

Health Consultation

INDUSTRIAL PLASTICS SITE FIRE

LOCATED ON THE WRIGLEY CHARCOAL SUPERFUND SITE

LYLES, HICKMAN COUNTY, TENNESSEE

MAY 27, 2014

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This document was prepared by the Tennessee Department of Health's Environmental Epidemiology Program. This document has not been formally reviewed and cleared by ATSDR.

Foreword

This document summarizes an environmental public health investigation performed by the Environmental Epidemiology Program of the State of Tennessee Department of Health. Our work is conducted under a Cooperative Agreement with the federal Agency for Toxic Substances and Disease Registry. In order for the Health Department to answer an environmental public health question, several actions are performed:

Evaluate Exposure: Tennessee health assessors begin by reviewing available information about environmental conditions at a site. We interpret environmental data, review site reports, and talk with environmental officials. Usually, we do not collect our own environmental sampling data. We rely on information provided by the Tennessee Department of Environment and Conservation, U.S. Environmental Protection Agency, and other government agencies, businesses, or the general public. We work to understand how much contamination may be present, where it is located on a site, and how people might be exposed to it. We look for evidence that people may have been exposed to, are being exposed to, or in the future could be exposed to harmful substances.

Evaluate Health Effects: If people have the potential to be exposed to contamination, then health assessors take steps to determine if it could be harmful to human health. We base our health conclusions on exposure pathways, risk assessment, toxicology, cleanup actions, and the scientific literature.

Make Recommendations: Based on our conclusions, we will recommend that any potential health hazard posed by a site be reduced or eliminated. These actions will prevent possible harmful health effects. The role of the Environmental Epidemiology Program in dealing with hazardous waste sites is to be an advisor. Often, our recommendations will be action items for other agencies. However, if there is an urgent public health hazard, the Tennessee Department of Health can issue a public health advisory warning people of the danger, and will work with other agencies to resolve the problem.

If you have questions or comments about this report, we encourage you to contact us.

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Table of Contents

Forward.....	i
Table of Contents.....	ii
Introduction.....	1
Background.....	2
Site History.....	2
Historic Site Operations and Pre-Fire Conditions.....	3
Figure 1. Wrigley Charcoal Site details.....	3
Current Use.....	4
Findings of Previous Site Environmental Investigations.....	4
Emergency Response.....	5
Figure 2. Modified evacuation area for December 19 to December 20, 2013.....	6
Discussion.....	7
Introduction to Chemical Exposure.....	7
Environmental Sampling.....	8
Air Quality.....	8
Figure 3. Air data sampling stations.....	9
Air Monitoring Results Discussion and Health Value Comparisons.....	10
Table 1. Comparison values for outdoor air.....	11
Table 2. EPA particulate matter fact sheet.....	13
After the Fire.....	15
Child Health Considerations.....	15
Community Concerns.....	16
Conclusion.....	16
Recommendations.....	17
Public Health Action Plan.....	17
Preparer and Reviewers of Report.....	18
References.....	19
Glossary of Terms and Acronyms.....	20
Appendix A. Photographs taken during fire.....	23
Appendix B. Air quality measurements.....	29
Appendix C. EPA fact sheet provided to citizens.....	35
Certification.....	37

Introduction

The Industrial Plastics facility that accumulates and recycles various types of plastics caught fire on December 18, 2013. The facility is located on a U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) Superfund Site, known as the Wrigley Charcoal Superfund Site. Local fire and emergency personnel responded and attempted to extinguish the fire. The fire quickly exceeded the capacity of the local fire crews. Additional mutual aid resources were requested to assist with the fire. Approximately 5 acres of plastics and surrounding buildings were on fire. The site is surrounded by residential communities and directly adjacent to the North Fork of Mill Creek. Concerns of water runoff into an adjacent creek and the presence of large liquid propane cylinders caused the fire crews to stop fire extinguishing and move to a safe distance. A large, thick, black smoke plume extended for miles downwind. Numerous homes and businesses were vacated due to the smoke plume. State and local officials implemented a 1.5 mile evacuation zone around the fire in all directions. Approximately 500 people were impacted by the evacuation. Local schools were closed.

An EPA On-Scene Coordinator (OSC) was called to the fire. The EPA OSC was notified of the fire by EPA Remedial Program personnel who were conducting a site visit at the time the fire began. The EPA OSC met with the local and State emergency responders. It was determined that EPA emergency assistance was needed for responder and community air monitoring, and for fire extinguishment. EPA provided on-scene emergency coordination, community air monitoring, and fire extinguishment.

Along with EPA, staff from the Tennessee Department of Health's (TDH) Emergency Preparedness (EP) program responded along with members of the Tennessee Emergency Management Agency (TEMA), the Hickman County Emergency Management Agency (HEMA), the Tennessee Highway Patrol (THP), and the Hickman County Sheriff's Office. The Tennessee Department of Environment and Conservation (TDEC) provided staff from its Columbia, Tennessee Field Office and from the Division of Remediation's (DoR) Nashville Field Office as part of the response.

A TDH Environmental Epidemiology Program (EEP) staff member responded as part of the response on December 19, 2013. The staff member acted as the onsite agent of the health department, and the liaison between TDEC and TEMA. TDH staff reviewed all air monitoring data collected by EPA on December 19. TDH and TDEC staff worked jointly in assessing the neighborhoods in the evacuated area for soot and particulate accumulation on homes, mailboxes, air conditioning units, etc. TDH additionally provided information to Hickman County Public Schools regarding appropriate precautions for reopening schools near the fire.

Once the fire was extinguished, air quality returned to safe levels. This health consultation documents actions undertaken to protect the public as part of the emergency response to the fire.

Background

Site History

The Industrial Plastics Company is operated on a 5-acre portion of the Wrigley Charcoal Superfund Site located at 8526 Plant Road, in Lyles, Hickman County, Tennessee. The 35-acre main or Primary Site is located northwest of Highway 100, west of Wrigley, and about 45 miles southwest of Nashville, Tennessee. The Primary Site is 1 of 7 separate sites that together form the Superfund Site (Figure 1):

- the 35 acre Primary Site
- the 2.5 acre Storage Basin, located 1,400 feet southwest of the Primary Site,
- the 40 acre Irrigation Field, located 3,500 feet northeast of the Primary Site,
- the 3.5 acre Athletic Field, located 800 feet southeast of the Primary Site,
- the 10 acre Groomed Pile, located southwest of the Primary Site,
- the 215 acre Northern Rail Yard, located north of the Primary Site, and
- the 24 acre Clark Hollow, located 1,300 feet southwest of the Primary Site.

From 1880 to 1966, various industrial operations, including iron, charcoal, and wood distillation product manufacturing took place at the Primary Site. Products made at the site included: wood alcohol, pig iron, tar, coke, charcoal, acetic acid, wood oils and pitch (EPA 2011). In 1978, the Tennessee Farmer's Cooperative bought the Primary Site property and began leasing a portion to the Pinewood Manufacturing Company (known as R. T. Rivers) for metals machining, storage of waste products obtained from other local industries and recovery operations of copper from transformers.

From 1938 to 1950, operators stored slag and soil from the Primary Site in a large ravine at what is now the Athletic Field. The ravine was filled with waste slag and other by-products over the years. The ravine was covered and graded to create the Athletic Field. In September 2004, TDH EEP prepared a Health Consultation to confirm the Athletic Field is safe for use by the community. Operations also disposed of waste from the Primary Site in the North Fork of Mill Creek until the mid-1940s. At that time, operators constructed wastewater impoundments to deal with waste streams. The impoundments resulted in spills at the Storage Basin and Irrigation Field areas. The Health Consultation stated the Storage Basin surface soils have been remediated. The entire Wrigley Charcoal Plant site was placed on the NPL in 1989.

The Industrial Plastics recycling business has conducted metal and plastic recycling, storage of waste products, and other related activities on the southern portion of the Primary Site since 1995. The remaining portion of the Primary Site is not used.

Historic Operations and Pre-Fire Conditions

Blast furnace operations to produce pig iron from locally-derived ore were initiated by the Warner Iron Company in 1881. The furnaces were fueled with carbonized wood or charcoal produced in retort ovens at the site. Ore, composed of brown, hematite-rich soil, was fluxed with limestone rock. From 1881 to about 1917 or 1918, iron production was intermittent, and the property changed ownership several times.

