Health Consultation

2009 Durrs Neighborhood Soil Testing

THE LINCOLN PARK COMPLEX
FT. LAUDERDALE, BROWARD COUNTY, FLORIDA

EPA FACILITY ID: FLN000407550

Prepared by
Florida Department of Health

JULY 26, 2010

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Foreword

This document summarizes public health issues for the Durrs neighborhood surrounding a former incinerator and other properties owned by the City of Ft. Lauderdale. The Florida Department of Health (DOH) evaluates site-related public health issues through the following processes:

- Evaluating exposure: DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it occurs on the site, and how people may be exposed to it. Usually, DOH does not collect its own environmental sampling data. We rely on information provided by the Florida Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency (EPA), and other government agencies, private businesses, and the public.
- Evaluating health effects: If there is evidence that people were–, are–, or could be exposed to hazardous substances, DOH scientists will determine whether that exposure could be harmful to human health. We base this report on existing scientific information and focus on public health; that is, the health impact on the community as a whole.
- Developing recommendations: In this evaluation report, DOH outlines its conclusions regarding any potential health threat posed by the Lincoln Park Complex site, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies, including the EPA and Florida DEP. If, however, an immediate health threat exists or is imminent, DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.
- Soliciting community input: The evaluation process is interactive. DOH starts by soliciting and evaluating information from various government agencies, individuals or organizations responsible for cleaning up the site, and those living in communities near the site. We share our conclusions about the site with the groups and organizations providing the information. Once an evaluation report has been prepared, DOH seeks feedback from the public. *If you have questions or comments about this report, we encourage you to contact us*.

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Purpose

The Florida DOH evaluates the public health significance of environmental contamination through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia. DOH reviewed 2009 soil test results for the Durrs neighborhood and assessed the possible health threat at the request of the Florida DEP.

Summary

INTRODUCTION

The Durrs neighborhood, including the Mt. Olive Apartments, surrounds the 16.5-acre Lincoln Park Complex in Ft. Lauderdale (Broward County), Florida. The complex includes a former municipal incinerator, the former Lincoln Park School, and the Lincoln Park properties. The City of Ft. Lauderdale completely fenced the former incinerator area, cleaned contaminated soil on the One-stop Shop (the former elementary school) property, and capped contaminated soil on the Lincoln Park playground. As a result, there are no current exposure pathways to soil contaminants on the Lincoln Park Complex site proper. In previous reports, DOH reviewed groundwater data, soil data, fruit testing data and blood-lead results for this hazardous waste site.

In May 2009, DEP's contractor tested soil to determine the geographical extent and levels of contamination in Durrs neighborhood. DEP's contractor collected 29 surface (0-3 inches below ground surface (bgs)) and subsurface (3-24 inches bgs) soil samples at 18 residential properties and one apartment complex. They collected soil borings and visually screened for incinerator debris. They had the soil analyzed for arsenic, barium, dioxins, lead, and polycyclic aromatic hydrocarbons (PAHs). DEP notified all property owners of their individual test results.

CONCLUSIONS

DOH concludes that touching, breathing or incidentally ingesting (swallowing) contaminants found in the **surface** soil in yards in the Durrs neighborhood is not likely to harm people's health. DOH also concludes that coming into contact with the lead in the **subsurface** soil in one yard on NW 19th Terrace could harm people's health.

BASIS FOR DECISION

Children in the Durrs neighborhood may be exposed to contaminants in soil when playing in yards by putting their soiled fingers or toys in their mouths. In addition, Durrs residents may be exposed by unintentionally ingesting soil or breathing contaminated dust. Except for lead in one

subsurface sample in a single yard on NW 19th Terrace, the amount of contaminants in soil that could get into a child's or an adult's body is below a level that would harm their health. If someone dug up the subsurface soil at the one residence on NW19th Terrace, long-term exposure to lead could cause harmful health effects.

NEXT STEPS

To protect public health, the contaminated soil in the single yard on NW 19th Terrace should be removed.

As recommended in previous reports, Durrs residents should follow safe gardening practices when growing fruits or vegetables.

DOH will review any additional soil data for the Durrs neighborhood.

FOR MORE INFORMATION

If you have concerns about your health, you should contact your health care provider. You may also contact the Florida Department of Health toll free at 877 798-2772 and ask for information about the Lincoln Park hazardous waste site.

Background

Site Description and History

The 16.5-acre Lincoln Park Complex is in a commercial and light industrial area north of Sistrunk Boulevard between NW 18th Avenue and Interstate 95, in Ft. Lauderdale (Broward County), Florida (Figure 1). The complex includes the former City of Ft. Lauderdale (CFL) municipal incinerator and later a waste water treatment plant, the former Lincoln Park Elementary School (now the One-stop Shop for City of Ft. Lauderdale permits), and the Lincoln Park playground (Figures 2 & 3). A detailed timeline including the former land uses for this site and detailed regulatory history is located in Appendix A.

Florida DOH has been involved in this site since 2004. In a March 2005 health consultation report, DOH found the blood lead levels in 40 children and three young adults attending after school programs or playing at the former Lincoln Park School were below the Centers for Disease Control (CDC) guidelines for intervention for lead-poisoned individuals [ATSDR 2005a].

In an October 2005 public health assessment report, DOH reviewed 2004 soil and groundwater test data for the Lincoln Park Complex. DOH found that the site posed "no apparent public health hazard," based on the information available at that time. DOH concluded that the health threat from past exposures was "indeterminate." The Lincoln Park Complex could present a future public health hazard if people ingested, inhaled, or had skin contact with the highest levels of lead, copper, or arsenic measured in soil collected deeper than 6 inches below land surface. [ATSDR 2005b].

In a March 2007 health consultation report, DOH reviewed all of the available soil test data for the Lincoln Park Complex. Based on the limited available data, DOH concluded that the public health hazard category for surface soil contaminants on residential properties to be a "no apparent public health hazard." However, the report explained that chronic daily exposures to the highest levels of lead measured in surface soil might adversely affect sensitive subpopulations with high blood pressure and anemia [ATSDR 2007a].

In May and June of 2008, the City of Ft. Lauderdale completed removal of contaminated soil in the right-of-way areas north of the trash transfer station (former incinerator property) and an adjacent residential property on NW 19th Terrace. During the same time period, DEP was making arrangements to conduct additional soil testing in the residential areas to determine the presence or absence of buried incinerator debris and the extent of soil contamination at residential properties located offsite in the Durrs neighborhood. As of 2009, the City of Ft. Lauderdale has completely fenced the former incinerator area, cleaned contaminated soil on the "One-stop" property, and capped contaminated soil on the Lincoln Park playground. As a result, there are no current exposure pathways to soil contaminants on the Lincoln Park Complex site proper.

In a September 16, 2009 health consultation report, DOH reviewed mango testing data and concluded that eating mangos grown near the Lincoln Park Complex is not expected to harm people's health. The levels of metals and pesticides found in the fruit were below ATSDR

comparison values and dietary intake levels. Therefore, there is a no apparent public health hazard from eating these mangos [ATSDR 2009a].

In October 2009, DOH mailed nearby residents a fact sheet (Appendix C) notifying them of the results of the mango testing and that additional residential soil testing was under review.

In May 2009, DEP's contractor, Environmental and Ecology, Inc. (E&E) sampled residential properties in the Durrs neighborhood (Figure 4) including the Mt. Olive Apartment complex (Figure 5) to determine the geographical extent and levels of contamination. E&E collected 29 samples at 18 residential properties and 10 samples at the apartment complex (including the playground). Incinerator debris is not generally homogeneous in distribution. Therefore, E&E visually screened the soil borings for incinerator debris [E&E 2009].

DEP notified all property owners of their individual test results. DEP requested that DOH evaluate these soil test results. In this health consultation, we evaluate these results and determine the possible public health implications.

Demographics
In 2000, about 19,643 persons lived within a 1-mile radius of the site. Approximately 39% were 19 years of age or less. Approximately 88% were black, 8% were white, and less than 3% were Latino/Hispanic. American Indian/Alaska Native, Asian/Pacific Islander, and all other racial/ethnic groups made up about 1% of the population [US Census 2000].

Land Use
Although properties along Sistrunk Boulevard (NW 6th Street) are commercial and light industrial, much of the area north and south of Sistrunk is residential. The nearest residences are north of the former incinerator site, west, north, and east of the former Lincoln Park Elementary School, and east of Lincoln Park. Interstate 95 borders the site on the west, and residential and industrial areas are west of I-95. The former Wingate Road Incinerator, a Superfund National Priorities List hazardous waste site, is 1½ miles northwest of this site.

Community Health Concerns

In September 2009, the Florida DEP sent out notification letters to inform property owners and occupants about residential soil sampling results performed earlier that year. Notification letters were also sent to residents living at nearby properties that were not sampled to inform them about the pollutants detected in soils at nearby properties that DEP had sampled. The Florida DOH received two phone calls from residents receiving a DEP letter. One expressed concerns specifically about the soil contamination and safety of children playing in the apartment complex playground. The other one had concerns about the potential health impact on pets from the chemicals found in the soil.

In October 2009, Florida DOH sent out a community update (Appendix C) to nearby residents to inform them that a health consultation was in progress to review the latest residential soil testing data. Florida DOH did not receive any additional calls after the community update was released.

In May 2010, Florida DOH and ATSDR offered this draft report to the community for public comment and addressed the comments and concerns that we received in the final report (Appendix C).

