Letter Health Consultation

DELPHI ENERGY AND ENGINE MANAGEMENT SYSTEMS

FITZGERALD, BEN HILL COUNTY, GEORGIA

EPA FACILITY ID: GAD075942706

Prepared by:
Georgia Department of Public Health

JULY 3, 2017

Prepared under Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
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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LETTER HEALTH CONSULTATION

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Georgia Department of Public Health
Chemical Hazards Program
Environmental Health Section
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Division of Community Health Investigations
Atlanta, Georgia 30333

July 3, 2017

The Honorable Philip C. Jay, III
Chairman & Commissioner At Large
Ben Hill County Commission
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Fitzgerald, Georgia 31750

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RE: Letter Health Consultation
Delphi Energy and Engine Management Systems
Fitzgerald, Ben Hill County, Georgia

At the request from a former Ben Hill County Commissioner, the Georgia Department of Public Health (DPH), under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), evaluated the health impacts of potential offsite exposures to lead from the Delphi Energy and Engine Management Systems (Delphi) site in Fitzgerald, Georgia and to the community at large from a nearby baseball field. The petitioner also requested a review of cancer data to determine if there is an association between contaminants from the site and reported cancer cases in the community, specifically, leukemia, melanoma, and rhabdomyosarcoma. DPH reviewed offsite soil sample results at an adjacent baseball field, cancer incidence data from Ben Hill County, and blood-lead data for Fitzgerald, Georgia. Based on the available data, DPH concluded the following:

- Because the site is fenced, it is unlikely that the public accessed the site while the plant was in operation or during remediation. Therefore, past and current on-site exposures are unlikely. Future exposures are unlikely as long as the fence is maintained.
- Children and adults who play at the nearby baseball field are not exposed to lead in soil that could harm their health. Surface soil lead levels at the baseball field were all below 25 parts per million (ppm). These soil concentrations are well below levels found at the periphery of the site boundary and the U. S. Environmental Protection Agency's residential soil screening level[1] of 400 ppm.
- Lead in emissions attaches to particulate matter in air and, because of the relatively large size and heavy weight of these particulates, and because Delphi did not have an emissions stack, lead may have traveled for short distances and settled offsite. However, the site is bordered by woodland, agricultural land and/or industry, and separated from residences by a woodland barrier. In addition, no residential areas near Delphi are downwind of prevailing winds. It is unlikely that a significant amount of lead

[1] https://www.epa.gov/sites/production/files/201606/documents/ressoil_sl_table_run_may2016.pdf

contaminated soil and dust traveled the long distance beyond natural barriers onto residential property.

- A review of cancer data for Ben Hill County showed the cancer incidence rates for the types of cancer reported by residents were not higher that the incidence rates for the same cancers for the state Georgia as a whole. No evidence exists of a higher than expected number of cases of leukemia, melanoma, and rhabdomyosarcoma in Ben Hill County. None of these types of cancer are associated with lead exposure.
- Children in Ben Hill County tested between 1998 to 2015 showed higher blood lead levels than children in the state of Georgia as a whole. The county reviewed elevated blood lead level cases in Fitzgerald and found that the majority lived in older housing, meaning that some children could be exposed to lead-based paint chips and dust in these older houses.

  No safe blood lead level in children has been identified. Repeated contact with lead that causes a measured blood lead level can

  - damage the brain and nervous system
  - slow growth and development,
  - lead to damage hearing and speech problems
  - lead to learning and behavioral problems

  Children less than 6 years old and the unborn children of pregnant women are at greatest risk for those health effects.

The limitations of this report include limited availability of environmental data, lack of residential soil sampling data, lead-only analysis of baseball field samples, and the use of prevailing wind direction information from Macon, Georgia. DPH used health protective assumptions in consideration of these limitations to protect public health.

DPH recommends

- Testing children between the ages of 1–5 for lead and conducting follow up according to the "Lead Screening Guidelines for Georgia" (*www.dph.georgia.gov/lead-screening-guidelines-children*).
- Testing blood lead level for pregnant women and women of childbearing age, especially those living in older housing.
- Following the recommendations to reduce exposures to lead in homes (see attachment).
- Arranging for a lead inspection by the county health department or a Certified Lead Risk Assessor if residents have concerns about lead in their home.

The remainder of this letter presents the evaluation of soil data collected at a nearby baseball field to support the conclusions and recommendations. This document does not include an assessment of exposures of former employees of the Delphi facility.

Background and Statement of Issues

The Delphi site is a former lead smelter located on Perry House Road, bordered by Edward Road to the south, State Highway 90 to the east, and State Highway 107 to the north (Figure 1). No other industry operated on the site prior to Delphi. Operations began at the approximately 160-acre site in 1975, including reclaimed battery storage, lead reclamation, and lead battery assembly: using a secondary smelting process to make lead-acid batteries[2]. Like primary lead smelting, the processing of secondary lead can produce lead dust and toxic slag. In addition, the battery-making process generated lead scraps, lead, and acid wastewater that was stored and treated on site, and lead sludge disposed of in an on-site sludge pond.