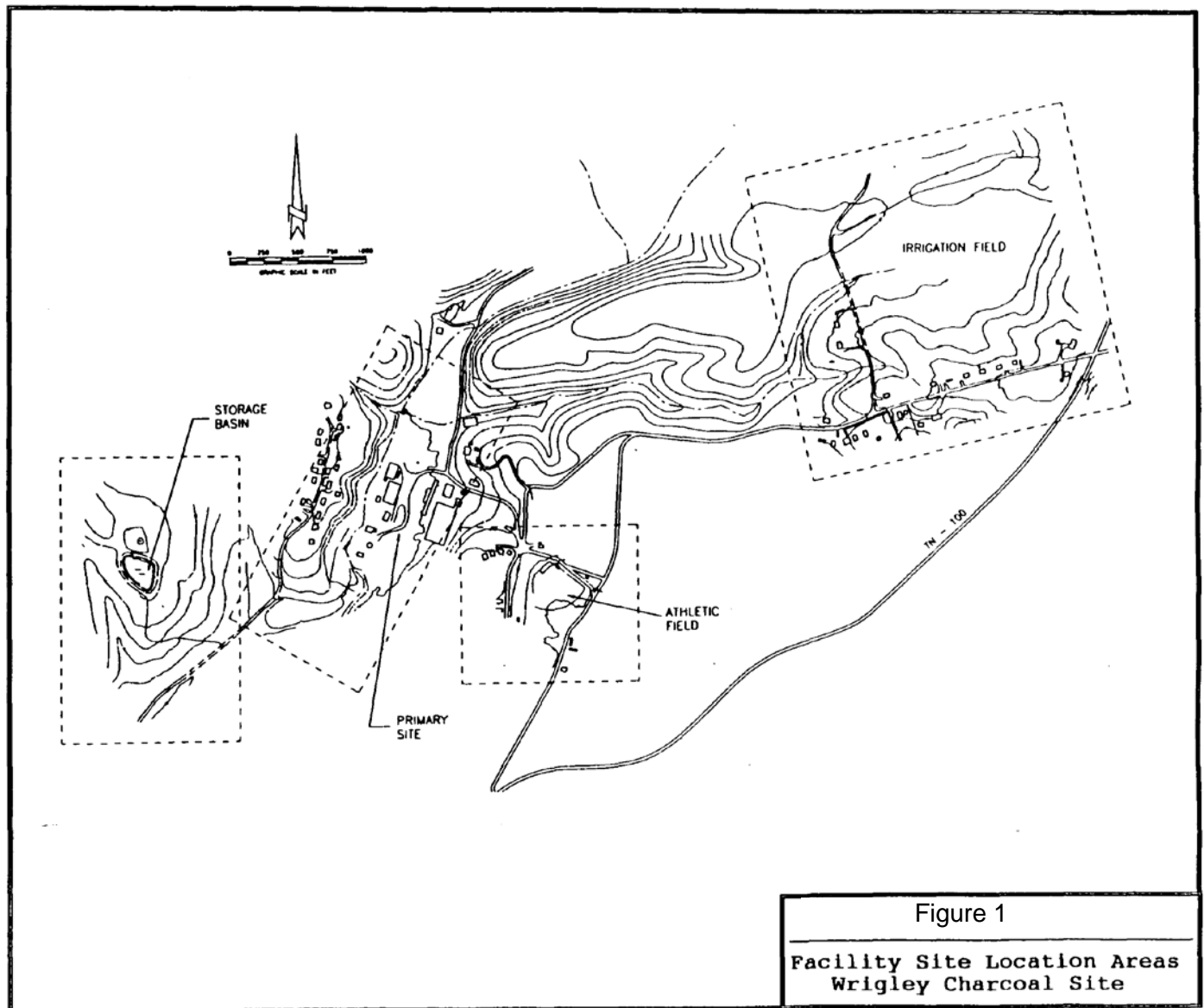


Figure 1. Wrigley Charcoal National Priority List (NPL) Site details. The Primary Site is noted as well as 3 of the other 6 management areas, the Storage Basin, the Athletic Field, and the Irrigation Field. Source: EPA 1991.

In 1917 or 1918, a new furnace was constructed at the site by the Bon Air Chemical Company, a subsidiary of Tennessee Products Company. The furnace operated in conjunction with a plant built by the U.S. Government during World War I to produce wood alcohol, acetic acid, and tar. These wood by-products were produced by heating oak and hickory in retort ovens and recovering the gases and liquids given off.

Tennessee Products Company took control of the operations in 1926 and produced pig iron, acetate of lime, charcoal, methanol (wood alcohol), wood oil, wood pitch, and other by-products. Iron production ceased in 1959. Wood distillation continued until 1966 with products including

charcoal briquettes, lump charcoal, acetic acid, methanol, wood tar, wood oils, and liquid smoke. The site was abandoned in 1966 and later purchased by the Tennessee Farmer's Cooperative.

Pinewood Manufacturing leased a portion of the site from 1978 to 1983, which was used for metal fabricating and machining.

As mentioned above, Industrial Products used a portion of the Primary Site since 1995. Piles of scrap metal, plastic, and other debris were scattered across the site. Mixtures of soil, slag, charcoal, and other historic processing wastes occur as piles and structural fill on the site. The North Fork of Mill Creek divides the Primary Site into northern and southern portions.

Current Use

The Industrial Plastics portion of the Primary Site consists of a large warehouse and a large processing building. Approximately 5 acres of outside, uncovered storage of processed and unprocessed acrylic, poly-carbonate, acrylonitrile-butadiene-styrene (ABS), polyethylene, polypropylene, styrene, polyvinyl chloride (PVC), and polyethylene terephthalate (PETG) plastics was onsite in totes and piles.

Industrial Plastics received at least one Notice of Violation (NOV) in October 1998 from TDEC's Division of Air Pollution Control for illegal burning at the site. In 1999, EPA sampled several soil areas where plastic material had apparently been burned by the company.

Uses of the other associated areas of the Wrigley Charcoal Site are varied. The Hickman County Parks and Recreation Department owns the Athletic Field. Observations during the fire response noted the field appeared to have been unused for some time. The Storage Basin and Irrigation Field have been regraded and vegetated. A soil removal was performed at the Storage Basin as part of an interim remedial action. These areas are not in use. Clark Hollow is now the location of a residential community. The Northern Rail Yard is unused. Land uses in the area include farms and residences. The residential areas surrounding the site seem typical for small, rural Tennessee towns.

Findings of Previous Site Environmental Investigations

According to the EPA Superfund (2014) information page for the site, the pig iron, charcoaling, and wood distillation operations contaminated site soil, surface water, and groundwater with volatile organic compounds (VOCs) that included acetone, benzene, toluene, ethylbenzene; semi-volatile organic compounds (SVOCs) that include polycyclic aromatic hydrocarbons (PAHs), phenol, 2,4-dimethylphenol, and naphthalene; and metals including arsenic, iron, manganese, copper, and zinc.

Because of the potential for a major release to the North Fork of Mill Creek and to allow stabilization of tar pits, the site was declared an imminent and substantial danger and placed on the NPL list in 1989.

In 1991 EPA issued an interim cleanup plan and Record of Decision (ROD). As part of the ROD, consolidated wastes from previous onsite cleanup activities were to be removed and access to the site was to be further restricted. From 1993 to 1995 EPA and TDEC undertook cleanup activities to address contamination at the Primary Site and in the Storage Basin area. More recent cleanup actions that were the result of a 2003 EPA ROD included the following:

- Digging up approximately 25,000 cubic yards of tar wastes and contaminated soil at the Primary Site and from a limited area between Oak Hill Road and the North Fork Mill Creek and disposing of the materials off site,
- Treating contaminated groundwater onsite using living organisms to break down contamination,
- Placing institutional controls on the site property to prohibit use of groundwater, and
- Connecting downgradient residences to the public water supply.

In 2007, EPA began additional monitoring in the deep aquifer beneath the Primary site. EPA also collected additional soil, waste, surface water, and groundwater samples in 2010. These investigations were all in an effort to identify any migration of the by-products from the manufacturing operations conducted at the site.

Emergency Response

EPA OSCs, Mr. Steve Spurlin and Mr. Kevin Eichinger, were deployed as well as EPA's Superfund Technical Assistance Response Team (START) and Emergency Response and Removal Services (ERRS) Contractors. As mentioned previously, local fire responders initially sprayed water on the fire to extinguish it. Water was initially used to keep multiple large (1,000 gallon) propane tanks from erupting and exploding. Due to initial concerns of fire being close to the propane tanks within one of the burning buildings, responders retreated to safer positions. Residents were evacuated within a 1.5 mile radius of the site. EPA contractors and the local Fire Departments later entered onto the site to determine a plan of action to extinguish the fire on December 18, 2013. During the entry, it was determined the fire did not pose a risk to the propane tanks.

With the information from the site entry, it was determined the best course of action to extinguish the fire would be to smother the fire with soil. Approximately 800 tons of clean soil from an off-site borrow source was used to extinguish the fire during the night of December 18 and day of December 19. The fire was approximately 90% contained on December 19, 2013. The remaining burning areas were extinguished during the overnight hours of December 19 to 20. Because of the success of extinguishing the fire on December 19, residents from a portion of the evacuated area were allowed to return to their homes (Figure 2). During the mid-morning of December 20, the remaining residents within the evacuation area were allowed to return to their homes.