Florida DOH provided local residents with a summary of the draft report and its findings in a community update and a press release to the local media. Florida DOH explained the public comment period process, including how to receive a copy of the draft report and how to provide comments to be addressed in the final report.

Discussion

Environmental Sampling

E&E collected 29 **surface** (0-3 inches below ground surface (bgs)) and **subsurface** (3-24 inches bgs) soil samples at residential locations in the Durrs neighborhood in May 2009 (Tables 1 & 2 and Figures 4 & 5). E&E visually screened the soil borings for incinerator debris and had the samples analyzed for arsenic, barium, dioxins, lead and polycyclic aromatic hydrocarbons (PAHs). Approximately one-third of the samples collected from the single-family homes in the Durrs neighborhood showed possible evidence of incinerator debris in no discernable pattern. All of the samples collected in the Mt. Olive Apartment complex showed possible evidence of buried incinerator debris [E&E 2009].

Levels of arsenic, dioxins, lead and PAHs in some Durrs neighborhood **subsurface** soil samples were above ATSDR health-based screening values. The highest soil concentration of barium in both surface and **subsurface** soil, however, was below the ATSDR screening values and is not likely to cause harm to human health.

Environmental sampling indicated that levels of contaminants at one residence on NW 19th Terrace were significantly higher than surrounding properties. It is important to note, the sampling at this residence occurred after the City conducted a limited soil removal action at this property in 2008 (Appendix A).

2009 **Surface** soil sampling results:

- **Arsenic** levels exceeded the federal ATSDR health-based comparison value for cancer at 21 out of 29 **surface** sampling locations. However, arsenic levels in **surface** soil are <u>not</u> at levels high enough to be expected to harm human health. The maximum theoretical excess cancer risk for surface soil is one additional cancer per 100,000 people, classified as a <u>very low</u> increased risk.
- **Barium** levels did not exceed the ATSDR health-based comparison values at any of the **surface** sampling locations. Barium levels found in the **surface** soil are <u>not</u> expected to harm human health.
- **Dioxin** levels did not exceed the ATSDR health-based comparison value at any of the **surface** sampling locations. Dioxin levels found in the **surface** soil are <u>not</u> expected to harm human health.
- **Lead** levels did not exceed the ATSDR health-based comparison value at any of the **surface** sampling locations. Lead levels found in the **surface** soil are <u>not</u> expected to harm human health.

- **PAHs** exceeded ATSDR health-based comparison value at 16 out of 29 **surface** sampling locations. However, incidental ingestion of very small amounts of **surface** soil with the highest PAH levels from the Durrs neighborhood, is not expected to harm human health. The maximum theoretical excess cancer risk for **surface** soil is one additional cancer per 1,000,000 (one million) people, classified as a very low increased risk.

2009 **Subsurface** Soil results:

- **Arsenic** levels exceeded the ATSDR health-based comparison value at 12 out of 29 **subsurface** sampling locations. However, arsenic levels found in **subsurface** soil are not high enough to be expected to harm human health. The maximum theoretical excess cancer risk for **subsurface** soil is three additional cancers per 1,000,000 (one million) people, classified as a very low increased risk.
- **Barium** levels did not exceed the ATSDR health-based comparison value at any of the **subsurface** sampling locations. Barium levels found in the **subsurface** soil are not expected to harm human health.
- **Dioxin** levels exceeded the ATSDR health-based comparison value at one out of 29 **subsurface** sampling locations analyzed. Incidental ingestion of very small amounts of **subsurface** soil with the highest dioxin levels from the Durrs neighborhood is not expected to harm human health. DOH did not estimate a lifetime excess cancer risk for the estimated dioxin exposure. The EPA considers dioxins to be a probable human carcinogen; however, a cancer slope factor has not been determined. Dioxin levels found in **subsurface** soil are not expected to harm human health.
- **Lead** levels exceeded the ATSDR health-based comparison value at one out of 29 **subsurface** sampling locations. Children chronically exposed to **subsurface soil** containing the highest lead level found in the Durrs neighborhood could have elevated blood lead levels. **These modeled levels for residential subsurface soil do not represent levels children are likely to be exposed to on a daily basis. Rather, they represent the potential for exposure, if residents dig on their property.**
- **PAH** levels exceeded the ATSDR health-based comparison value at three out of 29 **subsurface** sampling locations. Incidental ingestion of very small amounts of **subsurface** soil with the highest PAH levels from the Durrs neighborhood, is not expected to harm human health. The maximum theoretical excess cancer risk for **subsurface** soil is four additional cancers per 1,000,000 (one million) people, classified as a very low increased risk.

Quality Assurance and Quality Control

The completeness and reliability of the referenced environmental data determine the validity of the analyses and conclusions drawn for this health consultation. DOH used existing environmental data. We assume these data are valid. Florida DEP's contractor and the laboratory they used have approved comprehensive quality assurance project plans.

Pathway Analysis

Chemical contaminants in the environment can be harmful to public health, but only if people contact them. It is essential to determine or estimate the frequency of contact people could have

with hazardous substances in their environment to assess the public health significance of the contaminants. We examine human exposure pathways to determine whether people are exposed to contaminants at or near a site. DOH determines exposure to environmental contamination by identifying exposure pathways. An exposure pathway is classified by the environmental medium (e.g., water, soil, air, food). An exposure pathway consists of five elements: a source of contamination, transport through an environmental medium, a point of exposure, a route of exposure, and a receptor population. A completed exposure pathway exists when people are actually exposed through ingestion or inhalation of, or by skin contact with, a contaminated medium.

Completed Exposure Pathways

Surface Soil: Environmental sampling found contamination in some **surface** soil sampling locations in the Durrs neighborhood, including the Mt. Olive Apartments. DOH considers incidental ingestion of surface soil a completed pathway for past, current and future exposures.

Potential Exposure Pathway

Subsurface Soil: Environmental sampling found contamination in **subsurface** soil sampling locations in the Durrs neighborhood, including the Mt. Olive Apartments. DOH considers incidental ingestion of **subsurface** soil a potential exposure pathway for past, current and future exposures. DOH characterizes this pathway as a potential pathway and not completed because people are most likely to come into daily contact with the top layer of soil only. However, in certain circumstances, such as gardening, it would be possible to bring subsurface contaminants to the surface. In that instance, exposure could occur.

Identifying Contaminants of Concern

DOH compares the maximum concentrations of contaminants identified at a site to comparison values for contaminated environmental media for which a completed exposure pathway, or potential exposure pathway, is found to exist. Standard comparison values (CVs) are specific to the type of environmental media (water, soil, sediment) that is contaminated. DOH uses these standard comparison values to select site contaminants for further evaluation [ATSDR 2009b]. Site contaminants that fall below standard comparison values are unlikely to impact health, and are not evaluated further. This comparison helps to put the public health significance of the exposure level into perspective. Comparison values are not used to predict health effects or to establish clean-up levels. If the concentration of a contaminant exceeds the CV, or if the contaminant is a carcinogen, it is evaluated in further detail. This does not necessarily mean that a contaminant represents a health risk but rather that it warrants further study. DOH evaluates these exposures by estimating a daily dose for children and adults for possible non-cancer health effects. If the contaminant is a carcinogen, DOH calculates a theoretical cancer risk based on a 70-year life expectancy. To estimate an increased risk of cancer, DOH multiplies the estimated exposure dose for an adult by the cancer slope factor for each contaminant considered a human carcinogen.

In the following sections, we evaluate the contaminants of concern found during the 2009 soil sampling in the soil in the Durrs neighborhood and Mt. Olive Apartments and discuss whether long-term, daily exposures would be likely to cause non-cancer and cancer health effects.

Public Health Implications

DOH estimated possible incidental ingestion exposures by calculating a dose using the highest levels of each contaminant found during the May 2009 soil testing in the Durrs neighborhood. Typically, DOH estimates the likelihood of illness from exposures to the top three inches of soil since people are most likely to contact the top layer of soil. However, the **subsurface** soil contamination in the Durrs neighborhood may be brought to the surface because of gardening, landscaping or building. DOH calculated the estimated dose assuming residents' exposure to subsurface soil (3-24 inches deep) even though routine contact with subsurface soil remains unlikely.

The exposure to contaminants in soil via incidental ingestion is greater for children because they ingest more soil due to hand-to-mouth behavior. Inadvertent soil ingestion among young children may occur through the mouthing of objects or hands. Mouthing behavior is a normal phase of early childhood development.

Compared to ingestion, the estimated dose for inhalation was insignificant. This means that, if the ingestion and inhalation doses are added together, the inhalation doses insignificantly increases the entire exposure dose. Therefore, we only considered the ingestion doses for exposure.

Toxicological Evaluation

This subsection discusses exposure levels and possible health effects that might occur in people exposed to the highest measured levels of the contaminants of concern in the Durrs neighborhood. To evaluate exposure, an estimated daily dose for children and for adults was calculated for each contaminant of concern identified at the site. Kamrin explains the concept of dose in the following manner:

> . . .all chemicals, no matter what their characteristics, are toxic in large enough quantities. Thus, the amount of a chemical a person is exposed to is crucial in deciding the extent of toxicity that will occur. In attempting to place an exact number on the amount of a particular compound that is harmful, scientists recognize they must consider the size of an organism. It is unlikely, for example, that the same amount of a particular chemical that will cause toxic effects in a one-pound rat will also cause toxicity in a one-ton elephant [Kamrin 1988].

