Health Consultation

HICKORY STREET LANDFILL SITE

MOBILE, MOBILE COUNTY, ALABAMA

EPA FACILITY ID: ALD980842637

MARCH 9, 2006

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

Health Consultation: A Note of Explanation

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

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

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HEALTH CONSULTATION

HICKORY STREET LANDFILL SITE

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Prepared by:

The Alabama Department of Public Health
Risk Assessment Branch
Under cooperative agreement with the
Agency for Toxic Substances and Disease Registry

Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR) was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also called the *Superfund* law. That law set up a fund to pay for identifying and cleaning up our country's hazardous waste sites. The United States Environmental Protection Agency (EPA) and state environmental agencies oversee the site investigation and clean up actions. Historically, public health assessments are conducted by environmental and health scientists from ATSDR. In 1993, the Alabama Department of Public Health (ADPH) entered into a cooperative agreement with ATSDR, the goal of which was that ADPH would develop the capacity to perform this function for ATSDR.

In 1986, the Superfund Amendments and Re-authorization Act (SARA, Title III) required ATSDR to conduct a public health assessment at each site on the EPA National Priorities List (NPL). Public health assessments and consultations seek to discover whether people are being exposed to hazardous substances. Under the 1993 cooperative agreement and subsequent renewals, this responsibility has been assumed by ADPH for sites in Alabama. If people are exposed or have the potential to be exposed, a decision is made as to whether the exposure is harmful and at what level health effects might occur; from these data, a determination can be made whether the exposure should be stopped or reduced.

Exposure: ADPH health assessors review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. ADPH does not collect and analyze environmental samples**,** but, instead, reviews sampling data provided by EPA, other government agencies, businesses, or the public. When there is not enough environmental information available, the assessment will indicate that further sampling data are needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ADPH scientists evaluate whether that exposure may result in harmful effects. ADPH, as well as ATSDR, recognizes that children, because of their play activities and their smaller body size, may be most susceptible to these effects. As a policy, unless data are available to suggest otherwise, ADPH health professionals responsible for assessing effects in populations consider children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to children is considered first when evaluating the health threat to a community. The health impact to other high risk groups within the community (i.e., elderly, those with compromised immune systems, chronically ill or women of child-bearing age) also receive special attention during the evaluation.

ADPH uses existing scientific information that can include the results of medical, toxicological, and epidemiologic studies and disease registry data to determine the health effects that may result from exposure. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances may not be available. In such cases, the report will document the need for further data collection activities.

Conclusions: The report assigns a public health hazard category and describes any hazards at the site. It contains a public health action plan that recommends ways to stop or reduce exposure. Because ATSDR and ADPH are advisory agencies, not regulatory, the report identifies actions that are appropriate for EPA, other responsible parties, or the research or education divisions of ATSDR and/or ADPH to conduct. However, if there is an urgent public health hazard, a public health advisory can be issued to warn people of the danger. When appropriate, health education or pilot studies of health effects, full-scale epidemiology studies, diseases registries, surveillance studies, or research on specific hazardous substances can be initiated.

Interactive Process: The development of a health assessment or consultation is an interactive process. The approach requires accumulation of information from many sources, including, but not limited to: ATSDR; many city, state, and federal agencies; the companies responsible for cleaning up the site, the principal responsible party (PRP), and the community. Once an assessment has been completed, the conclusions are shared with all interested parties. They are asked to comment on an early draft of the report to make sure the data they provided are presented correctly and responsibly. Sometimes agencies will begin to carry out recommendations when they read the draft conclusions and recommendations.

Community: ADPH needs to determine what people in the area know about the site and what health concerns they may have about the site. Therefore, ADPH gathers information and provides its findings to the public. ADPH works closely with the local health department to provide the affected population informed about the type of contamination and conducts health education activities to ensure they understand the health effects and or outcome from being exposed to a specific contaminant. The public is broadly defined to include people who live or work nearby, property owners, business owners, civic leaders, health professionals, community groups, and anyone else who is interested or concerned. ADPH is available to answer questions or assist the public at all times.

Comments: If you have questions or comments after reading this report, please send them to the Alabama Department of Public Health, 201 Monroe Street, Suite 1470, Montgomery, Alabama 36104.

Table of Contents Page

Summary and Statement of Issues

The Alabama Department of Public Health (ADPH) was asked by the Alabama Department of Environmental Management (ADEM) to provide a public health evaluation of the Hickory Street Landfill, located in Mobile County, Alabama.