In January 1997, Delphi submitted a Closure Plan for site operations to the Georgia Environmental Protection Division (EPD). This Plan identified elevated levels of contaminants in soil, and lead was the primary chemical of concern. In July 1997, EPD listed Delphi on the state Hazardous Site Inventory (www.gaepd.org/Documents/hazsiteinv) for a known release of lead to on-site soil at levels exceeding the reportable quantity. Delphi entered into a Consent Order with EPD to close the solid waste management units, and these operations ceased in 2000. Numerous investigations were conducted, resulting in the removal of approximately 1,000 tons of lead-impacted soils. All facility operations ceased in 2007.

Figure 1: Delphi site and surrounding area

Delphi site remediation began in 2002. Approximately 1,000 tons of lead-contaminated soil were removed, and soil was remediated to site-specific background levels of 65 ppm (determined by EPD), except in two locations near a concrete pad and building structures. During 2010, the remaining area of contaminated soil was remediated to below the EPD industrial standard of 900 parts per million (ppm) for lead. All buildings on the site were demolished except one fenced-in building used for storage in the southeast corner of the property. Approximately 1,100 tons of concrete, brick, and soil contaminated with lead were removed from the property.

When Delphi was in operation, the facility had 24-hour security and a fence around the site perimeter. There are no reports that the public accessed the site during operations. During remediation, the site was fenced and access was limited to employees only. Sometime following remediation activities the fence was removed. There is currently a fence around the site that restricts all public access.

[2] Smelting lead-bearing materials other than ores, with the majority coming from used lead-acid batteries.

In October 2010, the property owner and a prospective purchaser met certain criteria set forth by the Hazardous Site Reuse and Redevelopment Act[3] in order to qualify for the Brownfield Limitations of Liability. An environmental covenant was executed in March 2013 restricting property reuse to non-residential purposes. In May 2013, EPD removed the Delphi site from the Hazardous Site Inventory.

The Delphi site is currently cleared and partially covered with grass, shrubs, and trees. The closest residence is more than one-half mile to the southwest. Woodland, agriculture, light industry, Fitzgerald West Lake, and residential property are located to the north. To the east are woodland, agriculture, and a tributary of Turkey Creek. Woodland and industry are to the south of the site. To the west are a city park, reservoir, and the Fitzgerald Municipal Airport. No public schools, day care centers, nursing homes, or other sensitive-population centers are within a one-mile radius of the property. In 2010, approximately 590 people lived within a 1-mile radius (Attachment A) of the Delphi site. The residential areas include approximately 270 residences located within one mile to the north and southwest of Delphi. Additional residences are between one and two miles to the northwest and east.

Discussion

Exposure Pathways

We reviewed contact with soils at the Fitzgerald ballfield and windblown dusts depositing on residential areas of Fitzgerald. During plant operations, Delphi employees may have inhaled, ingested, or carried contaminated dust and soil into homes from their clothing, but we did not evaluate review exposure to former workers.

Across Perry House Road to the west of Delphi is a city park with a pavilion and lake access. Approximately 15 years ago, baseball fields and a recreational vehicle park were added. DPH determined that the proximity of the baseball fields to Delphi could be of public health concern, so DPH took measures to evaluate whether the public might be exposed to lead contaminated soil during recreation activities.

According to the EPA Toxics Release Inventory, emissions from the Delphi lead smelter ranged between two and four tons of lead in particulates per year until 2007 (www.epa.gov/toxics-release-inventory-tri-program). Residents may have inhaled lead in air emissions and accidentally ingested contaminated soil and dust deposited onto nearby business and residential properties. Delphi vented emission through the plant's roof because there were no emission stacks.

Lead in emissions attaches to particulate matter in air and, because of the relatively large size and heavy weight of these particulates, may have traveled for short distances and settled off site. However, the site is bordered by woodland, agricultural land and/or industry, and separated from residences by a substantial woodland barrier of mature trees and shrubs.

[3] The Hazardous Site Reuse and Redevelopment Act passed in 2003 provides tax relief for properties where costs were incurred to obtain a brownfield limitation of liability (www.epd.georgia.gov/brownfield).

