AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

RALEIGH STREET DUMP
TAMPA, HILLSBOROUGH COUNTY, FLORIDA
EPA FACILITY ID: FLD984227249
JANUARY 20, 2006

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment 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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PUBLIC HEALTH ASSESSMENT

RALEIGH STREET DUMP

TAMPA, HILLSBOROUGH COUNTY, FLORIDA

EPA FACILITY ID: FLD984227249

Prepared by:

Florida Department of Health
Bureau of Community Environmental Health
Under a Cooperative Agreement with
Agency for Toxic Substances and Disease Registry
U.S. Department of Health and Human Services

TABLE OF CONTENTS

FOREWORD i

1.0 SUMMARY 1

2.0 PURPOSE 3

3.0 BACKGROUND 3
- 3.1 Site Description and History 3
- 3.2 Site Visit 4
- 3.3 Demographics, Land Use, and Natural Resource Use 4

4.0 DISCUSSION 6
- 4.1 Environmental Contamination 6
- 4.2 Quality Assurance and Quality Control 8
- 4.3 Physical Hazards 9
- 4.4 Pathway Analysis 9
- 4.5 Public Health Implications 10

5.0 COMMUNITY HEALTH CONCERNS 17

6.0 CONCLUSIONS 18

7.0 RECOMMENDATIONS 18

8.0 PUBLIC HEALTH ACTION PLAN 19

9.0 SITE TEAM/AUTHORS 20

10.0 REFERENCES 21

APPENDIX A. FIGURES 23

APPENDIX B. TABLES 38

APPENDIX C. RISK OF ILLNESS, DOSE RESPONSE/THRESHOLD, AND UNCERTAINTY IN PUBLIC HEALTH ASSESSMENTS 57

APPENDIX D. PUBLIC COMMENTS AND FLORIDA DOH RESPONSES 59

APPENDIX E. ATSDR PLAIN LANGUAGE GLOSSARY OF ENVIRONMENTAL HEALTH TERMS 61

CERTIFICATION 67

FOREWORD

This document summarizes public health concerns at a former lowland on which wastes from a battery recycling operation were disposed. In this report, the Florida Department of Health (DOH) evaluates the available site information. A number of steps are necessary to do such an evaluation:

- 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, identify the location of contamination relative to people that might contact it, and identify how people might contact it. Usually, DOH does not collect environmental sampling data. We rely on information provided by the Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency (EPA), and other government agencies, businesses, and the public.

- Evaluating health effects: If the evidence indicates that people currently contact hazardous substances—or could contact them in the future, DOH will take steps to determine whether that exposure could be harmful to human health. This report focuses on public health (that is the health impact on the community as a whole) and is based on existing scientific information.

- Developing recommendations: In the evaluation report, DOH (a) outlines its conclusions regarding any potential health hazard posed by a site and (b) 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 typically recommends actions other agencies should take, including EPA and DEP. However, if an immediate health hazard is evident, DOH issues a public health advisory warning people of the danger, and works to resolve the problem.

- Soliciting community input: The evaluation process is interactive. DOH solicits and evaluates information from various government agencies, the organizations responsible for cleaning up the site, and the community surrounding the site. We share any conclusions about the site with the groups and organizations that provided 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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1.0 SUMMARY

The Raleigh Street Dump is at the end of Raleigh Street, about ½ mile west of U.S. Highway 41 in Tampa (Hillsborough County), Florida. Raleigh Street divides the site into two parcels, which together form the Raleigh Street Dump. Heavy brush, trees, and waste materials cover the northern parcel. Tampa Fiberglass occupies the southern portion. The surrounding area is primarily industrial, with scattered residences within ½ mile of the site to the east and northeast. The U.S. Environmental Protection Agency (EPA) first discovered this dumpsite during an investigation of nearby Chloride Metals, Inc., when they detected lead in a composite soil sample from this site. Chloride Metals, Inc. personnel reportedly dumped incinerator slag and battery casings at the Raleigh Street Dump site. Because chemicals other than those expected from battery recycling operations were measured on the site, persons other than those employed by Chloride Metals may also have used the area for dumping.

The Florida Department of Health (DOH) evaluated data from site studies done from 1994 through 2003 by EPA and the Florida Department of Environmental Protection (DEP). Metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in on-site soil exceed health-based screening values. Soil in the northern part of the site contains the highest levels of contamination. Although on-site surface water samples contained lead levels greater than the drinking water standard, persons are unlikely to drink this salty water. While on-site shallow groundwater samples contained metals and PAHs, groundwater samples from the Floridan aquifer well on the southern parcel did not contain hazardous levels of these contaminants.