The Hickory Street Landfill was an open active dump dating before 1940 through the 1970's. The site reverted to a permitted sanitary landfill around 1970. Prior to 1970, the landfill accepted any kinds of wastes without restriction. Some of the products were electroplating sludges, solvents, organic and inorganic chemicals, heavy metals, cyanide and reactive sulfide wastes.

A portion of the dumpsite is located in a wetlands area that is prone to flooding. It has been stated that this portion of the dumpsite is 12 feet below the natural grade, and there are some materials buried there.

Former employees of the dumpsite stated that it was not uncommon to see numerous drums with a poison symbol on them. It has been reported that heavy equipment operators would crush the 55 gallon drums containing ignitable liquids, and they would explode. A fatality was reported when an equipment operator crushed a drum and it exploded, burning the bulldozer and the operator.

Some of the patrons that utilized the open dump site were Chevron Chemicals, Courtaulds, Gulf Plating Company, and private haulers.

There has never been a documented removal action or cleanup of the materials placed in the landfill. There are approximately 57 acres that comprise the landfill which is estimated to be 50 feet higher than the existing grade. It is estimated that 130,680,000 cubic feet of industrial and commercial waste is buried under the capped portion. The Hickory Street Landfill was covered with a two foot clay cap in the early 1980's. It has been noted that some areas of the cap have been compromised by erosion.

Monitoring wells on the landfill have confirmed the presence of volatile organics such as tetrahydrofuran, toluene, methyl ethyl ketone, and metals such as lead, cadmium, copper and zinc. The pesticide chlordane was also found.

Methane gas has been known to build up in the monitoring wells and pop the tops off the wells. This pressure is can be attributed to the degrading of buried materials that have been buried in the landfill. There are no other methane sources off site that would migrate to the Hickory Street Landfill.

The City of Mobile has undertaken fencing the entire site. Although in the past there was evidence that trespassing has occurred, there were no signs that the soil was disturbed by excavation which would more readily aerosolize contaminants. Secondly, these contaminants are located at a depth below the surface with which the public would not come in contact. In the event that a trespasser does cross the site, he would not be exposed to levels of contaminants that would cause health problems. The groundwater and surface water have shown a need for

additional testing to determine if contaminants are migrating off site into the creeks and wetlands, but contaminants from the landfill have not been detected off site in either media to date. A fish consumption advisory on the northernmost portion of Three Mile Creek approximately ½ mile northeast of the landfill, exists due to the chemical chlordane. The residents living nearest the site obtain drinking water from the Mobile Water Works. ADPH has reviewed the data and determined there are no health concerns for the residents that live ½ mile from the site. Local citizens and government are concerned that the site poses a significant health hazard. ADPH has not been able to substantiate this claim.

This property has been abandoned for approximately 20 years. The Alabama Department of Environmental Management (ADEM) has conducted an initial site assessment and conducted sampling of the soils and groundwater. Although the preliminary findings have shown that there are slightly elevated levels of volatile organics and heavy metals in the soil and groundwater, **there has not been a current exposure. In the absence of an exposure, there is no completed pathway. Therefore, there is no public health hazard.**

Background

ADPH conferred with the City Planner of Mobile, on 11 February 2004. The City of Mobile has targeted this area for a recreational park as part of the Brownfields initiative. There will be riding paths, walking trails and scenic views. There is no provision for homes or other residential or commercial structures. Currently, the Hickory Street Landfill site remains unused and, to the best of our knowledge, has never been remediated. Originally, it was assumed that the capped portion of the landfill was owned entirely by the City of Mobile. Recent research by ADEM has proven that there are more owners. The northern portion of the landfill lies vacant and is privately owned by the Norton Construction Company and composes the majority of the acreage. The eastern portion of the landfill is owned by the Bay Equipment Company. The southern portion of the landfill is owned by the City of Mobile. The portion that is owned by the Bay Equipment Company is not capped because the dumping of materials did not extend to this area. The Bay Equipment Company stored large piping materials and few transportation vehicles on the site. Past exposure to commercial workers would have been minimal There are a few unused office structures on the property, but all have been vacant for some time. The remaining portion is under the cap that was installed in the early 1980's. (See Appendix 1, page 12)