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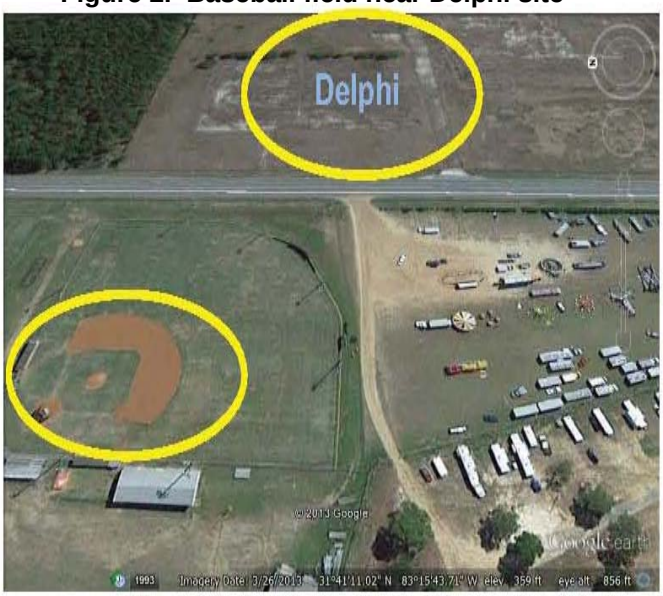
In Fitzgerald, Georgia, the prevailing winds are from the north-northwest to the south-southeast.[4] Wind direction data from Macon were used for Fitzgerald because of the long-term availability of reliable wind data from Macon. Macon also has terrain and elevation similar to that of Fitzgerald. The nearest residential properties are located about one mile from Delphi to the north, southwest, and east. No residential areas near Delphi are downgradient downwind of prevailing winds. Therefore, though no residential soil data was evaluated in this health consultation, it is unlikely that a significant amount of lead contaminated soil and dust traveled the long distance beyond natural barriers onto residential property.

Environmental Sampling Data

Offsite Soil

DPH reviewed soil samples from a nearby baseball field and reviewed wind speed and direction to evaluate the possibility of contaminated dust and soil from the Delphi site migrating to nearby recreational property.

Figure 2. Baseball field near Delphi site



In November 2013, DPH staff collected three surface soil samples (0–6 inches below ground surface) from a one foot-by-one foot area before second and third bases, and from home plate (Figure 2). Composite samples[5] were collected, mixed, transferred, stored, labeled, handled, and packed according to DPH-issued protocol. The samples were analyzed for lead by Environmental Hazards Services Laboratories (using EPA method SW-846 7000B). All results were below 25 milligrams lead per kilogram of soil (parts per million). In Georgia, the median background concentration of naturally occurring lead in soil is approximately 11 ppm[6]. Existing physiologically based pharmacokinetic models describing the uptake and disposition of chemical substances to quantitatively describe the relationship among critical biological processes would show an insignificant contribution to body burden (including blood-lead levels) from ingestion of soil in the baseball field.

[4] Summary of climatic wind data from Macon Georgia: https://www.ncdc.noaa.gov/sites/default/files/attachments/wind1996.pdf

[5] Composite sampling is a technique whereby multiple temporally or spatially discrete media or tissue samples are combined, thoroughly homogenized, and treated as a single sample. Composite sampling reduces bias and improves accuracy over single point sampling.

[6] https://www.epa.gov/superfund/usgs-background-soil-lead-survey-state-data#GA

Cancer Data Analysis

The petitioner requested that DPH review cancer data to determine if an association exists between contaminants from the site and reported cancer cases in the community, specifically, leukemia, melanoma, and rhabdomyosarcoma. **None of these types of cancer are associated with lead exposure.** Some evidence suggests that lead is associated with kidney, colon, rectum, lung, and brain cancer, but this evidence is weak [American Cancer Society, 2017]. Most of the evidence linking lead exposure and cancer comes from studies of workers with high levels of occupational exposure to inorganic lead (such as lead oxide and lead chloride). The EPA, International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) consider lead to be a possible, or reasonably anticipated to be a carcinogen.

The DPH Georgia Comprehensive Cancer Registry collects, maintains, analyzes, and publishes cancer mortality and morbidity data and responds to residents' concerns and inquiries about cancer. Cancers may take a long time to develop. Latency (the time from exposure to the development of the cancer) can be from a few months to 40 years or more. Most cancers have a latency of at least 20 years. The latency period for developing cancer after exposure to most substances is not known, so it is difficult for cancer cluster researchers to know how far back to look for a cause. More information about cancer can be found in Attachment B.

To address concerns about cancer, DPH evaluated cancer data. In December 2014, DPH evaluated age-adjusted cancer incidence data for the city of Fitzgerald (zip code 31750), Ben Hill County, and for the state of Georgia for the last ten years that data are available (2003–2012). Leukemia and melanoma cases did not show elevated rates. Rhabdomyosarcoma (cancer of connective tissues) is cancer that can affect several body systems, so it was evaluated separately. There were 241 cases of rhabdomyosarcoma in Georgia from 2003–2012. To protect privacy, DPH does not provide the exact number of cases in a county if there are fewer than five, and fewer than five cases reported for that time period in Ben Hill County.

Leukemia, melanoma, and rhabdomyosarcoma did not have rates that were statistically significantly higher than the rates for Georgia.