Soil and sediment samples from Delaney Creek contained lead. Off-site shallow groundwater has arsenic slightly above the drinking water standard. Antimony and lead in Delaney Creek water and sediments could result from runoff from Chloride Metals, Inc.

DOH determined that ingestion and inhalation of chemicals in on-site soil or on-site groundwater are possible current and future exposure pathways. DOH estimates that incidental ingestion of lead-contaminated, on-site surface soil could cause illness involving the blood, liver, and bones and the neurological and reproductive systems. Although the levels of lead and arsenic in the shallow groundwater might also cause illness, people are not likely to drink this water because of its high salt and iron content. Only one on-site shallow-aquifer monitoring well contained high levels of PAHs. Indoor inhalation of PAHs aerated from this well water could cause illness after several months of exposure. Such a pathway is not present now but could occur in the future.

The Raleigh Street Dump is a public health hazard because site access is not restricted. In March 2002, investigators found evidence of trespassers living on the site. Later, two site investigators reported seeing all-terrain vehicle riding trails on the site. To prevent trespass and exposure, DOH recommends that site access be restricted. DOH also recommends additional soil tests southwest of the site to define the extent of lead contamination in off-site surface soil.

Hillsborough County Health Department staff supplied the Florida DOH Community Involvement person with addresses for the 26 residences within ½ mile of the site. DOH mailed these residences a fact sheet announcing the availability of the Public Comment version of the Raleigh Street Dump Public Health Assessment in early August 2005. Two residents mailed the

Comment and Questions page back (8% of the persons that received the fact sheet). We address the comments and questions from these forms in Appendix D.

DOH mailed the EPA project manager a paper copy of the report, which he has included with the site file. The EPA project manager will also include this report with the site repository when it is set up. DOH also sent the fact sheet to the Hillsborough County Sheriff's Office, so they would be aware of the trespassing issues and unlawful occupancy that had occurred in the past. The fact sheet contained the Florida DOH toll free number and the web address for the site that has a copy of the available report: http://www.myfloridaeh.com/community/SUPERFUND/PHA.htm.

2.0 PURPOSE

The Agency for the Toxic Substances and Disease Registry (ATSDR), in Atlanta, Georgia, is a federal agency within the U.S. Department of Health and Human Services. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) authorizes ATSDR to conduct public health assessments of hazardous waste sites. In turn, ATSDR provides financial support to DOH to assess the public health hazard from exposure to chemicals in the environment. This report describes the public health assessment conducted at and around the Raleigh Street Dump hazardous waste site. DOH, in cooperation with ATSDR, estimates which groups of people are likely to have contacted, are contacting, or will contact contaminants at the site. DOH then estimates if these exposures may have caused illness in the past, could be causing illness now, or could cause illness in the future. We also identify appropriate actions to mitigate exposures.

3.0 BACKGROUND

3.1 Site Descriptions and History

The Raleigh Street Dump is at the end of Raleigh Street, approximately ½ mile west of U.S. Highway 41, in Tampa (Hillsborough County), Florida. Figures 1 and 2 (Appendix A) show the location of the site, the site layout, and the surrounding area. Power-line easements border the site on the east and west, and Delaney Creek borders the site on the south. Delaney Creek empties into Hillsborough Bay approximately 1 mile from the site. Numerous rail spurs, which service Port Sutton to the southwest, are west of the site. The areas north of the dump and south of Delaney Creek are undeveloped. Across Delaney Creek to the east and southeast, scattered businesses exist within ½ mile of the site. Immediately east of the site is a small group of mobile homes. Another residential neighborhood is more than ¼ mile east-northeast of the site.

Raleigh Street divides the site into the two parcels that originally formed the dump. The parcel south of Raleigh Street measures approximately 5 acres (Florida Department of Environmental Regulation (DER) (1993)). Tampa Fiberglass currently occupies this southern parcel and manufactures septic tanks, aircraft simulator shells, and tanks for wastewater treatment systems (EPA, 1999). The parcel north of Raleigh Street comprises approximately 8 acres and remains undeveloped (FDER, 1993).

The Raleigh Street Dump first came to the attention of EPA in 1980 during site reconnaissance of the Chloride Metals, Inc., facility, which occupied the property at the intersection of Raleigh Street and U.S. Hwy 41 (Figure 1, Appendix A). Chloride Metals, Inc. recycled old lead-acid storage batteries and reportedly disposed of battery casings and furnace slag at three different area dumps. EPA discovered the Raleigh Street Dump while searching for a site to collect a drainage ditch sample. EPA discovered that the owner of the Raleigh Street Dump had given Chloride Metals, Inc., permission to dispose of wastes on his property (EPA, 1980). Battery casings, incinerator slag, and other waste debris provided fill material for the owner's low-lying land. By July 1980, the company had stopped disposing of wastes on the Raleigh site. Other unidentified parties also dumped waste materials at the site (FDER, 1993).