Hickory Street Landfill is a Targeted Brownfields Assessment (TBA). TBA sites are usually contaminated sites that have the potential to be remediated below the maximum contaminant level (MCL) and then utilized for other purposes such as recreation areas or housing developments. **This site will not employ housing as part as the revitalization effort**. Hickory Street Landfill is located in a remote portion of northern Mobile. There are houses located on the Northern end of Hickory Street, however, the nearest home to the site is located approximately ½ mile away. ADPH has confirmed that the site is fenced, less a small portion in which persons may enter. Although persons may enter through this unfenced portion, the contaminants are at a depth where they would not come in contact with the person and a completed pathway does not exist. There are signs posted to prevent trespassing. In the event that trespassing should occur, contaminants are located well below the surface of the ground under a clay cap. Exposure to contaminants is unlikely from a person moving through the site.

To date, there is no record of any removal action or cleanup of the Hickory Street Landfill site.

In 2002, ADEM conducted a Preliminary Assessment (PA) of the site and found environmental contaminants in groundwater above the MCL. These contaminants included arsenic, barium, cadmium, lead, and mercury.

Laboratory sampling did confirm the presence of mercury and chromium in surficial soils down to 18 inches. The highest level of mercury detected was 66.8 ppm in a sample collected from property owned by the city of Mobile. The health based comparison value is 70 ppm. The highest level of chromium detected was 1409 ppm in a sample collected from property owned by the city of Mobile. The health based comparison value is 2000 ppm. The highest level recorded was Selected results of the characterization sampling for soil borings are represented in the tables found at appendix 1, page 12.

Although these samples exceed the comparison values, these comparison values are not used as health effect levels, but as screening levels to target these chemicals for further exposure evaluation. For a health hazard to exist, these contaminants would have to find a route of entry into the body through inhalation, and or ingestion. ADPH nor ADEM has not determined that these are viable routes to affect the health of individuals because either the contaminants are located away from the source or at a depth in which persons would not come in contact with them.

Community Health Concerns

In May of 2002, Representative Joseph Mitchell of the Alabama House of Representatives sent a letter to ADEM requesting that they investigate the property. ADEM's initial assessment did find contamination on the site that was above levels of concern. State Representative Mitchell sent another letter to ADEM requesting a study of the site. ADEM returned a letter to him stating that the site did warrant further investigation. ADPH and ADEM are working cooperatively to gather the facts and present them to the public in a manner that is acceptable for all involved. ADEM requested that ADPH review the preliminary test data to ascertain if an exposure scenario existed or could possibly exist in the future.

The City of Mobile has planned to utilize the property as recreational urban space which includes park areas for youth, walking/ riding paths for pedestrians and cyclists, and other amenities.

ADPH has reviewed the available data and has not found a viable exposure pathway that would lead to health problems within the community. Vapor intrusion is not an issue because the contaminants are located ½ mile away from the nearest home. Additionally, the city of Mobile has not planned to include any enclosed buildings or structures that would pose a vapor intrusion problem. If changes to the proposal for land use should occur, ADPH and ADEM will reevaluate them at that time.

There have been verbally reported cases of cancer to local health officials, but ADPH has not been able to verify if these cases are related to any of the contaminants found at the site. There are no incidences of vapor intrusion, nor do any of the residents that are reporting the cancers

live on Hickory Street or have either worked at the landfill. Based on this information, there is no exposure that could cause health problems based on the contamination at the site. Additionally, ADPH enlisted the services of the Alabama Cancer Registry and reviewed the available data on cancers within Mobile County around the site. It was found that the numbers of cancers were not abnormally higher than the state cancer rates of the same type. A slight increase incidence is thought to be attributed to the local hospitals case-finding procedures.

The ADPH Health Educator is currently preparing materials to inform the public in reference to exposures.

ADPH is committed to ensuring that public health is safeguarded and will continue to locate and analyze pertinent data as it becomes available.

Evaluation of Environmental Contamination and Potential Exposure Situations

What is meant by exposure?