Photographs of the site, the area as the fire was burning, and the aftermath of the fire, are shown in Appendix A. All photographs were taken by EPA personnel. More information about the Industrial Plastics fire and the emergency response to the fire can be found at this U.S. EPA website: www.epaosc.org/site/site_profile.aspx?site_id=8997

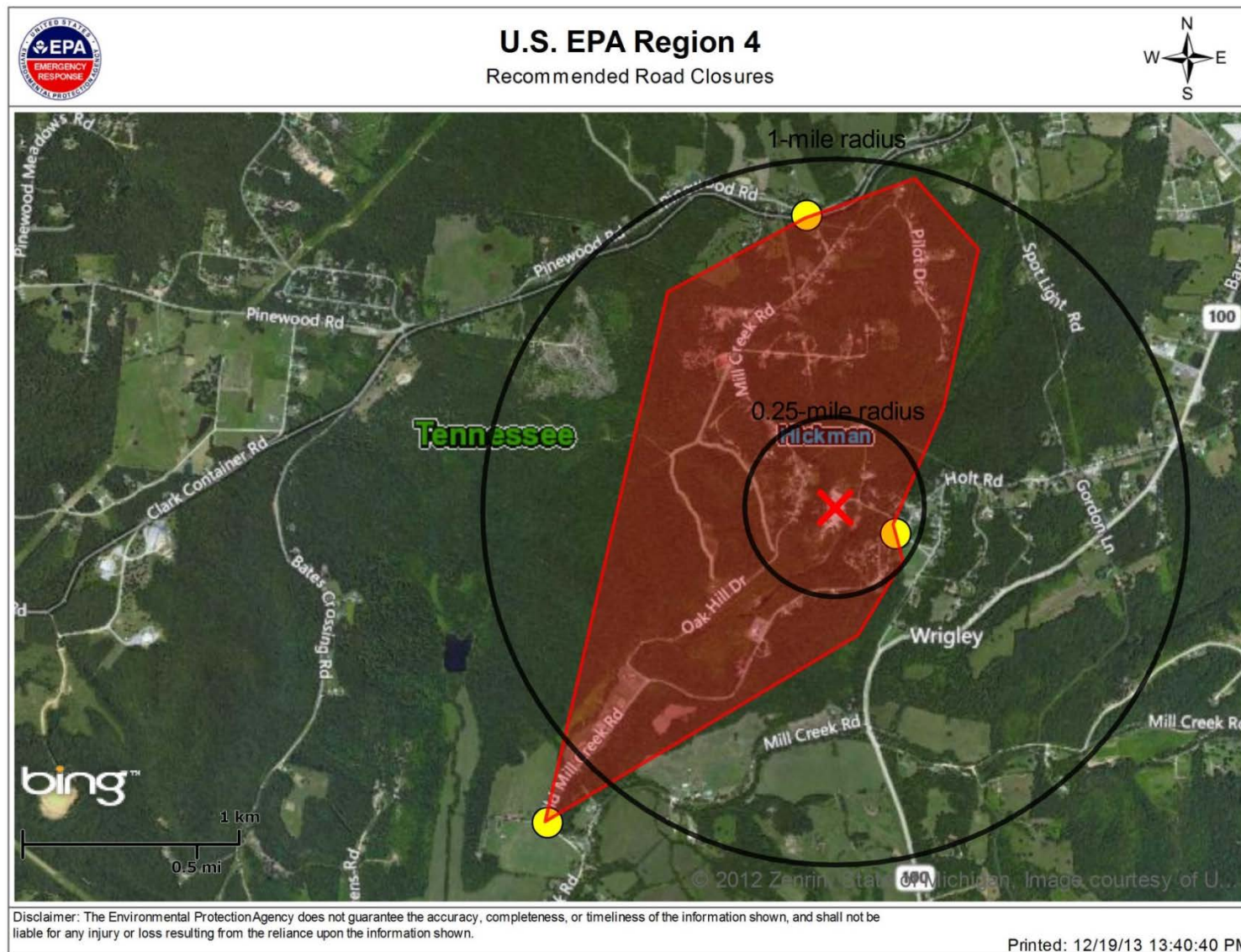


Figure 2. Map showing the modified evacuation area (in red) downgradient for the Industrial Plastics Site from the afternoon of December 19 to the morning of December 20, 2013. The original evacuation area on December 18 and most of the day December 19, 2013 included the entire area within and another 1/2 mile outside the dark circle. Source: EPA 2013.

Discussion

Introduction to Chemical Exposure

To determine whether persons have been or are likely to be exposed to chemicals, TDH EEP evaluates mechanisms that could lead to human exposure. Chemicals released into the environment have the potential to cause harmful health effects. Nevertheless, a release does not always result in exposure. People can only be exposed to a contaminant if they come into contact with it. If there is no contact with a contaminant, no exposure occurs. Therefore, no exposure-related health effects could occur. An exposure pathway contains five parts:

- a source of contamination,
- contaminant transport through an environmental medium,
- a point of exposure,
- a route of human exposure, and
- a receptor population.

An exposure pathway is considered complete if there is evidence that all five of these elements have been, are, or will be present at the site. An exposure pathway is considered incomplete if one of the five elements is missing.

The source is the place where the chemical was released or disposed. For this site, the source was the burning plastic on the site. Environmental media, such as, soil, surface water, groundwater, or air, transports contaminants. For this site, the chemicals were transported through the outdoor air. The point of exposure is the place where persons come into contact with the contaminated media. Outdoor air was the potential point of exposure which led to the evacuation. The route of exposure, for example, ingestion, inhalation, or dermal contact, is the way the contaminant enters the body. For the fire, the route of exposure would be inhalation, or breathing of outdoor air, and direct contact with the smoke and any particulate material from the fire.

Physical contact alone with a potentially harmful chemical in the environment by itself does not necessarily mean that a person will be harmed. A chemical's ability to affect health is controlled by a number of other factors, including:

- the amount of the chemical that a person is exposed to (dose),
- the length of time that a person is exposed to the chemical (duration),
- the number of times a person is exposed to the chemical (frequency),
- the person's age and health status, and
- the person's diet and nutritional habits.

During the fire response, the people who would be exposed were those close to the fire or those that breathed in smoke from the burning plastics. Their exposure would be acute, meaning an immediate exposure. After the fire began residents were evacuated within a 1.5 mile radius of the site by Sheriff's Department personnel going through the affected area knocking on doors. Nearby area schools were closed. No residents or local citizens were onsite during the fire.

Only EPA emergency response contractors were onsite during the fire. EPA contractors donned appropriate personal protective equipment during their fire extinguishing activities. There were very few residents that did not heed the evacuation order in the immediate downwind area from the fire. Those residents that did not evacuate sheltered in place. Therefore, most residents of the area downwind of the fire were not exposed or had limited exposure to the chemicals in the smoke.

Environmental Sampling

While the fire was burning at the site, EPA emergency response contractors tested outside air both onsite and off-site at 13 places (Figure 3). Testing was done from the evening of December 18 through December 20, 2013. Testing was continuous. One sampling station was onsite. One sampling station was approximately 0.8 miles downwind at an offsite fixed point location on Pilot Lane. Two automobiles roamed the downwind area and collected samples along both an outer loop and an inner loop at 11 other points (Figure 3). This mobile testing was conducted by equipping automobiles with sampling devices and driving throughout the 1.5 mile evacuation zone and downwind area from the fire. The monitoring points were established based on providing the best coverage for the downwind area affected by the smoke, accessibility, and the direction wind was blowing the smoke. Additionally, it was thought that the majority of the particulate matter and any fallout from the fire would most likely occur within the first mile.

Instruments used to monitor air quality included an AreaRae, which measured VOCs, carbon monoxide (CO), chlorine (Cl₂), oxygen (O₂), and lower explosive limit (LEL). A single point monitor (SPM) was used to measure phosgene and hydrochloric acid (HCl). A Data Ram which was used to measure particulate matter having an average diameter less than 10 microns in size (PM-10).

Air quality measurements began during the afternoon of Wednesday, December 18, 2013 at 10 pm after the fire began, and were taken continuously through 4:00 pm Friday, December 20, 2013.

Air Quality

EPA began air monitoring as soon as possible in the area. Some people may have wondered how the air was being monitored and why the evacuation was necessary. The chemicals and particulates that made up the smoke from the fire were found at levels that exceeded EPA Acute Exposure Guideline Levels (AEGLs). These are levels used to evaluate the amount of airborne levels of a chemical. AEGLs are explained further later in this section. TDH and TDEC were evaluating levels of chemicals in air along with EPA during the time air monitoring was being done. This section explains what health guideline values the air monitoring results were compared to. These values were used to protect the health of the residents who lived near the site.

To evaluate exposure to a hazardous substance, health assessors often use health comparison values. If the chemical concentrations are below the comparison value, then health assessors can be reasonably certain that no adverse health effects will occur in people who are exposed. If