In a 1980 investigation of Chloride Metals, Inc., EPA collected one composite soil sample from 4 areas across from the Raleigh Street Dump. This composite sample contained levels of arsenic and lead greater than background levels for Florida soil (EPA, 1980). In addition, water and sediment from Delaney Creek downstream of Chloride Metals, Inc., contained elevated levels of lead.

In 1993, DER located two community-class drinking water wells within 1 mile of the site. An estimated 40 people reportedly received water from these wells. In 1994, the Florida Department of Environmental Protection (DEP, formerly DER) collected soil and groundwater from the site, and surface water and sediments from Delaney Creek. DEP found arsenic, lead, polycyclic aromatic hydrocarbons (PAHs), and pesticides (dieldrin and heptachlor epoxide). Groundwater from the shallow aquifer beneath the site contained arsenic, lead, and PAHs. Sediment in Delaney Creek and site drainage ditches contained lead (DEP, 1994).

In 1999, 2001, and 2003, EPA found lead in surface soil, groundwater, sediment, and surface water. As observed in previous studies, surface soil on the site also contained PAHs, arsenic, and pesticides. In December 2000, EPA asked DOH to assess the public health hazard.

3.2 Site Visit

On February 20, 2001, staff of the Hillsborough County Health Department and the Health Assessment Team, DOH, visited the Raleigh Street Dump and surrounding area. They noted overgrown property on the north side of Raleigh Street with battery casings, tires, and concrete visible on the ground surface. Access to this area is unrestricted. Tampa Fiberglass occupies the property south of Raleigh Street. The EPA might restrict access to Tampa Fiberglass with a gate and intact fence. The investigators also toured the surrounding areas within ½ mile of the site. Residences are located east-northeast of the site, and no wells were evident at this residential development. The closest residential dwelling was $^{1}/_{10}$ mile east of the site and several vacant mobile homes are near the dump. Areas southeast, south, southwest, west, and northwest of the site are either undeveloped or developed for commercial/industrial use. Health department officials identified two private wells at businesses within ½ mile southeast of the site.

Staff of ATSDR, DEP and EPA visited the site on March 19, 2002. They observed a temporary dwelling, an outdoor eating area, a fire-pit, and a boat on the site. When EPA revisited the site in 2003, they found no evidence of anyone living on the site. Michael Taylor, engineer and project manager for EPA, visited the site in April and October 2004. He reported that the gate to the northern part of the site was gone. He said he would talk to the owner about putting a cable there because the road needs to be kept open for trucks servicing the utilities easement.

3.3 Demographics, Land Use, and Natural Resource Use

3.3.1 Demographics—An estimated 1,100 people lived within 1 mile of the Raleigh Street Dump (U.S. Department of Commerce, Bureau of the Census, 1990.Table 1, Appendix B). Of this population, 30% are younger than 19 years of age, 76% are white, 20% are black, and 4%

are Hispanic or from other racial/ethnic groups. About 300 people live within ½ mile of the site and about 50 people live within ¼ mile.

3.3.2 Land Use—Land use in this area is a mix of commercial and industrial. East of the site are a heavy equipment rebuilding facility, a construction and demolition dump, and the Chloride Metals, Inc., site. The land north, northwest, and east is heavily vegetated. Several railroad spurs and small businesses are within ½ mile southwest of the site. Port Sutton is $^{3}/_{4}$ mile to the southwest. The nearest residence is approximately $^{1}/_{10}$ mile east of the site. The nearest residential neighborhood is ¼ mile east-northeast of the site. The nearest school is 1 mile south-southeast of the site.

3.3.3 Natural Resource Use—In this region of Florida, two aquifer systems provide water. The surficial aquifer, also known as the shallow aquifer, begins approximately 5 feet below land surface and can continue down to 100 feet. Water quality in the surficial aquifer is poor, more suitable for irrigation than ingestion. At this site, water in the surficial aquifer flows south, toward Delaney Creek (DEP, 1991). Beneath the surficial aquifer, a discontinuous clay layer partially separates the surficial and deeper Floridan aquifers. Therefore, contaminants in the surficial aquifer can migrate into the Floridan aquifer. The presence of sinkholes in this region of Florida also facilitates the movement of contaminants from the surficial aquifer to the Floridan aquifer.

The Floridan aquifer lies beneath the intermediate clay layer and can extend over 1,000 feet down. This aquifer is the primary source of potable water for the area because of its higher yield of generally good quality water. For that reason, it is likely that nearby private potable wells are pumping water from the Floridan aquifer. Groundwater flow in the Floridan aquifer is southwestward toward Hillsborough Bay (EPA 1999).