Public health assessments are driven by exposure to, or contact with, environmental contaminants. Contaminants 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 that contaminant—if they breathe, eat, drink, or come into skin contact with a substance containing the contaminant. If no one comes into contact with a contaminant, then no exposure occurs, and thus no health effects could occur. An exposure pathway has five elements: (1) a source of contamination, (2) an environmental medium, (3) a point of exposure, (4) a route of human exposure, and (5) a receptor population. The source is the place where the chemical or radioactive material was released. The environmental media (such as, groundwater, soil, surface water, or air) transport the contaminants. The point of exposure is the place where people come into contact with the contaminated media. The route of exposure (for example, ingestion, inhalation, or dermal contact) is the way the contaminant enters the body. The people actually exposed are the receptor population.

How Does ADPH Determine Which Exposures To Evaluate?

Health assessors evaluate site conditions to determine if people could have been, are, or could be exposed (i.e., exposed in a past scenario, a current scenario, or a future scenario) to site-related contaminants. When evaluating exposure pathways, it is determined to what type of contaminated media (soil, sediment, water, air, or biota) through ingestion, dermal (skin) contact, or inhalation people might be exposed.

If exposure was, is, or could be possible, assessors consider whether contamination is present at levels that might affect public health and at what dose and for how long a duration. If it is determined that an exposure pathway exists, the contaminant level is compared against health-based comparison values. Comparison values are derived for each of the different media and reflect an estimated contaminant concentration that is not likely to cause adverse health effects for a given chemical, assuming a standard daily contact rate (e.g., an amount of water or soil consumed or an amount of air breathed) and body weight. Comparison values are not thresholds for adverse health effects. Comparison values establish contaminant concentrations many times

lower than levels at which no effects were observed in experimental animals or human epidemiologic studies. If contaminant concentrations are above comparison values, assessors further analyze exposure variables (for example, duration and frequency of exposure), the toxicology of the contaminant, other epidemiology studies, and the weight of evidence for health effects.

Discussion

Surface water and groundwater have been tested for the past 20 years to ensure there is no migration of contaminants. Soil and sediment from the wetlands and creeks have not been tested. However, these waterways eventually empty into the Mobile Bay, which is periodically tested and has not shown a migration of these contaminants.

Previous CERCLA assessments have indicated a concern for migration of contaminants out into the wetlands and creeks from the capped landfill. ADEM plans to conduct additional testing on the property, but testing dates have not yet been set.

The initial soil and water analyses revealed the presence of heavy metals. These contaminants are located under the capped portion of the landfill. This cap is approximately 2 feet thick and should provide an adequate barrier to prevent exposure to persons that may enter the site unlawfully. A portion of the cap is showing signs of deterioration. However, it is located in an area that is not easily accessible.

Should migration of contaminants through the soil occur, this will not impact the drinking water supply for northern Mobile as they receive their water from a protected and tested supply by the Mobile Water Works.

Three Mile Creek originates on the southwestern portion of the site from what appears to be a natural spring head and flows northeasterly along the eastern boundary of the industrial canal (a waterway which joins Three Mile Creek) and empties into the Mobile River. The Mobile River, in turn, empties into the Mobile Bay. Testing has revealed no migration of contaminants into the Mobile Bay waterway.

There are no occupied structures located near the site where vapor intrusion of methane gases or other chemicals from the landfill will occur. Additionally, the city of Mobile has not planned to include any enclosed buildings or structures that would pose a vapor intrusion problem. If changes to the proposal for land use should occur, ADPH and ADEM will reevaluate them at that time; therefore, this pathway is not plausible.

Children's Health Concerns

ADPH recognizes that infants and children can be more sensitive than are adults to exposure to some environmental contaminants or hazards than adults in communities faced with contamination of their water, soil, air, or food. This sensitivity is a result of (1) children are more

likely to be exposed to certain media (e.g., soil or surface water) because they play and eat outdoors (2) children are shorter than adults, which means that they can breathe dust, soil, and vapors closer to the ground (3) children are smaller than adults, thus childhood exposure results in higher doses per body weight. Children can sustain permanent damage if these factors lead to toxic exposure during critical growth stages. ADPH is committed to evaluating special interests for children at sites such as the Hickory Street Landfill. The location of this site is not in proximity to play areas of infants and small children; and therefore, their risk of contamination is low.

ADPH has evaluated the likelihood that children living around the Hickory Street Landfill might be exposed to contaminants at levels of health concern if they eat the soil or drink surface water. The residents surrounding the site are on municipal water which intakes from a source that is not contaminated. ADPH stresses that adults and children should not trespass on the Hickory Street Landfill property, ingest the soil, or drink water from unapproved sources.