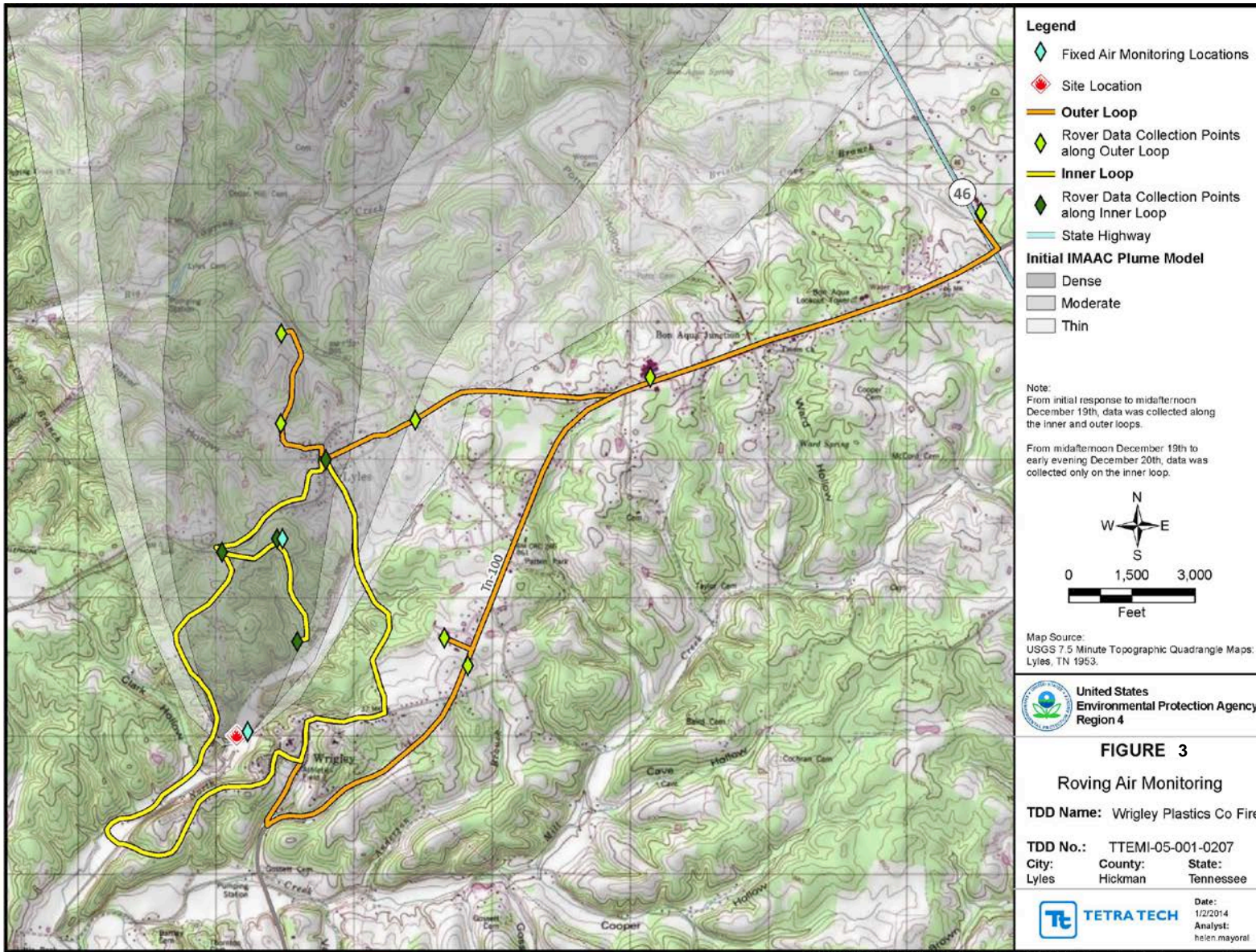


Figure 3. Fixed and roving air sampling stations where air data was collected during the Industrial Plastics fire. Source: EPA

concentrations are above the comparison values for a particular chemical, then further evaluation is needed. The chemicals evaluated in this health consultation were those tested for by EPA in the emergency response, and are shown in Table 1.

Outdoor air results collected onsite at the Industrial Plastics facility while the fire was burning were compared to National Institutes for Occupational Safety and Health (NIOSH) permissible exposure limits (PELs) and threshold limit values (TLVs). These values were used because they are the Occupational Safety and Health (OSHA) mandated screening values used in a work place setting as an EPA contractor was working in the immediate area of the fire to extinguish the flames and prevent other stockpiled plastic from burning.

Air monitoring results collected at the offsite fixed location and from the mobile air testing locations were compared to EPA Acute Exposure Guideline Levels-1 (AEGL-1) and AEGL-2. The AEGL-1 threshold exposure limit is the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m³) of a substance above which it is predicted the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon ending exposure. The AEGL-2 threshold exposure limit is the airborne concentration (expressed as ppm or mg/m³) of a substance above which it is predicted the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

Airborne concentrations below the AEGL-1 represent exposure levels that can produce mild and progressively increasing but transient and non-disabling odor, taste, and sensory irritation or certain asymptomatic (showing no physical signs of medical problem), non-sensory effects. With increasing airborne concentrations above each AEGL, there is a progressive increase in the potential occurrence and the severity of effects described for each corresponding AEGL. Although the AEGL values represent threshold levels for the general public, including susceptible subpopulations, such as infants, children, the elderly, persons with asthma, and those with other illnesses, it is recognized that individuals, subject to unique or an unusual or exaggerated reaction, could experience the effects described at concentrations below the corresponding AEGL.

Air Monitoring Results Discussion and Health Value Comparisons

Air monitoring conducted during the approximately 30 hours of the emergency response at all locations is summarized in Appendix B. All oxygen levels measured during each of the 3 days of air monitoring were within the necessary range between 19.5 and 23%. Lower explosive limit measurements were not detected. Therefore, none of the potentially released gases caused explosive conditions onsite or off-site. The remainder of the chemicals found and the health comparison values used to determine if breathing the outside air was hazardous or whether breathing the air would not harm the health of residents is discussed below.

Table 1. National Institutes of Occupational Safety and Health (NIOSH) and U.S. Environmental Protection Agency (EPA) air comparison values for chemicals found in the outdoor air at the Industrial Plastics Site Fire, 8526 Plant Road, Lyles, Hickman County, Tennessee. Outdoor air comparison values are shown. All comparison values shown are reported in parts per million (ppm) except those for particulate matter less than 10 microns in size, which are reported in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Chemical	Acronym	NIOSH Permissible Exposure Limits (PELs)/Threshold Limit Values (TLVs) for site workers	EPA Acute Exposure Guideline Levels (AEGL)-1 for residential areas	EPA Acute Exposure Guideline Levels (AEGL)-2 for residential areas
volatile organic compounds	VOCs	5	1	NE
carbon monoxide	CO	35	NR	27
chlorine	Cl ₂	0.5	0.5	0.71
phosgene	—	100	NR	0.04
hydrochloric acid	HCl	NE	1.8	11
particulate matter <10 microns	PM-10	5,000 ^a	See Table 2	

Note:

- a Particulate matter readings were measured in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
- EPA United States Environmental Protection Agency
- NIOSH National Institute of Occupational Safety and Health
- PEL Permissible exposure limits are limits that protect workers against the health effects of exposure to hazardous substances. They are set by the Occupational Safety and Health Administration. PELs are regulatory limits on the amount or concentration of a substance in the air. OSHA PELs are based on an 8-hour time weighted average (TWA) exposure.
- TLV The maximum level of a chemical believed a worker can be exposed day after day for a working lifetime without adverse health effects.
- AEGL-1 A threshold exposure limit for the general public for an emergency exposure period of 8 hours. The airborne concentration of a substance established by EPA above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
- AEGL-2 A threshold exposure limit for the general public for an emergency exposure period of 8 hours. The airborne concentration of a substance established by EPA above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- NE Not established
- NR Not recommended due to insufficient data.

December 18-19, 2013 – 10:00 PM to 4:00 AM

On December 18, 2013, the first day of the fire, air measurements onsite in the immediate area of the fire showed the presence of VOCs, CO, Cl₂, phosgene, and PM-10. Total VOC measurements exceeded its permissible exposure limit/threshold limit value (PEL/TLV) action level. Measured levels of PM-10 at the fire onsite ranged from 155 to 4,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) were in the “unhealthy” to above the “hazardous” Air Quality Index (AQI) range (Table 2) as defined by EPA (2014).

Measurements at the offsite fixed location about 0.8 miles downwind of the fire at 6701 Pilot Lane did not show detections of VOCs, CO, Cl₂. Measured PM-10 levels were within a range that was considered “unhealthy for sensitive groups” to “hazardous” by EPA (2014). The AQI time weighted average of 213.3 $\mu\text{g}/\text{m}^3$ was “very unhealthy.”

Downwind mobile air measurements conducted north of the site were started in the early morning hours of December 19, 2013.

December 19, 2013 – 4:00 AM to 6 AM

For the early morning hours of December 19, 2013, Cl₂, phosgene, hydrochloric acid (HCl), and PM-10 were measured in air samples collected onsite at the fire area. All measured levels of components were between 10 and 42 $\mu\text{g}/\text{m}^3$, with a 2-hour time weighted average of 26 $\mu\text{g}/\text{m}^3$. All of the PM-10 measurements were well below their specific PEL/TWA action levels. For the 2-hour time weighted average of 45 $\mu\text{g}/\text{m}^3$, the AQI was considered “good.”

Measurements downwind from the site at the offsite fixed location for the early morning of December 19, showed detections of CO, Cl₂, and PM-10. Both CO and Cl₂ levels were below their respective AEGL-1 or AEGL-2 action levels. PM-10 levels at the offsite fixed location ranged from 8 to 235 $\mu\text{g}/\text{m}^3$ “good” to “unhealthy” (Table 1) based on EPA air quality index (EPA 2014). The 2-hour period time weighted average AQI of 45 $\mu\text{g}/\text{m}^3$ was classified as being “moderate” overall (Table 2).

Downwind mobile PM-10 sample concentrations ranged from 5.8 to 97.3 $\mu\text{g}/\text{m}^3$ and were in the “good” to “moderate” AQI category (Table 2 - EPA 2013). There was not a period when a TWA reading was recorded.

December 19, 2013 – 6:00 AM to 1:00 PM

Concentrations of VOCs, Cl₂, phosgene, and PM-10 were noted in the facility air samples collected during this time frame. Cl₂ was the only chemical having measured levels above its PEL and/or TLV of 0.5 ppm. Measured levels of Cl₂ ranged from 0.3 to 0.7 ppm with an 8-hour time weighted average of 0.51 ppm. All PM-10 measurements were below its 5,000 $\mu\text{g}/\text{m}^3$ PEL/TLV.