Three municipal water systems provide potable water to most of this area. The nearest well field is over 3 miles southeast of the site (EPA, 1999). Health officials only identified four private wells within ¼ miles of the site. One well is at Tampa Fiberglass; another is 800 feet east at D&B Construction Services. These companies use the well water for filling toilets and washing hands, and other uses. Tampa Fiberglass provides bottled water for employees to drink. Two other private wells are at businesses to the southeast. According to the 1990 census, public water is available to 84% of the area residences. Health officials did not identify any private wells in the nearby residential neighborhoods. More recent information (August 2005) from the Hillsborough County Health Department shows the locations of these wells (Figures 4 and 5). Comparing Figures 4 and 5 shows that most of the homes around the site have City of Tampa meters which means they are on municipal water. For the area inside the quarter mile radius oval, SQG means small quantity generator (of hazardous waste, this site is the Tampa Fiberglass facility), and TRI means a site is on the EPA Toxic Release Inventory site list (this site is the former Chloride Metals site).

Storm water from the site runs off to a ditch about 300 feet northwest of the site and to Delaney Creek 300 feet south of the site. This drainage ditch joins Delaney Creek about 900 feet southwest of the site. Delaney Creek flows to the west and joins Tampa Bay about $^{3}/_{4}$ mile west-southwest of the site (Figures 1 and 2). Few roads are in this isolated area.

4.0 DISCUSSION

Uncertainties are inherent in the public health assessment process. These uncertainties fall into the following categories: 1) the imprecision of the risk assessment process, 2) the incompleteness of the information collected thus far, and 3) the differences in opinion as to the implications of the information (NJDEP, 1990). We address these uncertainties in public health assessments by using worst-case assumptions when estimating or interpreting health risks. Our health assessment calculations and screening values also incorporate safety margins. The assumptions, interpretations, and recommendations made throughout this public health assessment err in the direction of protecting public health.

4.1 Environmental Contamination

We used the following ATSDR standard comparison values (ATSDR 1992a; 1999a), in order of priority, to select potential contaminants of concern at this site:

1. CREG—Cancer Risk Evaluation Guide—calculated from the EPA's cancer slope factor and is the contaminant concentration estimated to result in no more than one excess cancer per one million persons exposed over a lifetime.

2. EMEG—Environmental Media Evaluation Guide—derived from the ATSDR's Minimal Risk Level (MRL) using standard exposure assumptions, such as ingestion of two liters of water per day and body weight of 70 kg for adults. An MRL is a conservative estimate of daily human exposure to a contaminant below which noncancerous illnesses are unlikely to occur. The calculation of the MRL is based on animal studies, and, when available, human studies, It is calculated very conservatively because the goal of the MRL is to protect public health. MRLs exist for each route of exposure, such as ingestion and inhalation, and for different lengths of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days).

3. RMEG—Reference Dose Media Evaluation Guide—derived from the EPA's Reference Dose (RfD) using standard exposure assumptions. RfDs are estimates of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous illness, generally for a year or longer.

4. LTHA—Lifetime Health Advisory—EPA's estimate of the concentration of a drinking water contaminant at which illnesses are not expected to occur over lifetime exposure. LTHAs provide a safety margin to protect sensitive members of the population.

5. SCTL, GWCTL, or SWCTL—Soil Clean-up Target Level, Groundwater Clean-up Target Level, or Surface Water Clean-up Target Level as determined by the Florida Department

of Environmental Protection. We only use SCTLs when no values exist for #1 through #4.

DOH uses ATSDR standard Comparison Values to select chemicals for further consideration—not for determining the possibility of illness. Identification of a contaminant of concern in this section does not mean that exposure will cause illness. If the data shows contaminants measured at concentrations exceeding medium-specific comparison values defined above, we choose those chemicals as contaminants of concern. Identification of contaminants of concern serves to narrow the focus of the public health assessment to those contaminants that are most important to public health. When we select a contaminant of concern in one medium (e.g., soil), we report that contaminant in all other media (e.g., groundwater). We evaluate the contaminant of concern in subsequent sections and estimate whether exposure is likely to cause illness. DOH evaluated all available documents in identifying the contaminants of concern. Tables 2 through 10 (Appendix B) list these environmental data. For this health assessment, DOH considers the surficial and Floridan aquifers a single source of groundwater; the clay layer that separates the aquifers is semi-permeable.

4.1.1 On-site Contamination—In a series of investigations between 1980 and 2002, EPA and DEP collected samples from groundwater, surface soil (0—6" below ground surface), and subsurface soil from the site (EPA 1980, 1999; DEP 1994; CDM 2001, 2003). Site evaluators analyzed on-site samples for volatile organic compounds, semi-volatile organic compounds, pesticides, and metals. Also for this public health assessment, "on-site" refers to the area within the property boundaries as shown in Figure 2 (Appendix A). The term “elevated” means that the contaminant concentration exceeded a screening or comparison value.

