:** Please see response to Comment 236.

**238. Comment:** What about the co-mixing of several containers in the same pit -- are there guarantees that toxic substances are not formed?

**Response:** Again, please see response to Comment 236.

*Comments 239-242 are related to the Recommendation section on page 17.*

**239. Comment:** Absolutely breathtaking! Unbelievable! An entire community of American citizens, young and old, was subjected for months to repeated assaults by junior chemical weapons, and the premier agencies in charge of our health and welfare have no recommendations! At the very least, there should have been an apology for the failure to order evacuation right after the first blast, when there was a real opportunity to protect people!

**Response:** Again, we stand firm in our acknowledgement that community exposure to ethoprop did not occur from wastewater shipped to PSC in late June 2006. The wastewater was removed; the tanks that held the wastewater have been decontaminated and were scheduled to be dismantled and removed from the property in November 2007. However, prior to PSC initiating the dismantling, the attorney for the citizen Class Action Lawsuit filed a request for injunction against the removal. The reason for this request was to preserve the evidence in the tanks until the judge rules on the Lawsuit. Therefore, the tanks are still at PSC. There are no further recommendations for the protection of public health from the events that occurred in late June 2006.

**240. Comment:** This community will never be the same. Some residents feel that they have lost everything and their lives are ruined. The SF/FC Task Force protests this made-to-order report and this no-recommendations outcome in the strongest possible terms. Setting

PSC loose on the community again without real regulation, enforcement and transparency is an outrage to conscience and an insult to all those who have suffered. It is wrong, and there should be enforceable regulations that make it criminal.

**Response:** Please see responses to Comments 226 and 239.

**241. Comment:** To require carefully controlled testing of all products before dumping in the pit at PSC is the only way one can guarantee that the residents around the plant and around the landfills are not being exposed to hazardous, harmful substances. But a plant like this has no place in a residential community.

**Response:** Please see response to Comment 226.

**242. Comment:** Given the history of the 2006 event at PSC, one should consider the lack of a substantial chain of custody and of independent testing both on and off site. Lack of verification prior to “processing” constitutes extreme negligence on the part of all agencies and PSC. It is also essential to continually monitor the parade of treatment chemicals, the products that result from treatment and the methods (such as aerosolization) that may of themselves constitute a hazard to the community. There is no “safety net” at PSC!

**Response:** The operational parameters of PSC’s solid waste treatment permit are regulated by, and overseen by GEPD’s Solid Waste Management Program.