Table 2. EPA particulate matter fact sheet for fires.



PARTICULATE MATTER FACT SHEET FOR FIRES

AQI Category (AQI Values)	PM _{2.5} or PM ₁₀ Levels (µg/m ³ , 1-to 3-hr avg.)	PM _{2.5} or PM ₁₀ Levels (µg/m ³ , 8-hr avg.)	PM _{2.5} or PM ₁₀ Levels (µg/m ³ , 24-hr avg.)	Visibility – Arid Conditions (miles)	Recommended Actions
Good (0 to 50)	0 – 38	0 - 22	0 - 15	≥ 10	Implement communication plan if smoke event forecast
Moderate (51 to 100)	39 - 88	23 - 50	16 – 35	6 – 9	-Issue press releases to advise public about health effects and symptoms and ways to reduce exposure -Distribute information about exposure avoidance
Unhealthy for Sensitive Groups (101 to 150)	89 – 138	51 – 79	36 – 65	3 – 5	-If smoke event projected to be prolonged, evaluate and notify possible sites for cleaner air shelters -If smoke event projected to be prolonged, prepare evacuation plans -Individuals who have asthma or another lung disease or heart disease should consider wearing a particulate respirator when outside.
Unhealthy (151 to 200)	139 - 351	80 – 200	66 – 150	1.5 – 2.5	-Consider “Smoke Day” for schools (i.e., no school that day), possibly based on school environment and travel considerations -Consider canceling public events, based on public health and travel considerations. -All individuals should consider wearing a particulate respirator when the AQI is 151 or higher when outside
Very Unhealthy (201 to 300)	352 – 526	201 – 300	151 – 250	1 – 1.25	-Consider closing some or all schools (However, newer schools with a central air cleaning filter may be more protective than older, leakier homes. See “Closures”, below) -Cancel outdoor events (e.g., concerts and competitive sports)
Hazardous (> 300)	> 526	>300	>250	≤3/4	-Close Schools -Cancel outdoor events (e.g., concerts and competitive sports) -Consider closing workplaces not essential to public health -If PM level projected to continue to remain high for a prolonged time, consider evacuation of sensitive populations

Notes:

- These 1- and 8-hr PM_{2.5} levels are estimated using the 24-hr breakpoints of the PM_{2.5} Air Quality Index included in the February 7, 2007 issue paper (http://www.epa.gov/airnow/aqi_issue_paper_020707.pdf) by dividing the 24-hr concentrations by the following ratios: 8-hr ratio is 0.7, 1-hr ratio is 0.4. Visibility is based on 1-hr values. If only PM₁₀ measurements are available during smoky conditions, it can be assumed that the PM₁₀ is composed primarily of fine particles (PM_{2.5}), and that therefore the AQI and associated cautionary statements and advisories for PM_{2.5} may be used. This assumption is reflected in the column headings.
- This table was adapted from Table 3, page 31 of *Wildfire Smoke: A Guide for Public Health Officials*, July 2008.
- Based on New Mexico Department of Health's "Recommended Actions During Smoke Events"

Air measurements downwind from the site at the offsite fixed location were all below their AEGL-1 or AEGL-2 action levels except PM-10. Measured levels of PM-10 were “unhealthy” according to EPA (Table 2).

Downwind mobile air measurements collected north of the facility had measured concentrations of VOCs, CO, Cl₂, and PM-10. PM-10 exceeded its action level. The PM-10 measurements ranged from 12 to 203.1 µg/m³, with a 7-hour time weighted average of 37 µg/m³. These levels were noted as “moderate” by EPA (Table 2).

For the community surrounding the facility, VOCs were detected during this timeframe in a range between 1 and 1.6 ppm. This detection was thought to be the result of “background sensor drift” of the instrument (see Appendix B), and was likely not a true measurement of chemicals in the outside air. Measured detections of CO, Cl₂, and HCl were all below their respective AEGL-1 or AEGL-2 action levels. PM-10 particulates were also measured. Levels measured ranged from 9.3 to 45 µg/m³. These levels were noted as “moderate” by EPA (Table 2).

December 19-20, 2013 – 1:00 PM to 6:30 AM

At the facility, VOCs, Cl₂, phosgene, and PM-10 were measured. Measured levels of all but Cl₂ were below their respective PEL/TLVs. Cl₂ levels ranged from 0.3 to 0.9 ppm and were above its 0.5 ppm PEL/TLV site worker action level.

Offsite chemical measurements at the offsite fixed location downwind from the site did not have any exceedances above AEGL-1 or -2 action levels for this time period. PM-10 level measurements were in the “good” AQI range (Table 2), from 7 to 18.4 µg/m³ with a period time weighted average of 10.6 µg/m³.

Downwind mobile monitoring north of the facility did not have any levels of chemicals measured above AEGL-1 or -2 action levels for this time period. PM-10 level measurements were in the “good” AQI (Table 2), from 12.9 to 104.8 µg/m³ with a period time weighted average of 19.2 µg/m³. Once the fire was extinguished, air quality returned to “good” (Table 2).

December 20, 2013 – 6:30 AM to 4:00 PM

At the facility, VOCs, CO, Cl₂, and PM-10 were measured. Measured levels of all chemicals except Cl₂ below their respective PEL/TLVs. Cl₂ levels ranged from 0 to 1 ppm and were above its 0.5 ppm PEL/TLV site worker action level. PM-10 measurements ranged from 17.5 to 1,936 µg/m³ with time weighted averages of 54.1 µg/m³ at the fixed onsite location and 74.5 µg/m³ using the mobile data collected on the facility. The PM-10 levels were below their permissible PEL/TLVs.

CO was the only chemical to have measured exceedances above its AEGL-1 or -2 action level at the offsite fixed location downwind from the site for this time period. PM-10 level measurements were in the “good” to “moderate” AQI range (Table 2), from 17.7 to 26.9 µg/m³ with a period time weighted average of 20.2 µg/m³, which was in the “good” AQI category.

Downwind mobile monitoring north of the facility did not have any levels of chemicals measured above AEGL-1 or -2 action levels for this time period. PM-10 level measurements were in the “moderate” to “hazardous” AQI (Table 2), from 21.3 to 767.6 $\mu\text{g}/\text{m}^3$ with a period time weighted average of 29.4 $\mu\text{g}/\text{m}^3$, which was in the “moderate” AQI category. Once the fire was extinguished, air quality returned to “good” (Table 2).

After the Fire

Most of the residents within a 1.5 mile radius of the fire were evacuated once the fire broke out. Any residents that did not get the evacuation word sheltered in place. In spite of the size of the fire, it was brought under control within 48 hours. Any exposures to the chemicals being released as the plastic stockpiles burned would have been acute or immediate.

Once air monitoring indicated PM-10 measurements returned to the “moderate” air quality index, and levels of individual air chemicals remained low, some residents within the 1.5 mile evacuation area were allowed to return home. These residents returned home during the afternoon on Thursday, December 19, 2013 (Figure 2). Residents in the immediate downwind area still were encouraged to not return to their homes because of the fire still burning and the elevated PM-10 measurements still being recorded. Officials anticipated that on December 19 when the fire was extinguished by EPA contractors, levels of air chemicals and PM-10 would be reduced so that all residents could return to their homes on December 20, 2013.

Air monitoring was conducted for 40 hours, from 10:00 pm on December 18 to 4:00 pm on December 20, 2013. All levels of chemicals detected returned to levels below all action levels on December 20. PM-10 particulate measurements returned to the “good” air quality category during the late night to early morning hours of December 19 to 20, 2013. Schools located outside of the area that remained evacuated reopened on December 20. EPA made a recommendation to County officials the morning of December 20, 2013 to lift the evacuation order based on the air monitoring results. County officials removed the evacuation order and allowed everyone to re-enter the downwind area after mid-morning, based on EPA’s recommendation.

Child Health Considerations

The many physical differences between children and adults demand special emphasis. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances (ATSDR 1997, 1998). Children have lower body weights than adults. Although children’s lungs are usually smaller than adults, children breathe a greater relative volume of air compared to adults. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage.

The site is not readily accessible to children as the site is situated in a valley area and is fenced. The area within 1.5 miles of the site fire was evacuated on December 18, 2013. Only a few residents remained in the downwind area. Local schools were also closed for 2 days, beginning

as soon as possible after the fire broke out. Schools reopened December 20, 2013. As the fire was extinguished during the evening of December 19, 2013, air quality readings quickly dropped back to “good” levels. Because of the 1.5 mile evacuation area and the closing of schools during the active fire, children were not likely to be exposed because they were not be in contact with or breathing the smoke from the site fire as it was burning.

Community Concerns

Members of the community surrounding the Industrial Plastics site had many concerns during the time they were evacuated. A fact sheet was prepared by EPA for the citizens living in the area of the fire and was mailed by EPA to every address that was evacuated during the emergency response. The fact sheet can be found in Appendix C. The citizens were concerned about looting and trespassing. The Hickman County Sheriff’s Department had checkpoints on roads leading into the evacuated community and patrolled the area to monitor potential looting and trespassing. The citizens were concerned about their livestock and pets they left behind. Local and State veterinaries were made available to answer any questions. Citizens had concerns about their indoor air quality since some soot had accumulated on personal items, air conditioners, and grass at homes within the evacuated area. TDH and EPA went to one home very close to the site and in the evacuated area the evening of December 19. EPA tested indoor air for chemicals and particulates. None were found above background levels. TDH and TDEC did identify a material that had been deposited on residential lawns along Pilot Drive north of the Industrial Plastics site as a result of the fire. The material was fibrous and concerns were expressed that it might have contained asbestos. However, the material was tested by an EPA contract laboratory and found not to contain asbestos. Members of the community had concerns about the safety of their children going back to school when the schools reopened. TDH and EPA conferred about ensuring the students safety and communicated our thoughts to the superintendent of schools.