4.1.1.1 On-site Surface Soil—Between 1980 and 2002, DEP and EPA collected and analyzed 72 on-site surface soil samples (soil 0—6” deep). Site evaluators did not analyze all samples for all contaminants of concern. Their combined results measured the highest levels of most contaminants just north of Raleigh Street. Florida DOH considers on-site surface soil adequately characterized for this public health assessment.

4.1.1.2 On-site Groundwater—Between 1980 and 2002, DEP and EPA collected and analyzed 17 groundwater samples from monitoring wells and the Tampa Fiberglass well. The highest lead, PAH, and arsenic levels were found in the shallow groundwater in the southeastern part of the northern parcel. This location coincides with the presence of numerous battery casings (Figure 2, Appendix A). The water sample collected from the Floridan aquifer well located on the Tampa Fiberglass property did not contain any contaminants at concentrations exceeding their respective ATSDR Comparison Values. The data from the groundwater samples indicates that contaminants have migrated to the shallow aquifer groundwater. Florida DOH considers on-site groundwater quality characterized for this public health assessment.

4.1.1.3 On-site Surface Water and Sediments—In 2002, EPA’s contractor collected and analyzed two on-site surface water samples and two on-site sediment samples from the bird-foot shaped drainage area in the northwestern part of the site. EPA’s laboratory analyzed surface water and sediments for semi-volatiles, pesticides, and metals. Surface water exceeded the drinking water standard for lead; sediments exceeded the screening value for lead and PAHs.

Florida DOH considers on-site surface water and sediments adequately characterized for this public health assessment.

4.1.2 Off-site Contamination—In 2000 and 2002, EPA's contractor collected off-site samples they had analyzed for volatiles, semi-volatiles, pesticides, and metals (CDM 2001, 2003). For this public health assessment, "off-site" refers to the area outside the property boundaries as shown in Figure 2 (Appendix A). The term "elevated" means that the contaminant concentration exceeded a screening or comparison value.

4.1.2.1 Off-site Surface Soil—EPA's contractor collected and analyzed nine off-site surface soil samples (soil 0—6" deep). The highest level of lead was found just southwest of Tampa Fiberglass, west of the western power line easement near monitoring well MW5. Although these data do not completely delineate the extent of contamination, for this public health assessment off-site surface soil has been adequately characterized.

4.1.2.2 Off-site Groundwater—EPA's contractor collected and analyzed nine off-site groundwater samples from monitoring wells and from the D&B Construction Services well. The water sample collected from the D&B Construction Services well had a high salt and iron content, but it did not exceed any chemical screening levels. While analyses measured arsenic values above the screening values in the samples from wetlands east-southeast of Tampa Fiberglass, these values could be natural. Therefore, the data from the groundwater samples indicate that site-related contaminants have not migrated to off-site groundwater. Florida DOH considers off-site groundwater adequately characterized for this public health assessment.

4.1.2.3 Off-site Surface Water and Sediments—EPA's contractor and DEP collected 50 surface water samples and 40 sediment samples from off-site drainage ditches and from Delaney Creek. Eighteen of the 50 surface water samples contained lead at levels exceeding drinking water standards (Table 9, Appendix B). The presence of lead in the surface water of the drainage ditches *east of the site* (i.e., down gradient) suggests contamination from Raleigh Street Dump. However, the presence of lead in the samples from Delaney Creek, *upstream of the site*, suggests an additional source for the lead contamination. The surface water sample taken the farthest to the east also contained antimony above the drinking water standard. The highest values measured for lead, antimony, and PAHs came from samples collected in off-site sediments taken up gradient (i.e., east) of the site.

4.1.3 Contaminants of Concern—By screening the available environmental data with the health-based comparison values (listed in section 4.1), DOH selected antimony, arsenic, dieldrin, gamma chlordane, heptachlor, heptachlor epoxide, lead, manganese, PAHs, PCBs, pentachlorophenol, and toxaphene for further evaluation.

4.2 Quality Assurance and Quality Control

DOH reviewed the quality assurance and quality control measures taken in gathering the referenced data. DOH believes that the data are sufficient to support the conclusions made in this document. Site evaluation teams followed appropriate chain-of-custody and data reporting procedures, they submitted appropriate laboratory, equipment, and sample controls for analyses.

The completeness and reliability of the referenced procedures support the validity of the analyses and conclusions drawn in this public health assessment.