Blood Lead Level Data Analysis

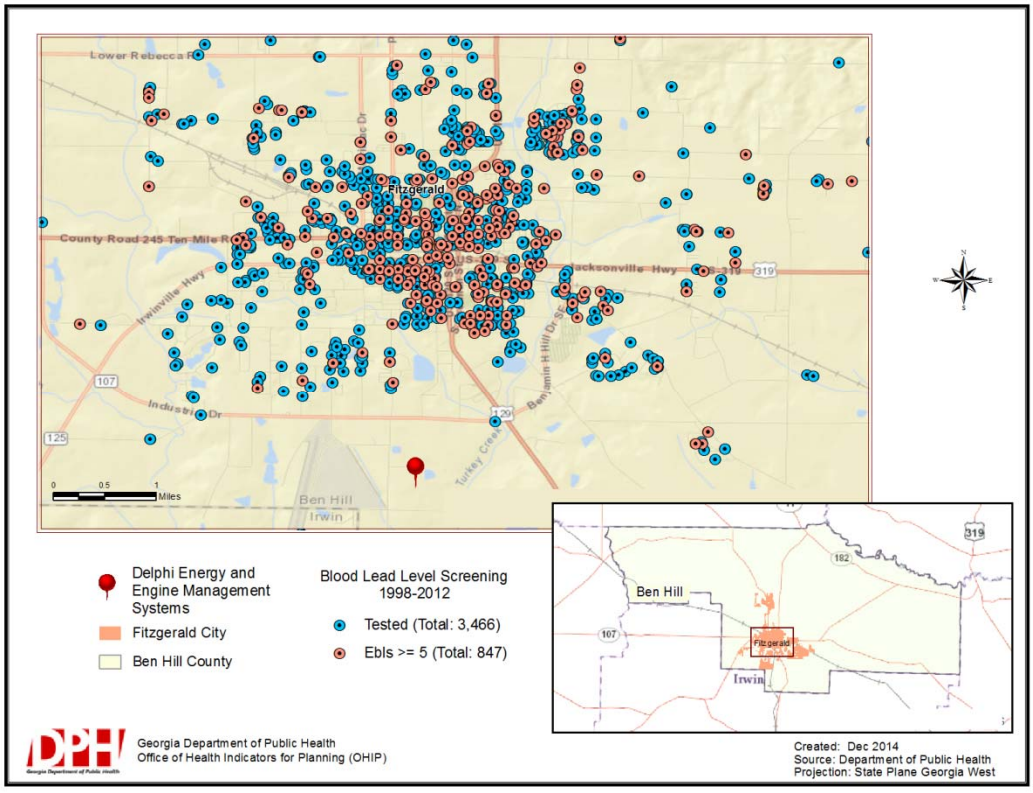
All children enrolled in Medicaid and state-managed health care programs for uninsured children are required to be tested for lead exposure.

Blood lead level (BLL) data for children younger than 6 years old were analyzed for Ben Hill County and for Georgia for 1998–2015 (Attachment C). Results showed that most cases of elevated blood lead levels in Ben Hill County are from the city of Fitzgerald. The age-adjusted rate of elevated blood lead levels (equal to or above 5 micrograms per deciliter (µg/dL))[7] was found to be higher in Fitzgerald by approximately one and a half to three times the rate found in Georgia for every year during this time period.

[7] A reference value based on the 97.5th percentile of the BLL distribution among children 1–5 years old in the United States to identify children with elevated BLLs using data generated by the National Health and Nutrition Examination Survey (NHANES).

To evaluate whether elevated blood lead levels found in children in Fitzgerald may be a result of exposure to soil contaminated with lead from Delphi operations, DPH mapped the children tested and elevated blood lead level cases for 1998–2007, the last ten years Delphi was in operation (Figure 4). During this period, emissions from Delphi were representative of annual emissions reported under federal requirements[8]. DPH could not map all cases (847) of elevated blood levels for these years because of data quality issues (e.g., truncated addresses, multiple cases/household, etc.). The map in Attachment A shows that because the area surrounding the site is commercial or woodland, children reside only to the northwest of the site. Prevailing winds blow towards the south and southeast. The cases in Fitzgerald (Figure 4) show no cluster of children with elevated blood lead levels near the former Delphi facility, indicating that deposition to soil from emissions and contaminated on-site soil and dust was not likely a potential exposure pathway for lead.

Figure 4: Location of elevated blood lead levels in Fitzgerald, Georgia, 1998-2007



Sources of Lead in the Home

Lead-based Paint

Georgia and other states have many areas with large numbers of cases of children with elevated blood lead levels. Lead-based paint and contaminated dust are the most frequent and dangerous sources of lead exposure for young children. In addition, soil can easily absorb lead from exterior

[8] *http://iaspub.epa.gov/enviro/tris_control.tris_print?tris_id=31750DLCRMPERRY.*

house paint, and plumbing pipes in many new and old houses may contain lead from lead solder used in plumbing pipe construction [Centers for Disease Control and Prevention, 2011].