Conclusions

As stated early on in this document, this health consultation was prepared to document actions taken to protect the public as part of the emergency response to the Industrial Plastics Site fire. TDH EEP was part of the coordinated emergency response effort. EEP, with other responding agencies addressed community concerns, conducted home visits to ensure residents it was safe to re-enter their homes, conferred with Hickman County School officials regarding procedures for reopening of schools, evaluated the amount of soot and other debris in downwind areas from the fire, and collected samples of debris that were found on resident’s lawns. EEP also received follow-up phone calls from residents after the fire who were concerned with their individual health or the health of members of their family.

Conclusion 1. *As part of the team of responding agencies, EEP agreed with the decisions made during the emergency response at the Industrial Plastics site. There was a public health hazard for breathing smoke, fumes, and particulates in air in the vicinity of the fire while it was burning. Therefore, the 1.5 mile radius area surrounding the site was an appropriate evacuation.*

Conclusion 2. *TDH EEP agreed with EPA that after the fire was extinguished on December 20, 2013, there was no apparent public health hazard for residents from breathing outdoor air at their residences. Residents were no longer exposed to chemicals detected during the site fire.*

Recommendations

TDH EEP recommends TDEC collect private residential water well samples in the vicinity of the site to assess if the any chemicals were mobilized to the soil and groundwater because of the fire.

EEP recommends TDEC collect surface soil samples from residential garden areas located near the Industrial Plastics site to understand if there were any chemicals transported through the air from the fire and deposited in residential gardens.

EEP recommends trespassers should be prevented from going onto the site.

Public Health Action Plan

The public health action plan for the Industrial Plastics Site follows below. It is a list of actions that have been or will be taken by TDH EEP and other agencies. The purpose of the public health action plan is to ensure that this health consultation identifies public health concerns and offers a plan of action that in this case is designed to mitigate and prevent harmful health effects that result from breathing hazardous substances in the environment. Included is a commitment on the part of EEP to follow up on this plan to ensure that it is implemented. Many of the actions within this public health action plan were taken during the time EEP staff was onsite.

Public health actions that have been taken by TDH's EEP include:

- Participated in the emergency response to the fire.
- Reviewed air data from the site fire.
- Conferred with EPA regarding air quality during the fire and extinguishing activities.
- Conferred with TDEC regarding air quality and groundwater quality.
- Assessed if there was any off-site fallout of materials related to the site fire by performing reconnaissance in the downwind area of the fire.
- Prepared this Health Consultation.

Public health actions that will be taken include:

- TDH EEP will provide copies of this health consultation to state and federal government agencies interested in the site and to interested residents in the vicinity of the site.

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Glossary of Terms and Acronyms

acute duration exposure: Contact with a substance that occurs once or for only a short time (up to 14 days)

adverse health effect: A change in body function or cell structure that might lead to disease or health problems

Acute Exposure Guideline Levels-1 (AEGL-1): the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

Acute Exposure Guideline Levels-2 (AEGL-2): the airborne concentration (expressed as ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

Air quality index (AQI): an index for reporting daily air quality. It explains how clean or unhealthy the air is, and what associated health effects might be a concern. The AQI focuses on health effects one may experience within a few hours or days after breathing unhealthy air.

ATSDR: Agency for Toxic Substances and Disease Registry.

cancer: Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

carcinogen: A substance that may cause cancer.

Comparison Value (CV): Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

concentration: The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

contaminant: A substance that is either present in an environment where it does not belong.

detection limit: The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

EEP: Environmental Epidemiology Program of the Tennessee Department of Health.

EPA: United States Environmental Protection Agency.

epidemiology: The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

exposure: Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

exposure pathway: The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: 1. a source of contamination (such as an abandoned business), 2. an environmental media and transport mechanism (such as movement through groundwater), 3. a point of exposure (such as a private well), 4. a route of exposure (eating, drinking, breathing, or touching), and 5. a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

groundwater: Water beneath the Earth's surface in the spaces between soil particles and between rock surfaces.

hazard: A source of potential harm from past, current, or future exposures.

health consultation: A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue.

migration: Chemical movement from one location to another.

PM-10: Atmospheric particulate matter – also known as particulates or particulate matter (PM) – are tiny pieces of solid or liquid matter associated with the Earth's atmosphere. In this, PM-10 refers to the amount of particles in air that are less than 10 microns in size. They are suspended in the atmosphere as a particulate/air mixture. Sources of particulate matter can be manmade or natural. They can adversely affect human health and also have impacts on climate and precipitation.

permissible exposure limits (PELs): limits that protect workers against the health effects of exposure to hazardous substances. They are set by the Occupational Safety and Health Administration. PELs are regulatory limits on the amount or concentration of a substance in the air. OSHA PELs are based on an 8-hour time weighted average (TWA) exposure.

plume: A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, there was a smoke plume from the burning plastic.

polycyclic aromatic hydrocarbons (PAHs): PAHs describe chemicals that are often found together in groups of two or more. PAHs are found naturally in the environment but they can also be man-made. PAHs are created when products like coal, oil, gas, and garbage are burned but the burning process is not complete.

ppb: parts per billion.

ppm: parts per million

Record of Decision (ROD): The Record of Decision (ROD) is a public document that explains which cleanup alternatives will be used to clean up a Superfund site.

remediation: Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a site.

route of exposure: The way people come into contact with a hazardous substance. Three routes of exposure are breathing (inhalation), eating or drinking (ingestion), or contact with the skin (dermal contact).

sample: A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population. An environmental sample, such as a small amount of soil or water, might be collected to measure contamination in the environment at a specific location.

Semi-Volatile Organic Compounds (SVOCs): semi-volatile organic compounds that has a boiling point higher than water and can vaporize when exposed to temperatures above room temperature. Semi-volatile organic compounds include naphthalene, phenols, and polycyclic aromatic hydrocarbons (PAH).

TDEC: Tennessee Department of Environment and Conservation

threshold limit value (TLV): The maximum level of a chemical believed a worker can be exposed day after day for a working lifetime without adverse health effects.

Toxicology: The study of the harmful effects of substances on humans or animals.

µg/m³: micrograms per cubic meter. Air results are usually measured in both µg/m³ and ppb.

Volatile Organic Compounds (VOCs): Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, dichloroethylene, toluene, trichloroethylene, methylene chloride, methyl chloroform, and vinyl chloride.

Appendix A: Photographs of the Fire – December 18 through December 20, 2013. Source of all photographs: EPA.

More photographs taken during and after the Industrial Plastics fire, information about the emergency response to the fire, air monitoring results, and information about the site itself can be found at this U.S. EPA website: www.epaosc.org/site/site_profile.aspx?site_id=8997



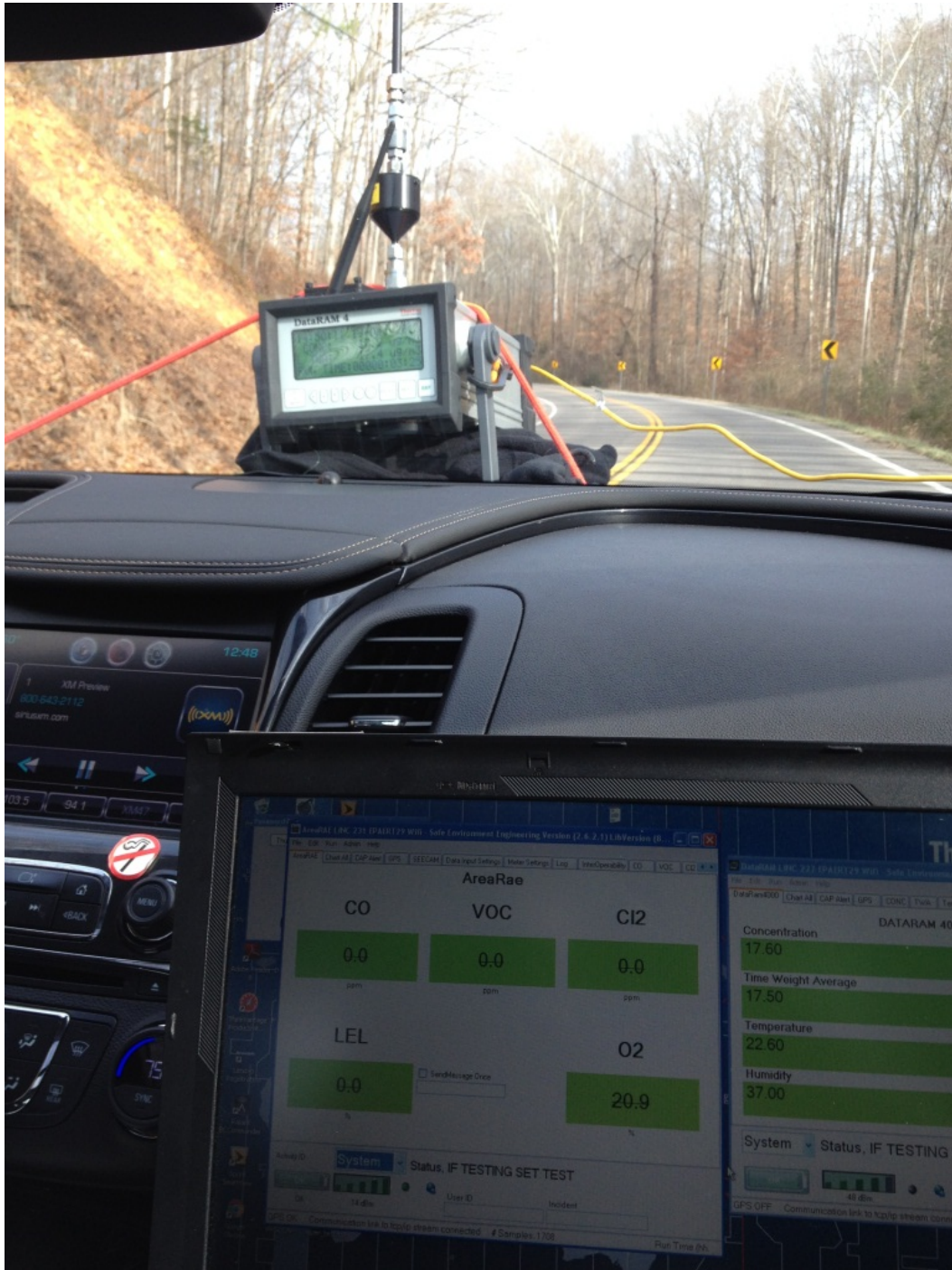
View looking toward the site on December 18, 2013 when the fire was growing. Wind is blowing the dense smoke from fire to the north. The athletic field is at left of EPA vehicle. Source: EPA.