4.3 Physical Hazards

Florida Health Assessment Team and Hillsborough County Health Department staff observed numerous physical hazards on both the Tampa Fiberglass property and on the dump area north of Raleigh Street. These hazards are in the form of battery casings, tires, concrete, and debris. Access to Tampa Fiberglass can be restricted with a fence, but unauthorized access to the dump area continues to be possible. Photographs of some of the debris are included in Appendix A.

4.4 Pathway Analysis

Florida DOH evaluated the environmental and human components of exposure pathways to evaluate if nearby residents or trespassers are contacting (or could contact) contaminants migrating from the site. Exposure pathways consist of five elements: a source of contamination (e.g., chemical spill), an environmental medium (e.g., groundwater), a point of exposure (e.g., tap water), a route of human exposure (e.g., oral), and a receptor population (e.g., area residents).

We eliminate an exposure pathway if at least one of the five elements is missing and will never be present. We classify exposure pathways that we do not eliminate as either complete or potential. With completed pathways, all five elements exist and exposure to a contaminant has occurred, is occurring, or will occur. We classify a pathway as potential if at least one of the five elements is missing, but could be present in the future. For both complete and potential pathways, DOH estimates the likely dose of each contaminant of concern and this dose serves as the basis of a toxicological evaluation. We list exposure pathways on Table 11.

4.4.1 Completed Exposure Pathways—The presence of riding trails indicates that people are riding 4-wheel sport vehicles on the site. In the past, a dwelling constructed of castoff materials, a fire pit, and a picnic area all photographed on March 19, 2002, indicated a completed pathway for exposure to on-site soil for trespassers living on this site.

4.4.2 Potential Exposure Pathways—If land use changes in the area, residents or employees of a business could contact contaminants in the surface soil at the Raleigh Street Dump or in off-site soil southwest of the site. Additionally, the indoor use of on-site shallow groundwater could allow volatilization of PAHs from groundwater to air (an inhalation route calculated to be significant).

4.4.3 Eliminated Exposure Pathways—DOH eliminates exposures to on- and off-site surface water and on- and off-site groundwater because this water is too saline for people to drink. We also eliminated subsurface soil on and off the site, and sediments on and off the site, as exposure pathways because regular contact with these media is unlikely.

4.5 Public Health Implications

In this section, we calculate the dose of a chemical that adults and children could potentially receive by all routes of exposure (Tables 10 through 18, Appendix B). We then review the ATSDR Toxicological Profile for each contaminant of concern and determine whether the estimated dose could cause illness.

4.5.1 Toxicological Evaluation—In this section, we discuss illnesses that could occur following exposure to contaminants of concern at this site. To evaluate the risks of illness, the ATSDR has developed Minimal Risk Levels (MRLs) for contaminants commonly measured at hazardous waste sites. An MRL is a conservative estimate of daily human exposure to a contaminant below which noncancerous illnesses are unlikely to occur. The calculation of the MRL is based on animal studies, and, when available, human studies, It is calculated very conservatively because the goal of the MRL is to protect public health. MRLs exist for each route of exposure, such as ingestion and inhalation, and for different lengths of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). The ATSDR presents these MRLs in toxicological profiles. Toxicological profiles are chemical-specific and provide information on the health effects, environmental transport, human exposure, and regulatory status of a specific chemical.

To apply the MRL, we estimate the daily dose for each of the contaminants of concern using standard exposure parameter estimates (i.e., average volume of water consumed per day, average shower time, etc.). Using these parameters, we estimate the number of milligrams of contaminant ingested per day (mg/day), then divide by the average human body weight. Dose units of measure are the number of milligrams of chemical per kilogram of body weight per day (mg/kg/day). In calculating the potential dose, we assume people contact the maximum concentration detected for each contaminant in each medium. Therefore, a dose that does not exceed the MRL is not likely to cause noncancerous illness.

The exposure parameters we used in estimating the daily doses for each exposure scenario appear below the tables. The values used are standard values for this type of analysis (EPA 1991, 1997). For groundwater, we estimated the dose of chemicals children and adults might ingest from drinking, absorbing chemicals through the skin during showering, and breathing indoor air. For soil exposures, we estimated the dose from incidental ingestion of soil and from the potential air concentration due to the generation of dusts.

4.5.1.1 Antimony—Antimony is a metal that can be melted with other metals to make them stronger (the alloy process). Battery producers use a lead-antimony alloy in lead-storage batteries. Estimated daily, long-term inhalation or ingestion exposures to the highest measured levels of antimony in on-site soil, on-site groundwater, and off-site sediments are below any levels associated with adverse health effects in animal studies. ATSDR did not locate reports on studies involving dermal exposure to antimony (ATSDR 1992b).