Conclusions

A completed pathway does not exist. The site itself is fenced except for a small portion in which persons may enter; however, there are signs posted to discourage trespassing. In the event that persons do access the site, the capped portion of the site provides a barrier to prevent exposure.

The residents close to the site receive drinking water from a protected source and there are no private wells. There are no homes or other occupied buildings located on the site. One structure on the site has not been occupied since 1982. In the absence of a completed pathway there is NO PUBLIC HEALTH HAZARD.

Recommendation

- The City of Mobile should ensure that the site is fenced and or patrolled to discourage trespassing.

- ADEM should continue to monitor fish tissue from Three Mile creek and One Mile Creek.

Public Health Action Plan

- ADEM will continue to conduct sampling of the four permanent monitoring wells and collect soil samples as needed. After their findings are complete, ADEM/ EPA may require responsible parties to remediate to standards for Brownfields projects.

- ADPH will provide health education on volatile organics and exposure potential for the public to minimize erroneous information.

- To reassure community members, ADPH will review fish tissue monitoring data on Three Mile and One Mile Creeks. If the data suggest levels above FDA guidance, a fish consumption advisory will be issued.

- ADPH will remain close working partners with ADEM and monitor the concentration of all remedial actions and address any public health questions or concerns regarding the Hickory Street Landfill.

- ADPH will continue to evaluate data as it becomes available and keep the communities informed

- ADPH will be available to address any public health questions or concerns.

- The city of Mobile has not planned to include any enclosed buildings or structures that would pose a vapor intrusion problem. If changes to the proposal for land use should occur, ADPH and ADEM will reevaluate them at that time.

References

ADEM Administrative Code, 2002. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Food and Drug Administration (FDA) "Action Levels For Poisonous or Deleterious Substances in Human Food and Animal Feed" Industry Activities Staff Booklet, August 2000.http://www.cfsan.fda.gov/~lrd/fdaact.html

Alabama Department of Environmental Management's Water Quality Report to Congress April 1992.

Alabama Department of Environmental Management's Water Quality Report to Congress April 1994.

Alabama's 2002 Water Quality Report to Congress (Clean Water Act 305(b) Report).

REPORT PREPARED BY

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Certification

This Hickory Street Landfill Health Consultation was prepared by the Alabama Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was begun. Editorial review was completed by the cooperative agreement partner.

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Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health assessment, and concurs with its findings.

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Team Leader, Cooperative Agreement Team, SSAB, DHAC, ATSDR

APPENDIX 1

TABLE 1

Soil boring, Mobile owned land (0-4' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	4.0	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/4/2003
lead	Soil	310.0	0.200	ppm	8/5/2003
Mercury	Soil	0.112	0.10	ppm	7/24/2003

Note: ug/L is a unit of measurement denoting micrograms per liter. This is equivalent to 1part per billion. These samples were taken from the groundwater monitoring well, therefore the samples are in ug/L.

Surficial Soils, Mobile owned land (0-2" deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	12.0	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/4/2003
lead	Soil	102.0	0.200	ppm	8/5/2003
Mercury	Soil	0.102	0.10	ppm	7/24/2003

Surficial Soils, Mobile owned land (0-2" deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	12.0	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/4/2003
lead	Soil	102.0	0.200	ppm	8/5/2003
Mercury	Soil	0.102	0.10	ppm	7/24/2003

TABLE 2

Soil Boring, 01 City of Mobile owned property (0-8' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	11.3	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/2/2003
lead	Soil	19.1	0.200	ppm	8/2/2003
Mercury	Soil	Below the MDL	0.10	ppm	8/2/2003

Soil Boring, 01 Bay Equipment owned property (0-8' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	7.4	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/2/2003
lead	Soil	9.8	0.200	ppm	8/2/2003
Mercury	Soil	Below the MDL	0.10	ppm	8/2/2003

Soil Boring, 02 Bay Equipment owned property (0-8' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis
Arsenic	Soil	2.0	1.0	ppm	8/2/2003
Cadmium	Soil	Below the MDL	1.0	ppm	8/2/2003
Lead	Soil	55.0	0.200	ppm	8/2/2003
Mercury	Soil	Below the MDL	0.10	ppm	8/2/2003

Note: ug/L is a unit of measurement denoting micrograms per liter. This is equivalent to 1part per billion.