Lead in house paint was greatly reduced after 1978. However, many older houses still have lead-based paint. Housing built before 1950 often has larger concentrations of lead in paint, as well as drinking water service lines made from lead, lead solder, and other plumbing materials that contain lead. Paint manufacturers began phasing out lead in residential paints in the 1950s, and the U.S. Consumer Products Safety Commission effectively banned it in 1978.

Lead can enter the household dust from normal friction, deterioration, and repair work. Both deteriorating housing conditions and renovating pre-1978 housing increase young children's potential for ingesting contaminated paint chips and inhaling contaminated dust. The recognition of lead-based paint as a potential health hazard is an important consideration for homes in Fitzgerald.

DPH reviewed the age of housing for the Fitzgerald zip codes. The majority of houses were built before 1978, with over 60% in each census tract. This amount is considerably higher than for the state, which has approximately 30% of pre-1978 housing.

Table 3: Age of housing

Year Built	Georgia	Fitzgerald Census Tract		
	--	**9605**	**9604**	**9603**
Pre-1978 Housing Units	--	1815	952	1107
Pre-1950 Housing Units	--	451	350	179
% Pre-1978 Housing	32.00%	65.90%	60.06%	58.02%
% Pre-1950 Housing	10.30%	16.38%	22.08%	9.38%

Based on the location of elevated blood lead level cases in Fitzgerald and analyses of Ben Hill County housing age data, some children are being exposed to lead-based paint chips and dust in older houses [Rustin, 2013].

If residents have concerns about lead in their home, they can arrange a Healthy Home Inspection with the local health department. The scope of an inspection will vary based on local resources and home conditions. Inspections can include

- a visual assessment of paint and housing conditions,
- testing of paint and dust, and
- assessment of other potential sources of lead such as imported pottery, food, and toys.

Contact the DPH Healthy Homes and Lead Poisoning Prevention Program at 404-657-6534 or visit the website at *www.dph.georgia.gov/lead* for more information.

Occupational Exposure and Transport

Exposure to lead occurs in many jobs, including at secondary lead smelters. Delphi employed approximately 300 workers; families of some workers may have been exposed to higher levels of lead when workers brought home lead dust on their work clothes and skin. DPH advises parents of children with elevated blood lead levels who live in a house with a former Delphi employee to take additional measures to reduce the levels of lead dust in the home.

Additional Resources

The DPH Healthy Homes and Lead Poisoning Prevention Program collects and monitors blood lead levels and provides interventions for children whose levels are elevated. There is no safe blood lead level in children. Contact the DPH Healthy Homes and Lead Poisoning Prevention Program at 404-657-6534 or visit the website at *www.dph.georgia.gov/lead* for more information about lead exposure. CDC and ATSDR recommend reducing lead exposure wherever possible. Attachment D contains materials about health effects, blood lead level screening, and practical ways to reduce lead exposure.

DPH will continue to gather and analyze cancer rates in Ben Hill County. If you have any further questions, please contact me at 404-657-6534 or franklin.sanchez@dph.ga.gov.

Respectfully,

Franklin Sanchez
Chemical Hazards Program
Georgia Department of Public Health

REFERENCES

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U.S. Environmental Protection Agency, *heavy metal accumulation in soil and vegetation from smelter emissions*. Aug 1974.