We could not estimate increased cancer risk rates for exposures to the highest measured levels of antimony because antimony does not have a cancer slope. Although studies of rats inhaling high levels of antimony showed associated increases in lung cancer, epidemiologic studies of workers have not shown occupational exposure associations with lung or other cancers (ATSDR 1992b).

4.5.1.2 Arsenic—If site use became residential, daily, long-term inhalation or ingestion exposure to the highest level of arsenic measured in on-site surface soil is not likely to cause noncancer illnesses. Such exposures might result in a low increased risk of cancers. Human cancers linked to inorganic arsenic ingestion include skin cancers (intra-epidermal carcinoma, basal cell carcinoma, and squamous cell carcinomas), lung, kidney, liver, and urinary tract cancers (ATSDR 2000a). However, few surface soil samples had elevated arsenic levels, so even a low increased cancer risk due to on-site soil arsenic exposure might be unlikely.

Daily ingestion of the highest levels of arsenic measured in on- and off-site shallow groundwater have been linked to cerebrovascular disease and blood changes that may signal liver dysfunction (ATSDR 2000a). However, people do not drink this water because it is too salty. The EPA reported that shallow groundwater in this area is only used for hand washing and toilet flushing.

4.5.1.3 Dieldrin—Daily, long-term inhalation or ingestion exposure to the highest level of dieldrin measured in on-site surface soil is not likely to cause non-cancer illnesses. Dieldrin has been associated with liver and thyroid cancers in rats and mice (ATSDR 2002). Extrapolating from these animal studies, long-term incidental ingestion of on-site surface soil with the highest level of dieldrin measured might result in a low increase in cancer risk.

4.5.1.4 Gamma Chlordane—Gamma chlordane only exceeded the screening value in one on-site surface soil sample, near the southeastern part of the north dump. Daily, long-term inhalation or ingestion exposure to this level of gamma chlordane is not likely to cause non-cancer illnesses. Chlordane is associated with liver tumors in a long-term study of mice (ATSDR 1989). Extrapolating from this mouse study, long-term incidental ingestion of on-site surface soil with the highest level of gamma chlordane measured is not likely to result in an apparent cancer risk increase.

While the health threat from exposure to chlordane appears to be minimal, it is important to recognize that pesticides were not produced on the Chloride Metals NPL site that was the source for the lead and antimony. These chemicals were apparently dumped on the site by another entity and serve to indicate that other chemicals in other amounts could also be present on the site.

4.5.1.5 Heptachlor/Heptachlor epoxide—Heptachlor only exceeded the screening value in one on-site surface soil sample, near the southeastern part of the north dump. Hepatachlor epoxide exceeded the screening value in three locations, with the highest measured value also found in the southeastern part of the north dump. Daily, long-term inhalation or ingestion exposure to these levels of heptachlor and heptachlor epoxide are not likely to cause non-cancer illnesses.

Heptachlor has been associated with liver cancer in one long-term study of mice (ATSDR 1993). Extrapolating from this animal study, long-term incidental ingestion of on-site surface soil with the highest level of heptachlor measured is not likely to result in an apparent increase in cancer risk.

4.5.1.6 Lead— If ingested, the levels of lead in surface soil are high enough to cause illness. Although the on-site shallow groundwater also contains high levels of lead, people would probably not drink it because it is too saline. Analyses of off-site shallow groundwater used for hand washing and toilet flushing at nearby businesses did not contain elevated lead. Although lead is present in on- and off-site surface water and off-site soil and sediments above screening values, it is unlikely people would ingest the surface water because it is highly saline or because the sediments are under water.

For lead, estimated blood levels more accurately predict health effects than traditional dose estimates. DOH used a simple model to estimate blood lead levels and likely health effects (ATSDR 1999) for soil, groundwater, surface water, and sediment exposure (Tables 15 and 16). This model takes into account people's exposure to lead from sources other than the site. DOH assumed on-site residents could contact lead-contaminated surface soil or sediments for 3 hours per day.

If children or adults contacted the highest concentrations of lead in the on-site surface soil (41,000 parts per million or milligrams per kilogram), for 3 hours a day, their blood lead levels may increase to between 31 and 103 micrograms per deciliter (µg/dl). Similar exposure to off-site surface soil would only elevate blood lead 1-4 µg /dl and off-site sediment exposure might increase blood lead 0.4 to 2.7 µg /dl (Table 16). The following table details possible health effects in children and adults associated with elevated blood lead levels from many studies (ATSDR 1999). However, the model is based on conservative assumptions and may not represent actual exposure. Information about the assumptions used as a basis for the model can be found in Tables 17 – 19 in Appendix B.