This amount per weight is the *dose*. A dose is calculated in toxicology to compare the toxicity of different chemicals in different animals. A dose is expressed in milligrams (mg) of contaminant per kilogram (kg) of body weight per day (mg/kg/day), A milligram is $^{1}/_{1,000}$ of a gram (a gram weighs about what a raisin or paperclip weighs); one thousand grams (a kilogram) weighs approximately 2 pounds.

To calculate the daily dose of each contaminant, standard assumptions are used about body weight, ingestion and inhalation rates, duration of exposure, and other factors needed for dose calculation [ATSDR 2005c; EPA 1997]. In calculating the dose, we assume people are exposed to the maximum concentration measured at the site for each contaminant in the soil. There are three primary routes of exposure: inhalation, ingestion, and dermal (skin) exposure. For each of these exposure routes, ATSDR groups health effects by duration of exposure. Acute exposures

are those with duration of 14 days or less; intermediate exposures are those with duration of 15–364 days; and chronic exposures are those that occur for 365 days or more (or an equivalent period for animal exposures). ATSDR's toxicological profiles also provide information on the environmental transport and regulatory status of contaminants. ATSDR's toxicological profiles are available on the web at: http://www.atsdr.cdc.gov/toxpro2.html.

To estimate a non-cancer exposure dose from incidental ingestion (swallowing) of contaminated surface and subsurface soil, DOH assumed the following:

- children ingest an average of 200 milligrams (mg) of soil per day (about the weight of a postage stamp), adults ingest an average of 100 mgs of soil per day
- average body weight: for children is 16 kilograms (kgs) (34 lbs), for adults is 70 kg (154 lbs)
- exposure duration for surface soil: 24 hours per day, 365 days per year for 70 years
- exposure duration for subsurface soil: 2 hours per day, 365 days per year for 70 years
- children and adults would ingest contaminated soil at the maximum concentration measured for each contaminant

Estimated exposure doses are compared to ATSDR chemical specific minimal risk levels (MRLs). MRLs are comparison values that establish exposure levels many times lower than levels where no effects were observed in animals or human studies. The MRL is designed to protect the most sensitive, vulnerable individuals in a population. The MRL is an exposure level below which non-cancerous harmful effects are unlikely, even after daily exposure over a lifetime. Although concentrations at or below the relevant comparison value may reasonably be considered safe, exceeding a comparison value does not imply that adverse health effects would be expected. If contaminant concentrations are above comparison values, DOH further analyzes exposure variables (for example, duration and frequency), the toxicology of the contaminant, past epidemiology studies, and the weight of evidence for health effects. For this report, chronic MRLs were used where possible because the possible exposure duration was longer than a year [ATSDR 2005c].

Surface Soil (0-3 inches deep)

Arsenic

Arsenic is a naturally occurring metal that is a common component of the earth's crust. Low levels of arsenic are found throughout the environment. While arsenic can be released into the environment from natural sources, releases from anthropogenic (man-made) sources are much more prevalent. Man-made sources can include metal mining and smelting, wood combustion, coal combustion, waste incineration and pesticide application. To be protective of human health, we assumed that the arsenic that was found in the off-site soils was in the more toxic inorganic form [ATSDR 2007b].

Non-cancer illness:
Arsenic was not detected above non-cancer screening guidelines in the **surface** soil of the Durrs neighborhood. The highest arsenic level found in the surface soil of the Durrs neighborhood was 5.4 milligrams per kilogram (mg/kg), well below the corresponding comparison value for

children of 20 mg/kg (Table 1). Therefore, incidental ingestion of arsenic measured in residential surface soils of the Durrs neighborhood is not expected to cause non-cancer illness.

Cancer Illness:
To evaluate a theoretical cancer risk from incidental ingestion of arsenic, the US EPA developed a cancer slope factor based on a human study where subjects developed skin cancer. To estimate the cancer risk, DOH multiplied the cancer slope factor by a lifetime average daily dose. The maximum theoretical excess cancer risk for lifetime exposure of incidental ingestion of arsenic in the Durrs neighborhood **surface** soil is one additional cancer per 100,000 people. It is classified as a very low increased risk. Because of the uncertainties and conservatism inherent in deriving cancer slope factors, this is only an estimate of risk; the true risk is unknown and could be as low as zero [ATSDR 2005c].

Barium

Barium is a silvery-white metal that occurs in nature in many different forms or compounds. Barium and its compounds are used to make paints, bricks, tiles, glass, rubber, insect and rat poisons, and fuel additives, and when drilling oil and natural gas wells. Doctors sometimes use barium compounds to perform medical tests as an X-ray radiocontrast agent for imaging the human gastrointestinal tract. Industrial operations can release barium into the air, soil, and water where they may be inhaled or ingested by people. Some foods such as Brazil nuts, seaweed, fish, and certain plants may contain high amounts of barium. Only a small amount of barium can enter the body through skin contact with barium compounds [ATSDR 2007c].

Non-cancer illness:
Barium was not detected above non-cancer screening guidelines in the **surface** soil of the Durrs neighborhood. Therefore, incidental ingestion of barium measured in residential surface soils of the Durrs neighborhood is not expected to cause non-cancer illness (Table 1).

Cancer Illness:
The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure. Therefore, DOH did not calculate a lifetime excess cancer risk for barium exposure.

Dioxins

Dioxins are a family of chemicals with similar structures and differing toxicities. The toxicities of each congener (chemical family member) are related to the most well studied member (2,3,7, 8-dibenzo-p-dioxin), and they are added together to give a toxicity equivalent (TEQ) for the entire family. Dioxins are produced when materials containing chlorine such as plastics are burned [ATSDR 1998]. Primary and secondary treatment of sewage and wastewater as well as the use of oxidation ponds also creates dioxins. Municipal garbage incineration, burning of yard trash and wastewater treatment may have contributed to the dioxin found in soil near the Lincoln Park Complex.

Non-cancer illness:
Dioxins were not detected above non-cancer screening guidelines in the **surface** soil of the Durrs neighborhood. Therefore, incidental ingestion of dioxins measured in residential surface soils of the Durrs neighborhood is not expected to cause non-cancer illness (Table 1).

Cancer Illness:
The EPA considers dioxins to be a probable human carcinogen; however, a cancer slope factor has not been determined. Therefore, DOH was unable to calculate a lifetime excess cancer risk for these estimated dioxin exposures.

Lead

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing [ATSDR 2007d]. Lead can affect almost every organ and system in the body, although the main target for lead toxicity is the nervous system. Children are more vulnerable to lead poisoning than adults.

In 1991, the CDC recommended lowering the level for individual intervention to 15 micrograms per deciliter (µg/dL) and implementing community-wide primary lead poisoning prevention activities in areas where many children had blood lead levels ≥ 10 µg/dL. However, this level, originally intended to trigger community-wide prevention activities, has been misinterpreted frequently as a definitive toxicological threshold. CDC maintains that efforts to eliminate lead exposures through primary prevention have the greatest potential for success, and reducing lead exposure will benefit all children, regardless of their current blood lead levels [CDC 2005]. There is no clear threshold for some of the more sensitive health effects from lead and no guidelines established for a safe dose of lead intake. EPA has no reference dose (RfD) and ATSDR has no minimal risk revel (MRL) to serve as a safe oral dose below which adverse health effects are unlikely to occur. Therefore, the usual approach of estimating exposure to an environmental contaminant and then comparing this dose to a health guideline (such as an RfD or MRL) cannot be used. Instead, exposure to lead is evaluated by using a biological model that predicts a blood lead concentration that would result from exposure to environmental lead contamination. DOH used EPA's Integrated Exposure Uptake and Biokinetic (IEUBK) model to estimate the potential geometric mean of lead in blood of children, ages 6 months to 7 years [EPA 1994, 2002]. This model also provides a probability estimate that a typical child will have a blood lead level greater than or equal to10 µg/dL. Estimates of greater than 5% are considered unacceptable.

In response to community concerns, the Broward County Health Department (CHD) offered free blood-lead testing in April 2004 to anyone who was concerned they might have had exposure to lead-contaminated soil associated with the Lincoln Park Complex site. The CHD publicized this free testing (for children 6 years of age and younger, living in the 33311 zip code) through a press release to major and community media outlets. Approximately 50 persons were tested, including some adults, but none had a blood lead level greater than or equal to 10 µg/dL [ATSDR 2005a].

Non-cancer illness:
Lead was not detected above non-cancer screening guidelines in the **surface** soil of the Durrs neighborhood. Therefore, incidental ingestion of lead measured in residential surface soils of the Durrs neighborhood is not expected to cause non-cancer illness (Table 1).

Cancer Illness:
The EPA considers lead to be a probable human carcinogen. While worker studies have shown limited associations between elemental lead exposure and lung, stomach, kidney, and gliomal (brain and spinal cord) cancers in humans, a dose-response relationship has not been established and a cancer slope factor has not been determined. Therefore, DOH was unable to calculate a lifetime excess cancer risks for lead exposures.

Polycyclic Aromatic Hydrocarbons (PAHs)

Like dioxins, polycyclic aromatic hydrocarbons (PAHs) are a family of chlorinated compounds formed when organic chemicals (garbage, coal, oil, gasoline, wood, tobacco, and charbroiled meat) are burned. PAHs are found in asphalt, crude oil, coal, coal tar pitch, creosote, and roofing tar. PAHs in soil are directly related to the proximity of asphalt and vehicle emissions from roads [ATSDR 1995]. To evaluate toxicity, we relate the toxicities of the carcinogenic PAH family members to the toxicity of benzo(a)pyrene, and then add them together for the PAH toxicity equivalent (TEQ).