Report Preparation

This Health Consultation for the Delphi Energy and Engine Management Systems site was prepared by the Georgia Department of Public Health (DPH) under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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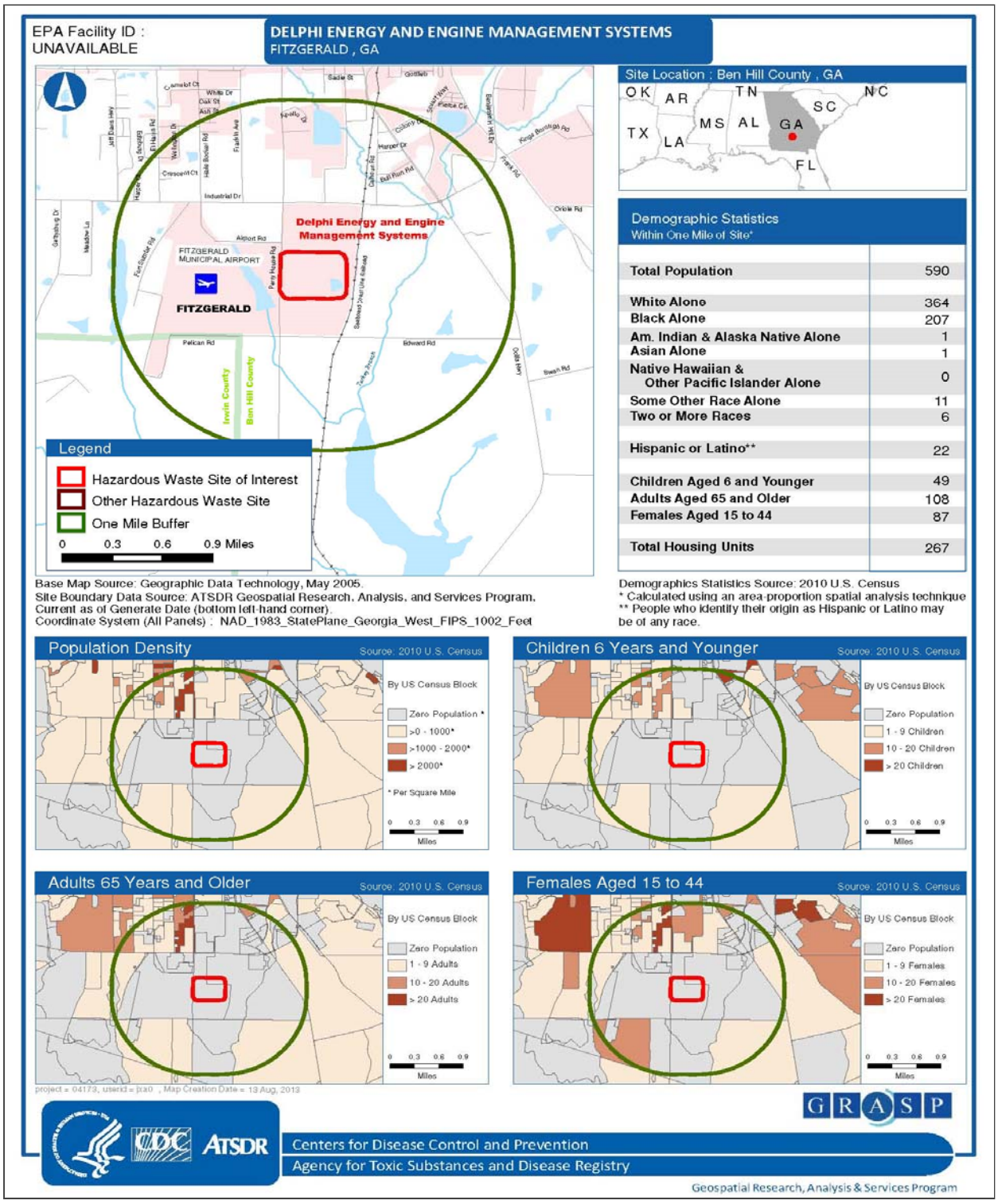
ATTACHMENT A. SITE DEMOGRAPHICS MAP



ATTACHMENT B. INFORMATION ABOUT CANCER

Cancer will affect 1 in 2 men and 1 in 3 women in the United States, according to statistics collected by the Surveillance Epidemiology and End Results program at the National Cancer Institute [*www.seer.cancer.gov*]. Cancer is a group of more than 100 diseases characterized by uncontrolled growth and spread of abnormal cells. Different types of cancers have differing rates of occurrence and different causes and chances for survival. Therefore, we cannot assume that all the different types of cancers in a community or workplace share a common cause or can be prevented by a single intervention.

Cancers may be caused by a variety of factors acting alone or together, usually over a period of many years. Scientists estimate that most cancers are due to factors related to how we live, often called lifestyle factors, which increase the risk for cancer including: smoking cigarettes, drinking heavily, and diet (for example, excess calories, high fat, and low fiber). Other important cancer risk factors include reproductive patterns, sexual behavior, and sunlight exposure. A family history of cancer may also increase a person's chances of developing cancer.

Smoking is by far the leading risk factor for lung cancer. Smokers are about 20 times more likely to develop lung cancer than nonsmokers. People who don't smoke but who breathe the smoke of others also have a higher risk of lung cancer. A non-smoker who lives with a smoker has about a 20% to 30% greater risk of developing lung cancer. Workers exposed to tobacco smoke in the workplace are also more likely to get lung cancer. Exposure to radon, asbestos, arsenic, chromium, nickel, soot, tar, and other substances can also cause lung cancer. An increased risk for lung cancer has also been associated with personal or family history of lung cancer. Most people are older than 65 years when diagnosed with lung cancer.

Smoking tobacco is also an important risk factor for kidney cancer. Obesity and high blood pressure have also been linked to the disease. People with a family member who had kidney cancer have a slightly increased risk of kidney cancer. Also, certain hereditary conditions can increase the risk. Kidney cancer is about twice as common in men as in women, and is slightly more common among blacks than other races. Workplace exposure to asbestos, cadmium, some herbicides, benzene, and organic solvents, particularly trichloroethylene, has also been associated with an increased risk for kidney cancer.

While cancer occurs in people of all ages, new cases of most types of cancer rise sharply among people over 45 years of age. When a community, neighborhood, or workplace consists primarily of people over the age of 45 (and even more so over the age of 60), we would expect more cancers than in a neighborhood or workplace with younger ages. However, cancer is also the second leading cause of death in children.