View looking east of the fire during the day on December 19, 2013. Note remaining smoke stack from when site was operating as Wrigley Charcoal Plant. Source: EPA.



Air monitoring instrumentation near the fire that was used to measure air quality, such as volatile organic compounds, chlorine, hydrochloric acid, phosgene, and carbon monoxide, from December 18 through December 20, 2013. Source: EPA.



Air monitoring equipment attached to vehicle used to measure air quality in neighborhoods surrounding and north of the site. This equipment was the mobile air monitoring equipment used to monitor air in the inner and outer loop during the fire from December 19 through December 21, 2013. Source: EPA.



Onsite building burning on December 19, 2013. Note soil stockpiles to be placed on fire burning inside the building. Note the absence of structural integrity of the building. View is to the northeast. Source: EPA.



Note burned plastics and other debris on ground near building in figure above. Photograph was taken after the fire was nearly extinguished on December 19, 2013. View is to the south-southeast. Source: EPA.



View of burned plastic and debris along North Fork of Mill Creek on property on December 21, 2013 after the fire was smothered. View is toward the south-southwest. Source: EPA.



Silt fencing was installed on December 21, 2013 to keep the burned materials and soil used to extinguish the fire from entering North Fork of Mill Creek. This location is behind the main building. View is to the north-northeast. Source: EPA.

Appendix B: Air Monitoring Results – December 18 through December 20, 2013

The following tables show the actual measurements of chemicals and particulate matter in air less than 10 microns in size collected by EPA's contractor. Data was collected at the fixed location onsite, at the offsite fixed location on Pilot Lane, and from the 11 mobile data collection locations in the inner and outer loops. This data was the actual data used to determine if the air was safe to breathe, to allow schools to reopen, and to lift the evacuation order so that nearby residents could re-enter their homes.

Air Monitoring Summary Tables

The table below summarize monitoring data collected on using EPA's Viper wireless remote monitoring system.



Project Name: Industrial Plastic Co Fire

Date: 12/18 - 12/19/2013

Time: 10:00 PM - 4:00 AM

Facility				
Instrument	Analyte	PEL Exceedances	Concentration Range	Action Level (PEL/TVLs)
AreaRae	VOCs	No	1 - 4.8 ppm	5 ppm
	CO	Yes	20 - 202 ppm	35 ppm
	Cl ₂	No	0 - 0.1 ppm	0.5 ppm
	O ₂	No	20.90%	<19.5 or >23%
	LEL	No	0%	10%
SPM	Phosgene	No	23 - 43 ppb	100 ppb
Data Ram	PM-10	No	155 - 4000 ug/m ³	5000 ug/m ³

Water Tower (6701 Pilot Drive)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Area Rae	VOCs	No	0 ppm	0 ppm	1 ppm
	CO	No	0 ppm	0 ppm	27 ppm
	Cl ₂	No	0 ppm	0 ppm	0.5 ppm
	O ₂	No	20.9%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	No	100 - 680 ug/m ³	213.3 ug/m ³	See fact Sheet

Downwind Mobile (North of the Facility)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Data Ram	PM-10	TBD	TBD	TBD	See fact Sheet

Notes:

- < Less than
- PM-10 Particulate matter with an average diameter less than 10 microns
- ppm Parts per million
- ug/m³ micrograms per cubic meter
- VOC Volatile organic compounds

Air Monitoring Summary Tables

The table below summarize monitoring data collected on using EPA's Viper wireless remote monitoring system.



Project Name: Industrial Plastic Co Fire

Date: December 19, 2013

Time: 4:00 AM - 6:00 AM

Facility					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (PEL/TLV)
Area Rae	VOCs	No	0 ppm	0 ppm	5 ppm
	CO	No	0 ppm	0 ppm	35 ppm
	Cl2	No	0 - 0.7 ppm	0.1 ppm	0.5 ppm
	O2	No	20.90%	20.90%	<19.5 or >23%
	LEL	No	0%	0%	10%
SPM	Phosgene	No	0 - 0.187 ppb	0.05 ppb	100 ppb
SPM	HCl	No	0.6 - 0.8 ppm	NA	5 ppm
Data Ram	PM-10	No	10 - 42 ug/m3	26 ug/m3	5000 ug/m3

Water Tower (6701 Pilot Drive)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Area Rae	VOCs	No	0 ppm	0 ppm	1 ppm
	CO	No	0 - 1 ppm	0.1 ppm	27 ppm
	Cl2	No	0 - 0.1 ppm	0 ppm	0.5 ppm
	O2	No	20.90%	20.90%	<19.5 or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	No	8 - 235 ug/m3	45 ug/m3	See fact Sheet

Downwind Mobile (North of the Facility)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Data Ram	PM-10	No	5.8 - 97.3 ug/m3	NA	See fact Sheet

Notes:

- < Less than
- NA Not Applicable
- PM-10 Particulate matter with an average diameter less than 10 microns
- ppm Parts per million
- ug/m3 micrograms per cubic meter
- VOC Volatile organic compounds
- Downwind Mobile Locations PM-10 readings were collected at or near several population centers downwind of the site within the 4-mile evacuation zone, including at E. Hickman Elementary and Middle Schools, Bon Aqua Day Care, and several hotels near 1-40 (Hampton Inn and Holiday Inn Express)

Air Monitoring Summary Tables

The table below summarize monitoring data collected on using EPA's Viper wireless remote monitoring system.



Project Name: Industrial Plastic Co Fire

Date: December 19, 2013

Time: 6:00 AM - 1:00 PM

Facility					
Instrument	Analyte	PEL Exceedances	Concentration Range	Period TWA	Action Level (PEL/TVLs)
AreaRae	VOCs	No	0 - 0.3 ppm	0.18	5 ppm
	CO	No	0 ppm	0	35 ppm
	Cl2	Yes	0.3 - 0.7 ppm	0.51	0.5 ppm
	O2	No	20.9%	20.9%	<19.5% or >23%
	LEL	No	0%	0%	10%
SPM	Phosgene	No	0 - 65.6 ppb	8.6 ppb	100 ppb
Data Ram	PM-10	No	3.7 - 4482.6 ug/m3	270.6 ug/m3	5000 ug/m3

Water Tower (6701 Pilot Drive)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Area Rae	VOCs	No	0 - 0.4 ppm	0.0 ppm	1 ppm
	CO	No	0 - 22 ppm	1.4 ppm	27 ppm
	Cl2	No	0 - 0.3 ppm	0.0 ppm	0.5 ppm
	O2	No	20.5 - 20.9%	20.8%	<19.5% or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	Yes, Unhealthy	7.1 - 307.3 ug/m3	121.5 ug/m3	See Fact Sheet

Downwind Mobile (North of the Facility)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
AreaRae	VOC	No	0 - 0.5 ppm	0.0 ppm	1 ppm
	CO	No	0 - 18.7 ppm	0.1 ppm	27 ppm
	Cl2	No	0 - 1.1 ppm	0.1 ppm	0.5 ppm
	O2	No	20.2 - 21.3%	20.8%	<19.5% or >23%
	LEL	See Comment ^a	0 - 3.1% ^a	1.5% ^a	0%
Data Ram	PM-10	Yes, moderate	12 - 203.1 ug/m3	37 ug/m3	See Fact Sheet

Community Surrounding Facility					
Instrument	Analyte	8-hour TWA Exceedances	Instantaneous Concentration Range	Action Level (AEGL-1 or 2)	
AreaRae	VOC	See Comment ^b	1.0 - 1.6 ppm ^d	1 ppm	
	CO	No	0 - 1 ppm	27 ppm	
	Cl2	No	0.0 - 0.3 ppm	0.5 ppm	
	O2	No	20.90%	<19.5 or >23%	
	LEL	No	0%	0%	
Data Ram	PM-10	Yes, Moderate	9.3 - 45 ug/m3	See fact Sheet	
SPM	HCL	No	0.0 ppm	1.8 ppm	

Notes:

- a Instrument malfunction during last 7 mins of the period. LEL readings were otherwise 0%.
- b Background sensor drift contributed factor
- < Less than
- % Percent
- Cl2 Chlorine
- HCL Hydrochloric acid
- LEL Lower explosive limit
- O2 Oxygen
- PM-10 Particulate matter with an average diameter less than 10 microns
- ppm Parts per million
- ug/m3 micrograms per cubic meter
- SPM Single point monitor
- VOC Volatile organic compounds

Air Monitoring Summary Tables

The table below summarize monitoring data collected on using EPA's Viper wireless remote monitoring system.