ADEM Sampled water from the existing permanent groundwater monitoring wells located on site. The groundwater and surface water data suggests that there are only a few heavy metals and other contaminants above the MCL. Although there were slightly elevated levels for lead and mercury in test locations, overall, the site does not generate a public health hazard, because these contaminants are located at a depth where normal human activities would not unearth them and expose humans to elevated levels of contaminants. Selected results of the characterization sampling for ground water and surface water are represented in the tables below:

TABLE 3

Permanent Groundwater Monitoring Well-01 (20' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	MCL
Arsenic	water	Below the MDL	10.0	ppb	3/27/03	0.05mg/l
Barium	water	0.319	0.152	ppb	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ppb	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ppb	3/27/03	0.1mg/l
lead	water	40.1	2.00	ppb	3/27/03	0.015 mg/l
Mercury	water	0.499	0.4	ppb	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ppb	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ppb	3/27/03	N/A

Note: One part per billion is 1 part in 1,000,000,000. One drop of ink in one of the largest tanker trucks used to haul gasoline would represent 1 ppb.

Permanent Groundwater Monitoring Well-02 (20' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	MCL
Arsenic	water	Below the MDL	10.0	ppb	3/27/03	0.05mg/l
Barium	water	0.178	0.152	ppb	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ppb	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ppb	3/27/03	0.1mg/l
lead	water	2.28	2.00	ppb	3/27/03	0.015 mg/l
Mercury	water	0.589	0.4	ppb	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ppb	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ppb	3/27/03	N/A

Permanent Groundwater Monitoring Well-03 (20' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	
Arsenic	water	Below the MDL	10.0	ppb	3/27/03	0.05mg/l
Barium	water	Below the MDL	0.152	ppb	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ppb	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ppb	3/27/03	0.1mg/l
lead	water	41.8	2.00	ppb	3/27/03	0.015 mg/l
Mercury	water	0..512	0.4	ppb	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ppb	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ppb	3/27/03	N/A

Permanent Groundwater Monitoring Well-04 (20' deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	MCL
Arsenic	water	Below the MDL	10.0	ppb	3/27/03	0.05mg/l
Barium	water	0.158	0.152	ppb	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ppb	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ppb	3/27/03	0.1mg/l
lead	water	Below the MDL	2.00	ppb	3/27/03	0.015 mg/l
Mercury	water	0.556	0.4	ppb	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ppb	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ppb	3/27/03	N/A

TABLE 4

Temporary Groundwater Well-1, Bay Equipment (12’ deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	MCL
Arsenic	water	Below the MDL	10.0	ug/L	3/27/03	0.05mg/l
Barium	water	0.551	0.152	ug/L	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ug/L	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ug/L	3/27/03	0.1mg/l
lead	water	4.43	2.00	ug/L	3/27/03	0.015 mg/l
Mercury	water	Below the MDL	0.4	ug/L	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ug/L	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ug/L	3/27/03	N/A

Temporary Groundwater Well-2, City of Mobile (20’ deep)

Contaminant	Medium	Concentration	MDL	Units	Date of analysis	MCL
Arsenic	water	Below the MDL	10.0	ug/L	3/27/03	0.05mg/l
Barium	water	0.183	0.152	ug/L	3/27/03	2.0 mg/l
Cadmium	water	Below the MDL	0.087	ug/L	3/27/03	0.005 mg/l
Chromium	water	Below the MDL	0.079	ug/L	3/27/03	0.1mg/l
lead	water	112	2.00	ug/L	3/27/03	0.015 mg/l
Mercury	water	Below the MDL	0.4	ug/L	3/28/03	0.002 mg/l
Selenium	water	Below the MDL	10.0	ug/L	3/27/03	0.05 mg/l
Silver	water	Below the MDL	0.116	ug/L	3/27/03	N/A

Note: ug/L is a unit of measurement denoting micrograms per liter. This is equivalent to 1part per billion.