Non-cancer illness:
DOH calculated the PAH TEQ dose for children and adults via incidental ingestion assuming daily contact with the **surface** soil in the Durrs neighborhood (Table 1). The maximum PAH ingestion dose for children, is 0.0000000003 ($3x10^{-10}$) milligrams per kilograms per day (mg/kg/day). The maximum PAH ingestion dose for adults is 0.00000000003 (3×10^{-11}) mg/kg/day. There is no established ATSDR MRL for PAHs; however, the maximum estimated dose for both children and adults is well below the level where human health effects are expected [ATSDR 1995]. Therefore, children or adults incidentally ingesting (swallowing) very small amounts of surface soil with the highest PAH levels from the surface soil of the Durrs neighborhood are not likely to suffer any non-cancer illness.

Cancer Illness:
The theoretical increased cancer risk for residential exposures to **surface** soil with the highest PAH TEQ level is four additional cancers per 1,000,000 (one million) people, or a very low increased risk. Because of the uncertainties and conservatism inherent in deriving cancer slope factors, this is only an estimate of risk; the true risk is unknown and could be as low as zero [ATSDR 2005].

Subsurface Soil (3 to 24 inches deep)

Arsenic

Non-cancer illness:
The highest arsenic level found in the **subsurface** soil of the Durrs neighborhood, was below the corresponding non-cancer comparison value for children (Table 2). Therefore, incidental

ingestion of arsenic measured in residential **subsurface** soils of the Durrs neighborhood is not expected to cause non-cancer illness.

Cancer Illness:
The maximum theoretical excess cancer risk for lifetime exposure of incidental ingestion of arsenic in the Durrs neighborhood **subsurface** soil is three additional cancers per 1,000,000 (one million) people, classified as a very low increased risk. Because of the uncertainties and conservatism inherent in deriving cancer slope factors, this is only an estimate of risk; the true risk is unknown and could be as low as zero [ATSDR 2005c].

Barium

Non-cancer illness:
The highest levels of barium found in the **subsurface** soil sampling were well below the ATSDR health-based comparison value and therefore, not likely to cause harm to human health (Table 2).

Cancer Illness:
The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure. DOH did not calculate a lifetime excess cancer risk for barium exposure to **subsurface** soil.

Dioxins

Non-cancer illness:
Dioxin levels exceeded the ATSDR health-based comparison value at one out of twenty-nine **subsurface** sampling locations (Table 2). DOH calculated the dioxin TEQ dose for children and adults via incidental ingestion assuming daily contact with the **subsurface** soil in the Durrs neighborhood. The maximum dioxin ingestion dose for children is 0.00000000007 (7×10^{-11}) mg/kg/day. The maximum dioxin ingestion dose for adults is 0.000000000008 (8×10^{-12}) mg/kg/day. The maximum estimated dose for both children and adults is well below the ATSDR minimum risk level of 0.000000001 (1×10^{-9}) mg/kg/day [ATSDR 1998]. Therefore, children or adults incidentally ingesting (swallowing) very small amounts of **subsurface** soil with the highest dioxin levels from the Durrs neighborhood are not likely to suffer any non-cancer illness.

Cancer Illness:
The EPA considers dioxins to be a probable human carcinogen; however, a cancer slope factor has not been calculated. Therefore, DOH was unable to calculate a lifetime excess cancer risk for these estimated dioxin exposures.

Lead

Non-cancer illness:
The highest **subsurface** soil (3-24 inches bgs) lead level was 810 mg/kg. This lead level is above the soil screening guideline of 400 mg/kg (Table 2). DOH used EPA's lead model to estimate possible blood lead levels of children exposed to daily to the highest lead level (810 mg/kg) found in the **subsurface** soil [EPA 1994, 2002].

The predicted geometric mean blood lead levels and the probability of blood lead levels exceeding the community intervention level of 10 µg/dL for children are shown in Appendix B, Table 3.

For the highest lead level in residential subsurface soil (810 mg/kg), the predicted blood lead levels for ages 12-24 months were slightly above 10 µg/dL. Additionally, probability estimates that a typical child will have a blood lead level greater than or equal to10 µg/dL were well above the recommended protection level of five percent for all groups. Estimates of greater than 5% are considered unacceptable. Therefore, children (for all age groups) who are exposed to **subsurface** soil containing 810 mg/kg lead (daily, for more than a year) in a residential setting could have elevated blood lead levels. This exposure could harm people's health.

These modeled levels for residential subsurface soil, however, do not represent levels children are likely to be exposed on a daily basis. Rather, they represent the potential for exposure, potential that may not be recognized by the community, and potential that may become more likely if residents dig on their property.

It is important to note that the there are uncertainties and limitations in the IEUBK modeling. One limitation that is a problem for this site is the inability to decrease the exposure frequency. The default frequency is 365 days per year. The likelihood of contacting **subsurface** soil on a daily basis is very low.

It is also important to note that the highest lead level in subsurface soil was found in only **one subsurface soil location out of 29 sampled**. The surrounding locations had lead concentrations significantly lower than the 810 mg/kg (ranging from 60 to 90mg/kg) used for modeling predicted blood lead levels.

Some of the heath effects of lead exposure on various organ systems are permanent or latent and may appear after exposure has ceased. Signs and symptoms associated with lead toxicity include decreased learning capacity and memory, lowered Intelligence Quotient (IQ), speech and hearing impairments, fatigue and lethargy. Evidence suggests that blood levels below 10 ug/dL may cause health effects such as hypertension, increase in bone and tooth decay, decrease in kidney function, and an increase in immunoglobulin E, an antibody that regulates immune system response.

Cancer Illness:

The EPA considers lead to be a probable human carcinogen. While worker studies have shown limited associations between elemental lead exposure and lung, stomach, kidney, and gliomal (brain and spinal cord) cancers in humans, a dose-response relationship has not been established and a cancer slope factor has not been calculated. Therefore, DOH was unable to calculate a lifetime excess cancer risks for lead exposures.

Polycyclic Aromatic Hydrocarbons (PAHs)

Non-cancer illness:

DOH calculated the PAH TEQ dose for children and adults via incidental ingestion assuming daily contact with the **subsurface** soil in the Durrs neighborhood (Table 2). The maximum PAH ingestion dose for children, is 0.0000001(1×10^{-7}) mg/kg/day. The maximum PAH ingestion dose for adults is 0.00000007 (7×10^{-8}) mg/kg/day. The maximum estimated dose for both

children and adults is well below the level where human health effects are expected [ATSDR 1995]. Therefore, children or adults incidentally ingesting (swallowing) very small amounts of **subsurface** soil with the highest PAH levels from the Durrs neighborhood are not likely to suffer any non-cancer illness.

Cancer Illness:
The theoretical increased cancer risk for residential exposures to subsurface soil with the highest PAH TEQ level is 5 in 10,000,000 (ten million), classified as a very low increased risk. Because of the uncertainties and conservatism inherent in deriving cancer slope factors, this is only an estimate of risk; the true risk is unknown and could be as low as zero [ATSDR 2005c].

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health. Therefore, DOH and ATSDR gave special consideration to the unique vulnerabilities of children in this neighborhood.

In addition to children, other susceptible populations may have different or enhanced responses to toxic chemicals than will most people exposed to the same levels of that chemical in the environment. Reasons may include genetic makeup, age, health, nutritional status, and exposure to other toxic substances (like cigarette smoke or alcohol). These factors may limit a susceptible person's ability to detoxify or excrete harmful chemicals or may increase the effects of damage to their organs or systems.

Community Health Concerns Evaluation

Concerns about the safety of children playing on the Mt. Olive Apt. complex were directed to DOH after the results of the 2009 soil sampling results were distributed. DOH determined that levels found during the 2009 sampling of the playground would not harm children's health. One resident asked DOH about the potential health impacts on pets in the neighborhood. DOH advises pet owners to consult their veterinarian.

Conclusions

- At one residential yard on NW 19th Terrace, lead in **subsurface** soil could potentially harm people's health, if exposure occurred daily over many years. **This is only a potential exposure if residents dig into the subsurface soil in this yard.** However, people are not currently exposed to the subsurface soil in this yard.

- Based on the available data, exposure to **surface** soil contaminants on residential properties in the Durrs neighborhood is not expected to harm people's health. Not enough is known, however, about the toxicology of dioxins and lead to quantify the risk of cancer for these two contaminants.

Recommendations

1. To protect public health, the contaminated soil in one residential yard on NW 19th Terrace should be removed.

2. Since incinerator debris is not generally homogenous in distribution, residents should consider following best health practices given in the safe gardening card (Appendix C).

Public Health Action Plan

- Florida DEP will continue to oversee the City of Ft. Lauderdale's testing and cleanup of the site and the Durrs neighborhood. DEP requires the City to take steps needed to cleanup contamination from the City's former incinerator.
- The City of Fort Lauderdale will remediate the lead in the **subsurface** soil in one yard on NW 19th Terrace.
- DOH will review any additional environmental sampling for the Durrs neighborhood if it becomes available.
- Florida DOH will notify the community of the availability of the final version of this report via direct mail and a press release.