Project Name: Industrial Plastic Co Fire

Date: 12/19-20/2013

Time: 1:00 PM - 6:30 AM

Facility					
Instrument	Analyte	PEL Exceedances	Concentration Range	Period TWA	Action Level (PEL/TVLs)
AreaRae	VOCs	No	0 - 1	0.19	5 ppm
	CO	No	0	0	35 ppm
	Cl2	Yes	0.3 - 0.9 ppm	0.55	0.5 ppm
	O2	No	20.9%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	10%
SPM	Phosgene	No	0 - 18.9 ppb	0.14 ppb	100 ppb
Data Ram	PM-10	No	0 - 609.1 ug/m3	108.7 ug/m3	5000 ug/m3

Water Tower (6701 Pilot Drive)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Area Rae	VOCs	No	0 - 0.3 ppm	0.0 ppm	1 ppm
	CO	No	0 - 19.8 ppm	0.6 ppm	27 ppm
	Cl2	No	0 - 0.2 ppm	0.1 ppm	0.5 ppm
	O2	No	20.9%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	Good AQI	7 - 18.4 ug/m3	10.6 ug/m3	See fact Sheet

Downwind Mobile Monitoring (Multiple Locations North of the Facility)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
AreaRae	VOC	No	0 - 1.5 ppm	0.0 ppm	1 ppm
	CO	No	0 - 14.7 ppm	0.1 ppm	27 ppm
	CL2	No	0 - 1.3 ppm	0.0 ppm	0.5 ppm
	O2	No	20.4 - 21.4%	20.90%	<19.5 or >23%
	LEL	NA	NA	NA	0%
Data Ram	PM-10	Good AQI	12.9 - 104.8 ug/m3	19.2 ug/m3	See fact Sheet

Notes:

- < Less than
- % Percent
- Cl2 Chlorine
- LEL Lower explosive limit
- O2 Oxygen
- PM-10 Particulate matter with an average diameter less than 10 microns
- ppb Parts per billion
- ppm Parts per million
- ug/m3 micrograms per cubic meter
- SPM Single point monitor
- VOC Volatile organic compounds

Air Monitoring Summary Tables

The table below summarize monitoring data collected on using EPA's Viper wireless remote monitoring system.



Project Name: Industrial Plastic Co Fire

Date: December 20, 2013

Time: 6:30 AM - 4:00 PM

Facility					
Instrument	Analyte	PEL Exceedances	Concentration Range	Period TWA	Action Level (PEL/TVLs)
AreaRae	VOCs	No	0 - 0.4 ppm	0.0 ppm	5 ppm
	CO	No	0 - 6.9 ppm	0.5 ppm	35 ppm
	Cl2	Yes	0 - 1 ppm	0.5 ppm	0.5 ppm
	O2	No	14.7 - 20.9%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	10%
SPM	Phosgene	No	0 ppb	0 ppb	100 ppb
Data Ram	PM-10	No	17.5 - 401.5 ug/m3	54.1 ug/m3	5000 ug/m3

Facility Mobile					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (PEL/TVLs)
Data Ram	PM-10	No	18 - 1936.6 ug/m3	74.5 ug/m3	5000 ug/m3

Water Tower (6701 Pilot Drive)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
Area Rae	VOCs	No	0 - 1.2 ppm	0.1 ppm	1 ppm
	CO	No	0 - 30.8 ppm	1.0 ppm	27 ppm
	Cl2	No	0 - 0.2 ppm	0.0 ppm	0.5 ppm
	O2	No	20.9%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	Good	17.7 - 26.9 ug/m3	20.2 ug/m3	See PM Fact Sheet

Downwind Mobile (North of the Facility)					
Instrument	Analyte	8-hour TWA Exceedances	Concentration Range	Period TWA	Action Level (AEGL-1 or 2)
AreaRae	VOC	No	0 - 3 ppm	0.2 ppm	1 ppm
	CO	No	0 - 12.6 ppm	0.1 ppm	27 ppm
	Cl2	No	0 - 0.2 ppm	0.0 ppm	0.5 ppm
	O2	No	20.9 - 21.3%	20.9%	<19.5 or >23%
	LEL	No	0%	0%	0%
Data Ram	PM-10	Moderate	21.3 - 767.6 ug/m3	29.4 ug/m3	See PM Fact Sheet

Notes:

- a background sensor drift contributed factor
- < Less than
- > Greater than
- % Percent
- Cl2 Chlorine
- LEL Lower explosive limit
- O2 Oxygen
- PM-10 Particulate matter with an average diameter less than 10 microns
- ppm Parts per million
- ug/m3 micrograms per cubic meter
- SPM Single point monitor
- VOC Volatile organic compounds

Appendix C: Fact Sheet provided to citizens living in the evacuated area.

Source: EPA.

This fact sheet was provided to residents in the evacuated area by EPA. More information about the emergency response to the Industrial Plastics fire can be found at this U.S. EPA website:
www.epaosc.org/site/site_profile.aspx?site_id=8997



FACT SHEET

Wrigley Charcoal Superfund Site

8526 Plant Road

Lyles, Hickman County, TN

No. 1

January 2014

This Fact Sheet sheet summarizes the Site description, recent response activities, and future activities planned for the Wrigley Charcoal Superfund Site.

Contact Information

If you have questions concerning the site please do not hesitate to contact us:

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Manager
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**Tennessee Department of
Environment Conservation**
(888) 891-TDEC

**Tennessee Department of
Health – David Borowski**
(800) 404-3006

Additional Resources

<http://epaossc.org/industrialplasticscofire>

<http://www.epa.gov/region4/superfund/sites/npl/tennessee/wrigccoatn.html>

www.hickmanco.com

<http://www.tn.gov/environment/>

SITE DESCRIPTION

The Wrigley Charcoal Superfund Site (Site) is located in Hickman County, Tennessee and includes seven distinct areas affected by various industrial activities. The Industrial Plastics Company, Inc., operated a small scale plastics and metals recycling facility on a portion of the Site known as the Southern Primary Site.

RECENT EMERGENCY RESPONSE ACTIONS

On December 18, 2013, the Industrial Plastics portion of the Site caught fire. Local Fire, Emergency Crews and the Environmental Protection Agency (EPA) responded to extinguish the fire. Approximately 5 acres of plastics and surrounding buildings were on fire. State and Local Officials implemented a 1.5 mile evacuation zone in all directions including closing local schools for the day. The burning plastic was difficult to extinguish using water so heavy equipment was used to bring in approximately 800 tons of clean soil from an off-site facility to cover and smother the fire. EPA conducted air monitoring throughout the community until the fire was extinguished and the evacuation was lifted. Particulate levels were initially a concern, however, once the fire was completely extinguished, readings quickly dropped to safe levels. As a result of community concern, EPA performed air monitoring inside two residential homes and no issues were found.

As a precaution, residents were told that they could do the following to reduce exposure after re-entry to their homes: 1) wipe down all counter tops, window sills and shelves with warm soapy water, 2) wash all dishes, pots and pans with warm soapy water prior to use, 3) damp mop all floors, 4) empty and wash all pet food and water bowls, 5) throw out all exposed foods except fruit, these can be washed prior to peeling and eating, 6) wipe the tops of all canned goods prior to opening and 7) consider checking and changing air filters.

SUPERFUND REMEDIAL ACTIONS AND NEXT STEPS

The EPA placed the Site on the National Priorities List (NPL) in 1989 because of contaminated debris, ground water and soil resulting from industrial operations. Since the Site has been placed on the NPL, EPA has taken steps to cleanup the Site. In 2014, the EPA plans to propose a revised cleanup plan that will modify the 2003 Site cleanup plan. The revised plan is currently being negotiated between EPA and Tennessee Department of Environment Conservation (TDEC). Following the completion of these negotiations, a Proposed Plan will be introduced to the community for review and comment. By investigating the Site, conducting cleanup activities and performing Five-Year Reviews, EPA and TDEC continue to protect people and the environment from Site contamination. A public repository for Site documents is maintained at the Hickman County Public Library.

Certification

This Public Health Consultation: *Industrial Plastics Fire Located on the Wrigley Charcoal Superfund Site, Lyles, Hickman County, Tennessee*, was prepared by the Tennessee Department of Health's Environmental Epidemiology Program. It was prepared in accordance with the approved methodology and procedures that existed at the time the health consultation was begun.



Director, Environmental Epidemiology Program
Tennessee Department of Health