APPENDIX 2

Methods for Collecting Data

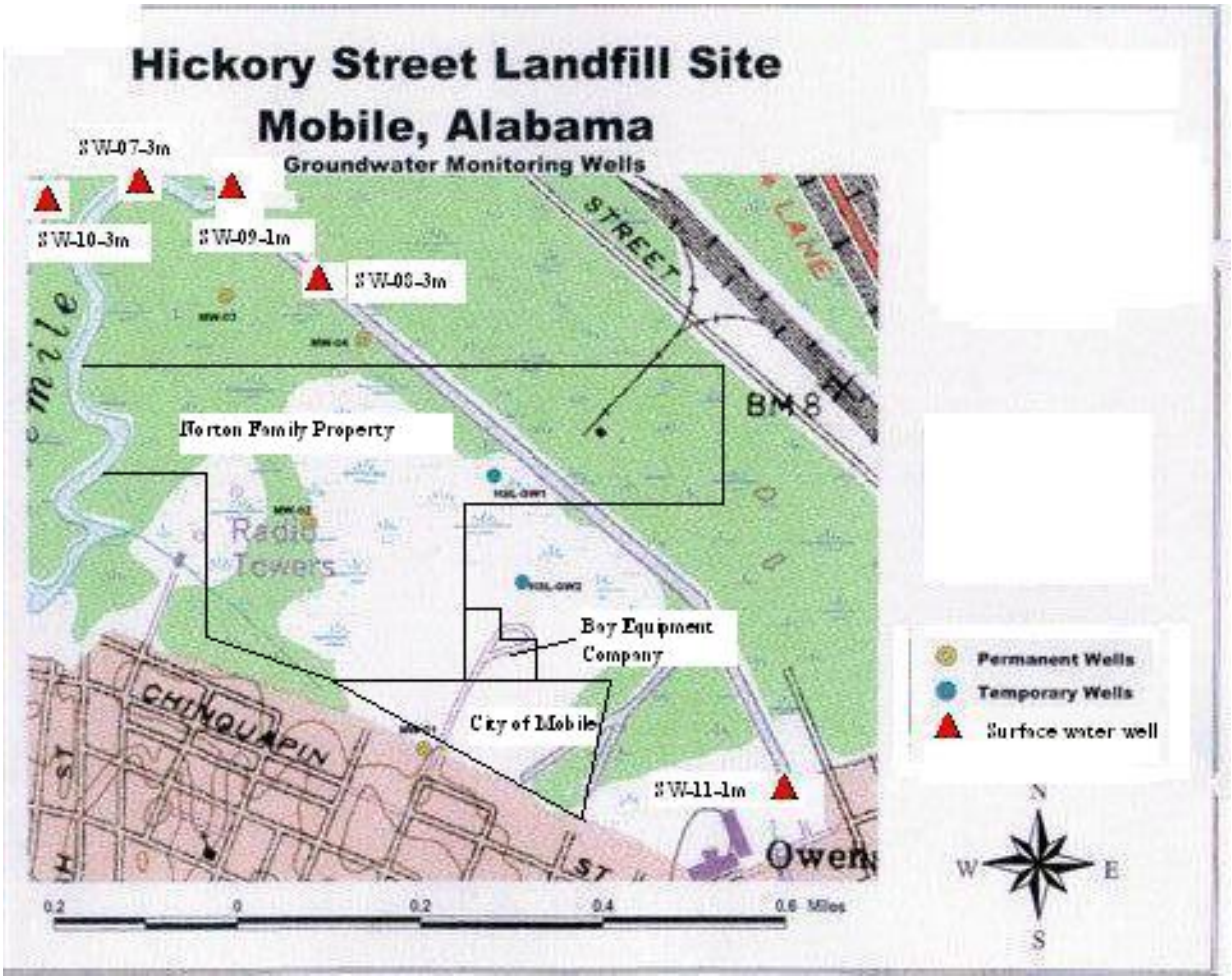
Soil

ADEM collected three different types of soil samples from the sampling area. The three types of soils were: surface soils, soil borings and soils from the existing ground water monitoring wells. These soil samples were collected by standard protocols and chain of custody followed. The soil samples were delivered to the lab for analysis.

Water

ADEM took water samples from the existing permanent groundwater monitoring wells located onsite. The samples were taken using standard protocols and chain of custody and sent to the lab for analysis.

Appendix 3


Hickory Street Landfill Site
Mobile, Alabama
Groundwater Monitoring Wells
SW-07-3m
SW-10-3m
SW-09-1m
SW-08-3m
STREET
LANE
BM 8
Norton Family Property
Radio Towers
Bay Equipment Company
City of Mobile
CHINQUAPIN
ST
SW-11-1m
Owen
Permanent Wells
Temporary Wells
Surface water well
N
W
E
S
0.2
0
0.2
0.4
0.6 Miles