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Appendix A:

Site History

- **1920s to Mid-1950s.** A municipal incinerator operated on the site [4, 6, 55}.

- **1920s to 1997.** A WWTP operated on the western portions of the site from the 1920s through 1997. An additional WWTP was constructed in 1969 on the portion of the site where the incinerator had formerly operated [4, 6, 55].

- **1960s to 1980s.** The Lincoln Park Elementary School operated on the northeast section of the site. After closing, the school buildings were used for an after-school program and a small print shop. The available aerial photographs indicate that one dwelling existed on the school property in 1946, and 22 dwellings existed on the property in 1958. The majority of these dwellings were located on the southern portion of the property. The dwellings were demolished to construct the elementary school. [4, 6, 55].

- **1960s to 2002**. A park existed on the southeast section of the site since the 1960s. Construction or renovation of the park to its condition prior to finding contamination appears to have occurred between 1984 and 1992. A house existed in the southeast corner of the park property from some time before 1946 until some time between 1969 and 1984 [4, 6, 55].

- **1997**. The WWTP facility was demolished and a trash transfer station was constructed. The eastern portion of the WWTP (former incinerator property) remained vacant [4, 6, 55].

- **September and October 1997.** EE&G conducted a limited-scope Phase II ESA at the former incinerator property. The scope of the ESA included the installation of 11 soil borings and four temporary monitoring wells. Arsenic, barium, lead, and benzo(a)pyrene were detected in soil samples at concentrations exceeding the State of Florida SCTLs for residential direct exposure. The groundwater sample collected from one monitoring well in the northern section of the property exhibited a lead concentration exceeding the Florida Groundwater Cleanup Target Level (GCTL). It was noted that a 2- to 3-foot layer of crushed glass and brick was encountered in those areas that exhibited elevated lead concentrations [6, 55].

- **June 2000.** EE&G conducted a Phase I ESA on behalf of the CFL for the LPC site [6]. The Phase I ESA identified several recognized environmental conditions, including a print shop in the former school buildings, a vent pipe possibly associated with an underground storage tank (UST) on the former school property, the former existence of a municipal incinerator and WWTPs on the trash transfer station property, and the former existence of USTs associated with vehicle fueling at the former WWTPs.

- **July 2001.** EE&G conducted a limited-scope Phase II ESA as the former elementary school property. The scope of the ESA included the installation of nine soil borings and installation of two temporary monitoring wells. Target compounds exceeding their respective SCTLs, and GCTLs were not detected in the samples collected. However, soil samples collected near the southwest corner of the school property contained fragments of glass, metal, and concrete [6].

- **July 18 and 19, 2001.** EE&G conducted a limited-scope geophysical survey of the southeastern parking lot at the former elementary school. The purpose of the survey was to trace the presence of a UST in the vicinity of the maintenance room, and large areas of buried debris in the southeastern corner of the school property, possibly associated with an emergent steel vent pipe located in the vicinity of the maintenance room. A follow-up survey was conducted on January 22, 2002 (see below).

- **2002.** FDEP conducted a windshield survey of the LPC site [41].

- **January 2002.** EE&G conducted additional assessment activities at the former elementary school property. EE&G installed seven additional soil borings and one additional temporary monitoring well. Two soil samples collected near the southwest corner of the property exhibited concentrations of arsenic above the SCTL for residential direct exposure. In addition, these soil samples were analyzed for dioxins/furans. The toxicity equivalents (TEQs) for both samples were below the Florida SCTLs for residential direct exposure. The groundwater samples collected from the newly installed monitoring well located in the southwest section of the site exhibited concentrations of lead and chromium exceeding the respective GCTLs [6. 55].

- **January 22, 2002.** A geophysical survey of the southeastern parking lot at the former elementary school was conducted as follow-up to the July 18 and 19, 2001 survey (see above). No evidence of a UST was produced during either survey; however, due to interference by underground utilities, investigators could not rule out the possible existence of an improperly abandoned UST beneath surface structures [6].

- **February 2, 2002.** Mr. Walter "Mickey" Hinton (President, Durrs Homeowners Association) submitted a letter to David Struhs (Secretary, FDEP) requesting that FDEP conduct sampling and a health study at, and near, the former municipal incinerator site [5].

- **April 2002.** EE&G conducted a limited-scope Phase II ESA at the former Lincoln Park property. EE&G installed 20 soil borings. Soil samples collected at the former Lincoln Park property exhibited concentrations of arsenic, barium, and lead above the respective SCTLs for residential direct exposure. Soil Samples analyzed for dioxins/furans exhibited TEQs below the Florida SCTLs for residential direct exposure [6, 55}. Upon review of the Phase II ESA, the CFL fenced and closed the park to the public.

- **May 2002.** EE&G collected three soil samples from residential properties located east of the site along NW 18th Street. The soil samples were analyzed for metals. Metals were not detected as concentrations exceeding SCTLs [6, 55].

- **September 27, 2002.** FDEP completed a Pre-CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) Screening Assessment Checklist/Decision form recommending that the site be entered into CERCLIS [47].

- **October 2002.** EE&G submitted a Preliminary Contamination Assessment Report to FDEP on behalf of the CFL [6] summarizing the results of previous investigations to that date. EE&G used FDEP's Contaminant Cleanup Target Levels (CTLs) cited in the Florida Administrative Code (FAC) Chapter 62-777 as comparison criteria for all soil and groundwater analytical results [6].

- **October 11, 2002.** FDEP submitted a copy of the Pre-CERCLIS Screening Assessment Checklist/Decision Form to the CFL stating that FDEP was recommending further CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980) action at the site [47].

- **October 30, 2002.** Personnel representing FDEP, the CFL, and E & E conducted a site meeting and a site reconnaissance of the LPC site. In addition, neighborhood representatives were present for the site reconnaissance.

- **January 2003.** Under contract to FDEP, E & E submitted a Site Inspection (SI) Work Plan for the LPC site and conducted the investigation [57].

- **January 26-31 2003.** CERCLA SI fieldwork was conducted by FDEP and E & E at the LPC site [60, 61]. The purpose of the SI was to characterize soil and groundwater conditions at the LPC site. Fourteen (14) surface soil samples, five subsurface soil samples, and 10 groundwater samples were collected. Trash and incinerator debris were observed in direct-push borings installed on the former incinerator property and the Lincoln Park property. Debris was observed in boring LPC-8, located toward the southwest corner of Lincoln Park, at a depth of approximately 10 feet BGS. As part of the SI conducted in 2003, soil and groundwater samples were collected from four locations within the Durrs Neighborhood (LPC-1, LPC-2, LPC-9, and LPC 10) [61].

- **October 2003.** The Final CERCLA SI Report was submitted to FDEP. The Investigation found metals (including antimony, arsenic, barium, and copper), dioxins/furans, and PAHs in soil samples collected at the LPC site at concentrations above the comparable Florida SCTLs. In addition, aluminum, iron, and manganese were detected in groundwater samples at concentrations above their respective Secondary Drinking Water Standards (SDWS, FAC Chapter 62-550). In addition, trash and other debris were observed in borings conducted on the Lincoln Park property [61].

- **Early 2004.** The former elementary school property was razed to begin construction activities for the CFL one-stop city services center.

- **July 2004.** E & E submitted the Final Letter Work Plan for an Expanded Site Investigation Assessment to FDEP and conducted the investigation. The primary objective of the expanded investigation was to evaluate contaminant migration pathways to determine potential impacts to the residential area immediately surrounding the LPC site [62, 63]. A total of 30 surface and 10 subsurface soil samples were collected within the Durrs Neighborhood adjacent to the LPC site. All soil samples were analyzed for Resource Conservation and Recovery Act metals; base, neutral, and acidic extractable organic compounds (BNAs); and dioxins/furans. One BNA, benzo(a)pyrene, was detected in six surface soil samples at concentrations greater that the SCTL for residential direct exposure. Metals were detected in 25 surface soil and 10 subsurface soil samples at concentrations greater than the respective SCTLs for residential direct exposure. Arsenic was in all these samples at concentrations exceeding the applicable SCTL for residential direct exposure. However, FDEP revised the SCTL for arsenic after the sampling was completed and some of the arsenic levels detected at certain locations are below the current SCTL for arsenic. The dioxins/furans TEQ exceeded the SCTL for residential direct exposure in seven surface soil samples and five subsurface soil samples.

- **October 2004.** A preliminary Public Health Assessment report was completed by the Florida Department of Health (FDOH) for the Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate public health issues associated with contamination from the LPC site. FDOH classified the shallowest soils on and around the LPC site as not representing an apparent public health hazard. FDOH was unable to assess the probability of past exposures or illness associated with the LPC site due to the lack or other monitoring data during former incinerator operations.

- **April 2005.** An Abbreviated Report for an Expanded SI Assessment was submitted by E & E to FDEP. Results provided in this report showed that surface soils collected within the Durrs Neighborhood contained arsenic, benzo-a-pyrene, and dioxins/furans at concentrations above the respective SCTLs for these analytes [63].

- **April 2005.** The CFL submitted an application to FDEP for TBA assistance on behalf of the Durrs Neighborhood. FDEP approved the application on April 28, 2005.