Many people believe that cancer is usually caused by toxic substances in the home, community, or workplace. Although we do not know the exact impact of environmental pollutants on cancer development, less than 10% of cancers are estimated to be related to toxic exposures.

Since the 1970s when state cancer registries were first being organized, many public health scientists and residents hoped that anecdotal observations of clusters of cancer in the community might lead to prevention of new cases via discovery of specific causes of these cancers. Since then, thousands of investigations have taken place throughout the country, mainly conducted by state, local, or federal agencies. With one or two possible exceptions involving childhood cancers, none of these investigations have led to the identification of the causes of any of these possible clusters, even when a statistically elevated number of cancers in a geographic area could be documented. The Georgia Department of Public Health has developed strategies for active cancer surveillance. This systematic approach to monitoring cancer trends in our state will lead to more opportunities for prevention and control of cancer in Georgia.

For more information about cancer, please contact:

Chrissy McNamara, MSPH
Cancer Epidemiologist
Georgia Comprehensive Cancer Registry
Georgia Department of Public Health
Atlanta, GA
404-657-2654 (phone)
404-463-0780 (fax)

ATTACHMENT C. LEAD DATA AND INFORMATION

Children's Blood Lead Level Screening Data for Fitzgerald, Ben Hill County and Georgia
1998 – 2015

Year	Number Tested			Number of BLL >= 5 µg/dL			Percentage of BL L>=5 µg/dL		
	State	Fitzgerald	Ben Hill County	State	Fitzgerald	Ben Hill County	State	Fitzgerald	Ben Hill County
1998	22,163	233	259	9,128	123	130	41.19%	52.79%	50.19%
1999	18,475	150	164	6,294	72	78	34.07%	48.00%	47.56%
2000	26,301	148	152	7,249	68	68	27.56%	45.95%	44.74%
2001	31,654	158	159	6,759	64	64	21.35%	40.51%	40.25%
2002	33,020	117	123	6,706	46	48	20.31%	39.32%	39.02%
2003	50,742	100	155	9,564	34	49	18.85%	34.00%	31.61%
2004	61,241	193	205	8,935	67	70	14.59%	34.72%	34.15%
2005	72,320	171	171	7,721	36	36	10.68%	21.05%	21.05%
2006	65,366	215	218	6,395	58	58	9.78%	26.98%	26.61%
2007	64,059	214	220	5,566	57	59	8.69%	26.64%	26.82%
2008	72,286	225	228	5,117	28	29	7.08%	12.44%	12.72%
2009	123,253	374	374	7,630	55	55	6.19%	14.71%	14.71%
2010	128,274	469	474	6,712	44	44	5.23%	9.38%	9.28%
2011	120,797	314	328	5,361	35	36	4.44%	11.15%	10.98%
2012	116,200	216	236	4,622	21	23	3.98%	9.72%	9.75%
2013	104,492	199	210	3,087	13	14	2,96%	6.53%	6.67%
2014	105,772	218	292	2,781	15	22	2.63%	6.88%	7.53%
2015	113,492	204	246	2,520	16	17	2.22%	7.84%	6.91%

BLL = blood lead level
µg/dL: micrograms of lead per deciliter of blood
Source: Georgia Department of Public Health, Healthy Homes and Lead Poisoning Prevention Program, 2017

ATTACHMENT D. LEAD EXPOSURE INFORMATION

Sources of Lead
www.cdc.gov/nceh/lead

Lead can be found in many products and locations. Lead-based paint (LBP) and contaminated dust are the most widespread and dangerous high-dose source of lead exposure for young children.

Lead exposure can occur from one or more of the following:

Indoor
Paint – Ingesting paint chips primarily found in homes built prior to 1978 and on older toys and furniture
Dust – Ingesting dust (from hand-to-mouth activity) found in older homes (built prior to 1978) or tracked in from contaminated soil

Water – Drinking water containing lead that comes from corrosion of older fixtures, from the solder that connects pipes, or from wells where lead contamination has affected the groundwater

Tableware – Eating foods from imported, old, handmade, or poorly glazed ceramic dishes and pottery that contains lead. Lead may also be found in leaded crystal, pewter, and brass dishware

Candy – Eating consumer candies imported from Mexico. Certain candy ingredients such as chili powder and tamarind may be a source of lead exposure. Candy wrappers have also been shown to contain some lead

Toy Jewelry – Swallowing or putting in the mouth toy jewelry that contains lead. This inexpensive children's jewelry is generally sold in vending machines and large volume discount stores across the country

Traditional (folk) Medicines –Ingesting some traditional (folk) medicines used by India, Middle Eastern, West Asian, and Hispanic cultures. Lead and other heavy metals are put into certain folk medicines on purpose because these metals are thought to be useful in treating some ailments. Sometimes lead accidentally gets into the folk medicine during grinding, coloring, or other methods of preparation