- **October 2005.** An FDOH Public Health Assessment Report was issued by the ATSDR. The FDOH health assessment involved a review of historical information and sampling data collected at the site. FDOH concluded that the site currently presents "no apparent health hazard;" however, FDOH also concluded that "health hazards for past exposures are indeterminate" and that the park

and former municipal incinerator properties could present a future public health hazard if people had long-term exposures to the highest levels of soil contamination that were detected in ash residues at the site. FDOH recommended that workers and others avoid contact with subsurface soils at the park and former incinerator properties, especially soils that contain ash or debris, until the properties are cleaned up. FDOH also recommended that workers and nearby residents avoid dust inhalation during future cleanup; nearby residents follow safe gardening practices; and that people living in the area should not drink or use irrigation well water for bathing, food preparation, and cleaning food contact surfaces.

- **January 2006**. EE&G completed corrective actions to address environmental contamination at the Lincoln Park property.

- **February 2006.** The CFL commenced contamination assessment at the former incinerator property.

- **February 2006.** E & E submitted a Final Work Plan for TBA to FDEP. The primary objective of the soil investigation was to evaluate surface and subsurface soils on properties within the Durrs Neighborhood [65].

- **February 27 through March 1, 2006.** TBS fieldwork was conducted by FDEP and E & E on properties at the Durrs Neighborhood [66].

- **October 2006.** The Lincoln park property was reopened to the public after completion of corrective actions which included: excavation of contaminated soils and relocating the soils to the center of the Lincoln Park property; installation of an HDPE liner to served as protective barrier located above possibly contaminated subsurface soils to prevent exposure; backfilling with clean soil; and confirmation sampling [68].

- **March 2007.** An FDOH Health Consultation Report was issued by the ATSDR. This health consultation involved the review of 2004 and 2006 soil sampling results from samples that FDEP collected at residential properties in the Durrs Neighborhood. FDOH concluded that based on limited available data, the public health hazard associated with surface soil contamination at the residential properties sampled as "No Apparent Public Health Hazard; "however, FDOH also concluded that some off-site surface and subsurface soils in non-residential areas (rights-of way) would be a "public health hazard" if people had daily long-term exposures to them and recommended the collection of additional surface and subsurface soils from the residential areas located to the north and east of the LPC.

- **May 2007.** E & E submitted the Final TBA report for the 2006 investigation. Concentrations of metals, PAHs, and dioxins/furans were detected in surface and subsurface soils at concentrations greater than the respective FDEP residential, industrial, and/or leachability to groundwater SCTLs. Based upon the sample results and visual observations, it appeared that contamination from former incinerator activities had impacted the off-site surface and subsurface soil in the vicinity of the former incinerator operations areas. In addition, elevated concentrations of dioxins/furans detected in samples collected from locations along NW 19th Avenue, along and to the north of NW 7th Street, and to the east of NW 18th Avenue were also likely attributable to former incinerator activities. Furthermore, the majority of soil samples that exhibited dioxins/furans concentrations above SCTLs also exhibited elevated concentrations of PAHs and metals (primarily arsenic, barium, and lead). Evidence of incinerator ash was observed at some of these sample locations. Additionally, it was noted that PAHS and arsenic were also detected above SCTLs at other sample locations where dioxins/furans did not exceed SCTLs. Therefore, it was unclear whether the presence and distributions of PAHs and arsenic were attributable to former incinerator operations, other potential sources of PAHs and arsenic, or background conditions.

- **February 20, 2008.** EE&G submitted an engineering Control and No Further Action with conditions Report to FDEP on behalf of the CFL for the Lincoln Park site [68]. The report summarized the installation of engineering controls and sampling on the Lincoln Park property.

- **May 27 through June 2008.** EE&G oversaw the removal of impacted soils from the western side of NW 19th Avenue between 6th and 7th Streets and the northern and southern side of NW 7th Street between 19th and 29th Avenue. A total of 2,713 tons of impacted soils were excavated and transported to the Waste Management Central Landfill in Pompano Beach, Florida [70].

- **July 31, 2008.** EE&G submitted a draft SAR Addendum III for the CFL Former Trash Transfer Station on behalf of the CFL. The report summarized the expanded groundwater assessment, removal of impacted soil (source) in right-of way areas, and confirmatory/expanded soil assessment. The report recommended additional soil assessment and source removal activities, implementing a natural attenuation monitoring plan, and implementing a No Further Action with Conditions plan for the former trash transfer station property [70].

- **September 2008.** EE&G completed an expanded source removal action to address incinerator debris observed during the right-of way source removal at a residential property located at 701 NW 19th Terrace (Parcel ID 504204180310).

- **March 2009.** EE&G submitted a SAR Addendum IV for the former incinerator property. The March 2009 SAR addendum includes a response to FDEP's Addendum III review comments, groundwater monitoring results, and a summary of an expanded source removal event completed at a residential property located at 701 NW 19th Terrace (Parcel ID 504204180310. In May 2009, FDEP completed the review of the SAR Addendum IV and requested additional information.

- **April 2009.** E & E submitted the Durrs Neighborhood TBA Work Plan to FDEP. The primary objective of the targeted assessment was to determine the presence or absence of buried incinerator debris and soil contamination at residential properties located near the former CFL incinerator/LPC site [73].

- **May 18 through May 20, 2009.** E & E conducted additional soil sampling activities (field investigation) for the Durrs Neighborhood TBA. Soil Borings were advanced and visually screened until native soils were encountered to determine the presence or absence of incinerator debris. Following visual observation of the soil borings, a total of 29 surface (0 to 3 inches BGS) soil samples , 29 subsurface soil samples (3 to 24 inches BGS), two surface soil duplicate samples, and two subsurface soil duplicate samples from the properties within the Durrs Neighborhood were collected for laboratory analysis. Findings from the TBA field investigation are presented in Section 5 of this Draft TBA report.

Appendix B: Figures and Tables

Figure 1: Location of Lincoln Park in Broward County, Florida

Figure 1: Location of the site in Ft. Lauderdale, Broward County

Figure 2: Location of Durrs Neighborhood and Mt. Olive Apartments near Lincoln Park in Ft. Lauderdale

Figure 3: Aerial View of Durrs Neighborhood

Figure 4: Soil Sampling Locations in Durrs Neighborhood

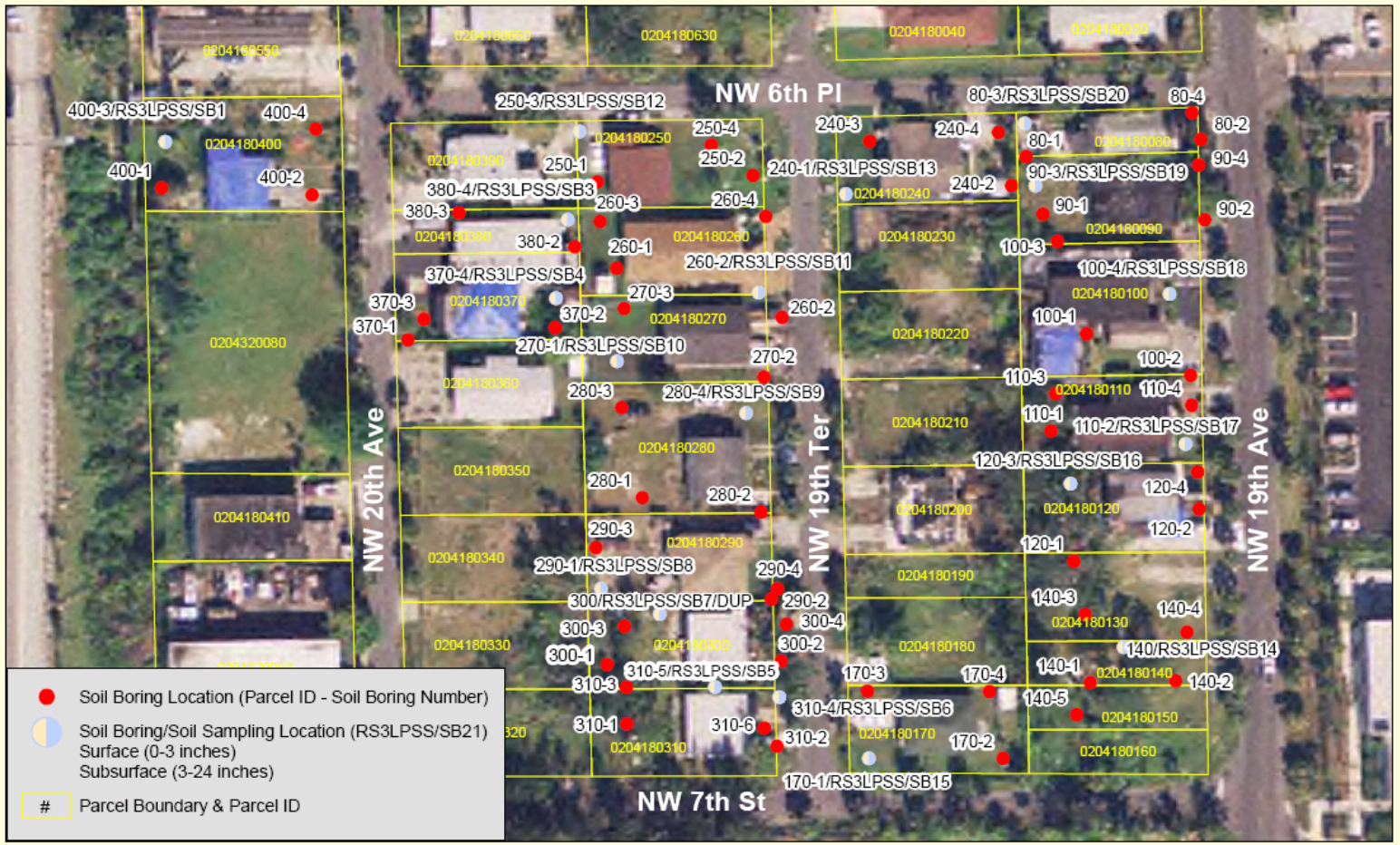

Figure 5: Soil Sampling Locations at the Mt. Olive Apartment Complex

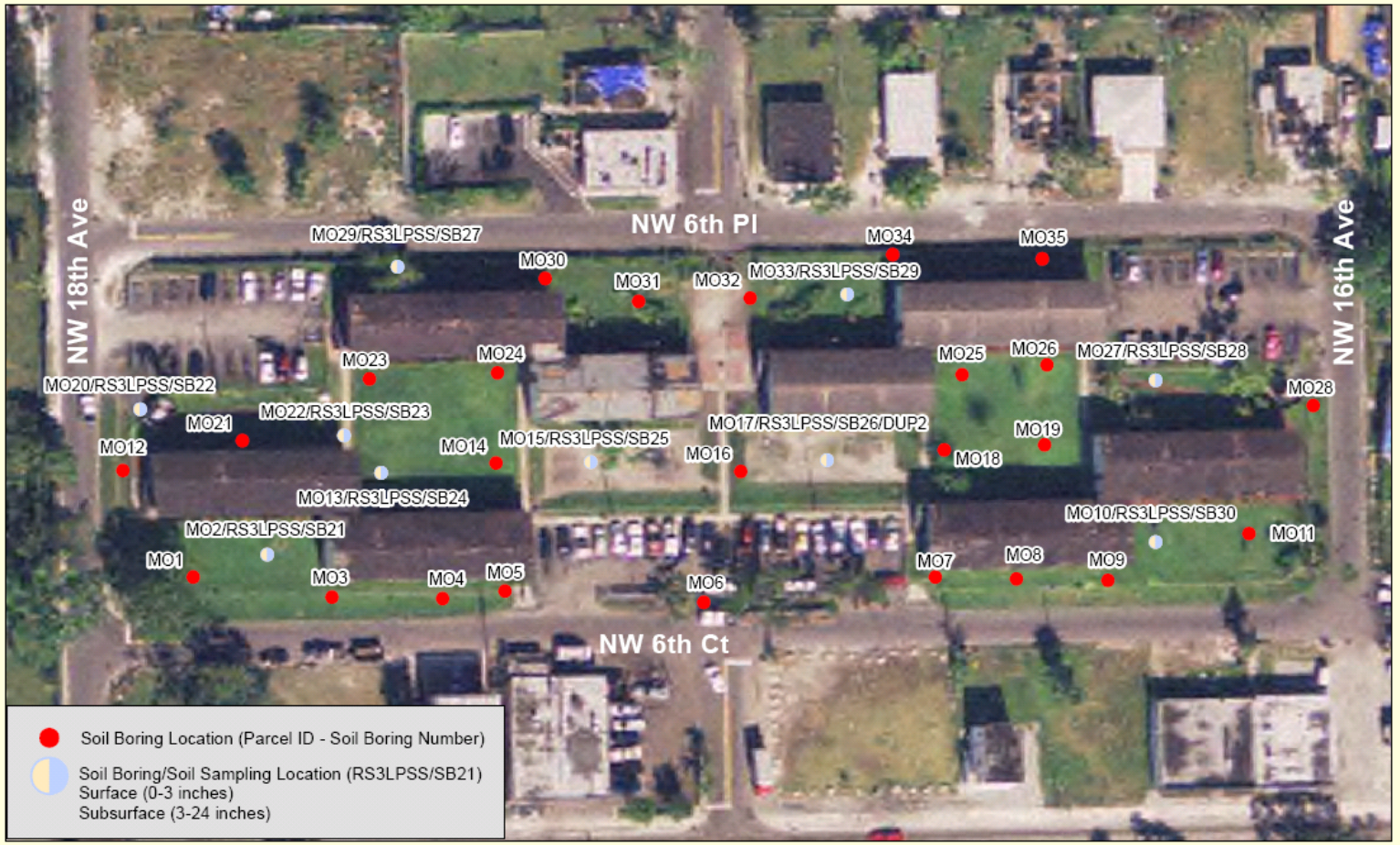

Table 1: Surface Soil Maximum Contaminant Concentrations in Durrs Neighborhood Surface Soil (0-3 inches below ground surface)

Contaminant	Maximum Concentration (mg/kg)	# Above Comparison Value/ Total # of Samples	Comparison Value☼	
			mg/kg	Source
Arsenic	5.4	0/29	20 Child non-cancer EMEG	ATSDR 2009b
		0/29	200 Adult non-cancer EMEG	
		21/29	0.5 Cancer CREG	
Barium	100	0/29	**10,000 Child non-cancer EMEG**	ATSDR 2009b
		0/29	**100,000 Adult non-cancer EMEG**	
		0/29	Not carcinogenic	
Dioxins (TEQ)	0.00002	0/29	**0.00005 Child non-cancer EMEG**	ATSDR 2009b
		0/29	**0.0007 Adult non-cancer EMEG**	
		0/29	Not available	
Lead	330	0/29	400 Child non-cancer	ATSDR 2009b
		0/29	Not available	
		0/29	Not available	
PAHs (TEQ)	0.358	0/29	Not available	ATSDR 2009b
		0/29	Not available	
		17/29	0.1 Cancer CREG	

Source: E&E 2009

☼ Comparison values are used to select chemicals for further scrutiny, not for determining the possibility of illness.
PAHs (TEQ) - polycyclic aromatic hydrocarbons toxicity equivalence
Dioxins TEQ- dioxins toxicity equivalence
mg/kg = milligrams per kilogram of soil
CREG- Cancer Risk Evaluation Guide
EMEG- Environmental Media Evaluation Guide

Table 2: Subsurface Soil Maximum Contaminant Concentrations in Durrs Neighborhood
(3-24 inches below ground surface)

Contaminant	Maximum Concentration (mg/kg)	# Above Comparison Value/ Total # of Samples	Comparison Value☼	
			mg/kg	Source
Arsenic	16	0/29	20 Child non-cancer EMEG	ATSDR 2009b
		0/29	200 Adult non-cancer EMEG	
		13/29	0.5 Cancer CREG	
Barium	480	0/29	**10,000 Child non-cancer EMEG**	ATSDR 2009b
		0/29	**100,000 Adult non-cancer EMEG**	
		0/29	Not carcinogenic	
Dioxins (TEQ)	0.00007	1/29	**0.00005 Child non-cancer EMEG**	ATSDR 2009b
		0/29	**0.0007 Adult non-cancer EMEG**	
		0/29	Not available	
Lead	810	**1/29**	400 Child non-cancer	ATSDR 2009b
		0/29	Not available	
		0/29	Not available	
PAHs (TEQ)	0.578	0/29	Not available	ATSDR 2009b
		0/29	Not available	
		4/29	0.1 Cancer CREG	

Source: E&E 2009

☼ Comparison values are used to select chemicals for further scrutiny, not for determining the possibility of illness.
PAHs (TEQ) - polycyclic aromatic hydrocarbons toxicity equivalence
Dioxins TEQ- dioxins toxicity equivalence
mg/kg = milligrams per kilogram of soil
CREG- Cancer Risk Evaluation Guide
EMEG- Environmental Media Evaluation Guide

Table 3: Modeled Geometric Mean Blood Lead Levels

CHILDRENS' AGES (MONTHS)	EXPOSURE SCENARIO			
	200 mg/kg Residential Background*		810 mg/kg Residential Subsurface Level	
	Blood Lead** Level (µg/dL)	Probability*** Estimate %	Blood Lead** Level (µg/dL)	Probability*** Estimate %
6-12	3.8	2.0	8.9	40.5
12-24	4.2	3.1	10.2	52.0
24-36	3.9	2.3	9.6	47.0
36-48	3.7	1.7	9.2	43.3
48-60	3.1	0.7	7.7	29.0
60-72	2.7	0.3	6.5	18.3
72-84	2.5	0.2	5.8	12.4

mg/kg = milligrams per kilogram µg/dL = micrograms per deciliter
*200 mg/kg is used as a potential background
** Geometric mean for input lead level.
*** Probability of blood lead higher than 10 µg/dL as calculated by the IEUBK model (estimates greater than 5% are considered unacceptable).

APPENDIX C:

RESPONSE TO PUBLIC COMMENTS / COMMUNITY INVOLVEMENT AND EDUCATION

RESPONSE TO PUBLIC COMMENTS

This document was available for public comment from May 10, 2010 to June 25, 2010. Florida DOH received a few general comments about the site from nearby residents, summarized and responded to below. To receive the full text of these comments, please contact Florida DOH.

Community Comments/Concerns and Responses:

Comment: One resident who has lived in the Durrs neighborhood for 38 years and raised her family there, is concerned about the possibility of general health effects resulting from living near the Lincoln Park site.

Response: Florida DOH evaluated the long-term health threat from ingestion of contaminated surface and subsurface soil in the Durrs neighborhood. According to available data, exposure to the chemical levels found in the surface soil of residential properties is not likely to harm health. Not enough data is available to quantify the risk of cancer for dioxins and lead. At one residential yard on NW 19th Terrace, lead in **subsurface** soil could potentially harm people's health, if exposure occurred daily over many years. **This is only a potential exposure if residents dig into the subsurface soil in this yard.** However, people are not currently exposed to the subsurface soil in this yard.