Outdoor
Outdoor Air – Breathing lead particles in outdoor air that comes from the residues of leaded gasoline or industrial operations

Soil – Ingesting dirt (pica) contaminated with lead that comes from the residues of leaded gasoline, industrial operations, or lead-based paint

Other
Hobbies – Ingesting lead from hobbies using lead such as welding, auto or boat repair, the making of ceramics, stained glass, bullets, and fishing weights. Other hobbies that might involve lead include furniture refinishing, home remodeling, painting and target shooting at firing ranges

Workplace – Ingesting lead found at the workplace. Jobs with the potential for lead exposure include building demolition, painting, remodeling/renovation, construction, battery recycling, radiator repair, and bridge construction. People who work in a lead environment may bring lead dust into their car or home on their clothes and bodies exposing family members

References:

Centers for Disease Control and Prevention (CDC 2009). *Lead*. Last Updated Jun 2009. Available online at www.cdc.gov/nceh/lead/tips/sources.htm

Oregon Health Authority. Not dated. Available online at http://www.oregon.gov/oha/ph/HealthyEnvironments/HealthyNeighborhoods/LeadPoisoning/Pages/index.aspx

New York Department of Health (NYDOH 2010). *Sources of Lead*. Last updated Apr 2010. Available online at www.health.ny.gov/environmental/lead/sources.htm

How to Prevent Lead Exposure
www.cdc.gov/nceh/lead/ACCLPP/Lead_Levels_in_Children_Fact_Sheet.pdf

Parents can take simple steps to make their homes more lead-safe.

- Talk to your local health department about testing paint and dust in your home for lead if you live in a home built before 1978.
- Common home renovation activities like sanding, cutting, and demolition can create hazardous lead dust and chips by disturbing lead-based paint. These can be harmful to adults and children.
- Renovation activities should be performed by certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices.
- Learn more at EPA's Renovation, Repair, and Painting rule Web page: www.epa.gov/lead/pubs/renovation.htm.
- If you see paint chips or dust in windowsills or on floors because of peeling paint, clean these areas regularly with a wet mop.
- Wipe your feet on mats before entering the home, especially if you work in occupations where lead is used. Removing your shoes when you are entering the home is a good practice to control lead.
- Remove recalled toys and toy jewelry from children. Stay up-to-date on current recalls by visiting the Consumer Product Safety Commission's Web site: www.cpsc.gov.

Lead can be found in a variety of sources.

These include:

- paint in homes built before 1978
- water pumped through leaded pipes
- imported items including clay pots.
- certain consumer products such as candies, make -up and jewelry
- certain imported home remedies

Protect your Children from Lead Exposure
www.cdc.gov/nceh/lead/tips.htm

It is important to determine the construction year of the house or the dwelling where your child may spend a large amount of time (e.g., grandparents or daycare). In housing built before 1978, assume that the paint has lead unless tests show otherwise.

- ***Have your children tested for lead beginning at 9 months to one year of life.***
- ***Provide a healthy diet for your child that is rich in iron, calcium and vitamin C, and with appropriate levels of fat based on age.***
- ***Regularly wash children's hands, especially before eating.*** Always wash their pacifiers, drinking bottles and toys before they use them.
- ***Regularly wet-mop floors and wet-wipe window components.*** Because household dust is a major source of lead, parents should wet-mop floors and wet-wipe horizontal surfaces every 2-3 weeks. Windowsills and wells can contain high levels of leaded dust. They should be

kept clean. If feasible, windows should be shut to prevent abrasion of painted surfaces or opened from the top sash.

- ***Make sure your child does not have access to peeling paint or chewable surfaces painted with lead-based paint.*** Do not try to remove peeling paint yourself! If there is peeling paint in your home, call the health department for help on how remedy this. If you rent, report peeling paint to your landlord. It is your landlord's responsibility to properly take care of this problem.
- ***Pregnant women and children should not be present in housing built before 1978 that is undergoing renovation.*** They should not participate in activities that disturb old paint or in cleaning up paint debris after work is completed.
- ***Create barriers between living/play areas and lead sources.*** Until environmental clean-up is completed, parents should clean and isolate all sources of lead. They should close and lock doors to keep children away from chipping or peeling paint on walls. You can also apply temporary barriers such as contact paper or duct tape, to cover holes in walls or to block children's access to other sources of lead.
- ***Remove shoes before entering your home and ask others to do the same.***
- ***Prevent children from playing in bare soil; if possible, provide them with sandboxes.*** Parents should plant grass on areas of bare soil or cover the soil with grass seed, mulch, or wood chips, if possible. Until the bare soil is covered, parents should move play areas away from bare soil and away from the sides of the house. If using a sandbox, parents should also cover the box when not in use to prevent cats from using it as a litter box. That will help protect children from exposure to animal waste.
- ***Let tap water run for one minute before you start using it.***