Comment: One resident of the Durrs neighborhood wanted to be sure that she would receive updates regarding this site.

Response: Florida DOH will continue to provide Durrs residents with updates on any future evaluations on additional data.

Comment: One resident wanted to know why it was taking the City of Ft. Lauderdale so long to fix the problem. If the City of Ft. Lauderdale is not responsible then who is?

Response: The City of Ft. Lauderdale is scheduled to remove the soil from the yard on NW 19th Terrace. The City continues to work closely with FDEP to complete the clean up for this site.

Community Education and Involvement

Durrs Neighborhood/Lincoln Park Community Update

October 2009

Fort Lauderdale, Broward County, Florida

New Health Consultation Report Available

Review of Mango Testing from a Durrs Neighborhood Yard

About the Health Agencies

The Broward County Health Department (CHD), Florida Department of Health (DOH), and the US Agency for Toxic Substances and Disease Registry (ATSDR) serve the public by:

- Using the best science,
- Taking responsive public health actions, and
- Providing trusted health information about toxic chemicals at hazardous waste sites.

About the Lincoln Park Site

The Lincoln Park complex is between NW 18th Avenue and I-95, north of Sistrunk Boulevard. The City of Fort Lauderdale ran an incinerator to burn trash collected in the city from the late 1920s to the mid 1950s. Until summer 2004, the City used the western part of the property as a transfer station to recycle household trash. The former Lincoln Park Elementary School property was just north of the complex. The Durrs neighborhood is north and east of the site.

About Community Concerns

Community residents have concerns about site chemicals harming their health. In response to those concerns, Florida DOH has written three health reports about the site since 2005. The most recent one in March 2007 looked at off-site soil tests made from 2004 to 2006.

Residents also have concerns that eating homegrown produce may be a health risk if they take up chemicals from the soil. In 2005, Florida DOH first recommended produce testing. In 2007 and 2008, Florida DOH tried to test homegrown produce, but could not find any at that time. Meanwhile, our research showed the best chemicals to test for in produce were metals (arsenic, barium, and lead) and pesticides.

On May 21, 2009, the Florida Department of Agriculture and Consumer Services (DACS) and the Broward CHD collected mangos from a resident's tree on NW 19th Avenue next to the Lincoln Park Complex site.

Florida DOH found:
Metals found in mangos are not likely to harm health.
Pesticides in mangos are not likely to harm health.
Therefore, eating mangos grown in the Durrs area is not likely to cause illness.

DOH's Report Recommends:

For best public health practice, nearby residents should follow steps for safe gardening, such as:

* Add clean compost or soil to your garden.
* Wear gloves when working in the garden.
* Don't eat, drink, or smoke while gardening.
* Wash hands and clothes after you've worked in the garden. Leave dirty shoes outside.
* Rinse leafy vegetables before eating.

Planned DOH Actions

- Recently, the Florida DOH received data from more soil tests in resident's yards. We will see what health risks chemicals found in these samples may pose. We will also write a new health report on our findings.
- Florida DOH and Florida DEP will keep working to let people living in the Durrs neighborhood know what we find.

For more information:

- For questions *about mango testing*, call **Susan Skye** with the Florida DOH at **877-798-2772** (toll-free)
- For questions *about new offsite soil testing*, call **Elizabeth Tull** with the Florida DOH at: **877-798-2772** (toll-free).
- For questions *about the site cleanup,* call **Joe McGarrity** with the Florida DEP at: **850-245-8979**

Please share this update with your friends and neighbors!

You can find the ATSDR/Florida DOH report on the mango testing along with other Lincoln Park site reports on our website at:

http://www.doh.state.fl.us/environment/medicine/SUPERFUND/pha.htm

Scroll down to the Lincoln Park Complex heading

Or call us toll-free at 877-798-2772 to ask for a copy to be mailed to you

FLORIDA DEPARTMENT OF HEALTH

ATSDR AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Glossary of Environmental Health Terms

Absorption: How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.

Acute Exposure: Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.

Additive Effect: A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

Adverse Health Effect: A change in body function or the structures of cells that can lead to disease or health problems.

Antagonistic Effect: A response to a mixture of chemicals or combination of substances that is **less** than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

ATSDR: The **A**gency for **T**oxic **S**ubstances and **D**isease **R**egistry. ATSDR is a federal health agency in Atlanta, Georgia, that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.

Background Level: An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific environment.

Biota: Used in public health, things that humans would eat B including animals, fish and plants.

CAP: See **C**ommunity **A**ssistance **P**anel**.**

Cancer: A group of diseases that occur when cells in the body become abnormal and grow, or multiply, out of control.

Carcinogen: Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See **C**omprehensive **E**nvironmental **R**esponse, **C**ompensation, and **L**iability **A**ct.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure Pathway: See **Exposure Pathway**.

Community Assistance Panel (CAP): A group of people from the community and health and environmental agencies who work together on issues and problems at hazardous waste sites.

Comparison Value: **(CVs)** Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): **CERCLA** was put into place in 1980. It is also known as **Superfund**. This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.

Concern: A belief or worry that chemicals in the environment might cause harm to people.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See **Environmental Contaminant**.

Delayed Health Effect: A disease or injury that happens as a result of exposures that may have occurred far in the past.

Dermal Contact: A chemical getting onto your skin. (see **Route of Exposure**).

Dose: The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as "amount of substance(s) per body weight per day".

Dose / Response: The relationship between the amount of exposure (dose) and the change in body function or health that result.

Duration: The amount of time (days, months, years) that a person is exposed to a chemical.

Environmental Contaminant: A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in **Background Level**, or what would be expected.

Environmental Media: Usually refers to the air, water, and soil in which chemicals of interest are found. Sometimes refers to the plants and animals that are eaten by humans. **Environmental Media** is the second part of an **Exposure Pathway**.

U.S. Environmental Protection Agency (EPA): The federal agency that develops and enforces environmental laws to protect the environment and the public's health.

Epidemiology: The study of the different factors that determine how often, in how many people, and in which people will disease occur.

Exposure: Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see **Route of Exposure**.)

Exposure Assessment: The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

Exposure Pathway: A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

- Source of Contamination,
- Environmental Media and Transport Mechanism,
- Point of Exposure,
- Route of Exposure, and
- Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

Frequency: How often a person is exposed to a chemical over time; for example, every day, once a week, and twice a month.

Hazardous Waste: Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.

Health Effect: ATSDR deals only with **Adverse Health Effects** (see definition in this Glossary).

IEUBK: EPA's Integrated Exposure Uptake and Biokinetic model to estimate the potential geometric mean of lead in blood of children, ages 6 months to 7 years.

Intermediate Exposure: Any chemical exposure that has occurred for more 14 days but less than one year (365 days).

Indeterminate Public Health Hazard: The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.

Ingestion: Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See **Route of Exposure**).

Inhalation: Breathing. It is a way a chemical can enter your body (See **Route of Exposure**).

LOAEL: **L**owest **O**bserved **A**dverse **E**ffect **L**evel. The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.

Malignancy: See **Cancer**.

MRL: **M**inimal **R**isk **L**evel. An estimate of daily human exposure B by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.

NPL: The **N**ational **P**riorities **L**ist. (This is part of Superfund.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site.

NOAEL: **N**o **O**bserved **A**dverse **E**ffect **L**evel. The highest dose of a chemical in a study, or group of studies, that did not cause harmful health effects in people or animals.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: **P**ublic **H**ealth **A**ssessment. A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.

Plume: A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney or contaminated groundwater sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples: the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.

Population: A group of people living in a certain area; or the number of people in a certain area.

PRP: **P**otentially **R**esponsible **P**arty. A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.

Public Health Assessment(s): See **PHA**.

Public Health Hazard: The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health Hazard Criteria: PHA categories given to a site that tells whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

- Urgent Public Health Hazard
- Public Health Hazard
- Indeterminate Public Health Hazard
- No Apparent Public Health Hazard
- No Public Health Hazard

Receptor Population: People who live or work in the path of one or more chemicals, and who could come into contact with them (See **Exposure Pathway**).

Reference Dose (RfD): An estimate, with safety factors (see **safety factor**) built in, of the daily, lifetime exposure of human populations to a possible hazard that is not likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:

- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Safety Factor: Also called **Uncertainty Factor**. When scientists do not have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is not likely to cause harm to people.

SARA: The **S**uperfund **A**mendments and **R**eauthorization **A**ct in 1986 amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from chemical exposures at hazardous waste sites.

Sample Size: The number of people that are needed for a health study.

Sample: A small number of people chosen from a larger population (See **Population**).

Source (of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

Special Populations: People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics: A branch of the math process of collecting, looking at, and summarizing data or information.

Superfund Site: See **NPL**.

Survey: A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

Synergistic Effect: A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effects of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

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

Tumor: Abnormal growth of tissue or cells that have formed a lump or mass.

Uncertainty Factor: See **Safety Factor**.

Urgent Public Health Hazard: This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed.

CERTIFICATION

This Lincoln Park Complex 2009 Durrs Neighborhood Soil Test Health Consultation was prepared by the Florida Department of 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 health assessment was begun.

Jennifer Freed
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

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

Alan Yarbrough
CAT, CAPEB, DHAC, ATSDR