Health Effects from Blood Lead Levels of 31 to 103 Micrograms per Deciliter (µg/dl) (modeled in Tables 15 and 16, as discussed above).		
Children	Adults	Health Effects
No threshold	3 – 56 µg/dl	Decreased aminolevulinic acid dehydratase (ALAD) enzyme activity. ALAD is necessary for hemoglobin synthesis. A large decrease in ALAD activity can lead to anemia.
1 – 17 µg/dl		Alterations in visual evoked potentials.[1]
6.5 µg/dl		(Average value at 24 months of age) **-** Lower cognitive function test scores in children 5 to 10 years of age.
6 – 200 µg/dl		Decreased neurobehavioral function; slightly decreased performance on IQ tests and other measures of neuro-psychological function.
≥ 9 µg/dl g		Impaired motor developmental among 6 year olds.
	5.5 (average)	Decreased performance on neurobehavioral tests.
	30 – >70 µg/dl	Decreased peripheral nerve conduction velocity.
7 – 80 µg/dl	80 µg/dl	Decreased pyrimidine 5' nucleotidase[2].
10 – 15 µg/dl		Impaired mental and physical development.
11.9 µg/dl	36 (mean) µg/dl	(Geometric mean) **-** Dizziness when standing (postural disequilibrium).
12 – 17 µg /dl		Reduced birth weight and/or reduced gestational age. Increased incidence of stillbirth and neonatal death.
	≥10 µg/dl	Increased incidence of miscarriages and stillbirths.
	37.2 µg/dl	Decreased fertility.
12 – 120 µg/dl		Decreased vitamin D metabolism.
≥15 µg/dl		Increased zinc protoporphyrin (ZPP) that can lead to anemia.
≥ 20 µg/dl		Moderate deficit in Wechsler Performance IQ (intelligence test) in 6.5 year olds.
≥20 µg /dl		Hematocrit of less than 35% and anemia.
20 – 30 µg/dl		Lack of feeling in the fingers/toes and slower nerve responses.
>25 – 35 µg/dl	>25 – 35 µg/dl	Increased iron protoporphyrin (FEP) that can lead to anemia.
	>35 µg/dl	Increased urinary or blood delta-aminolevulinic acid (ALA), protoporphyrin IX, and co-protoporphyrin.

[1]The visual evoked potential measures the electrical response of the brain's primary visual cortex to a visual stimulus.

[2] "Pyrimidines, along with purines, are the building blocks of DNA and RNA, the basic elements of cell programming machinery. In addition, they fulfill a variety of functions in the metabolism of the cell of which the most important are regulation or cell metabolism and function, energy conservation and transport, formation of coenzymes and of active intermediates of phospholipids and carbohydrate metabolism. Therefore in case a deficit exists, any system can be affected." (Van Gennip 1999).

Health Effects from Blood Lead Levels of 31 to 103 Micrograms per Deciliter (µg/dl) (modeled in Tables 15 and 16, as discussed above).		
Children	Adults	Health Effects
30 – 60 µg/dl		Growth retardation.
37.3 µg/dl		(Average) - Increased blood pressure.
≥40 µg/dl		Decreased hemoglobin (oxygen carrying molecule in red blood cells) and anemia.
60 – 100 µg /dl		Colic.
60 – 450 µg/dl		Irritability, lethargy, behavioral problems.
>80 µg/dl		Increased amino acids in urine.
	7 – 38 µg/dl	Increased blood pressure most prominent in middle-aged white men.
	18 – 26 µg/dl	Renal impairment with gout or hypertension.
80 – 800 µg/dl		Swelling and inflammation of the brain (encephalopathy).

Currently, EPA classifies lead as a "probable human carcinogen", based on increased incidences in kidney (renal tubular) cancer in rats exposed to high-levels of lead (45 times the estimated doses for this site). Nonetheless, lead does not currently have a cancer slope; therefore Florida DOH was unable to estimate the increased likelihood of cancer for exposure to site soils.

4.5.1.6 Manganese—Daily, long-term ingestion (especially by children) of the highest levels of manganese measured in shallow groundwater and surface soil might cause illness. People drinking water with manganese at roughly the highest measured levels in on-site shallow groundwater (for long periods) experienced mild neurological symptoms including mental and emotional disturbances, and slow/clumsy body movements. Nonetheless, it is unlikely anyone will drink this water due to its high salt and iron content. The doses calculated for manganese in surface soil were about half those calculated for shallow groundwater. ATSDR did not locate studies linking inorganic manganese with cancer in people or animals (ATSDR 2000d).

4.5.1.7 Polycyclic Aromatic Hydrocarbons (PAHs)—Florida DOH evaluated all PAHs found in on-site soil, groundwater, and off-site sediments in terms of toxic-equivalence to benzo(a)pyrene (B(a)P). Only the level estimated for the inhalation route associated with indoor use of on-site groundwater has been associated with illness. Inhalation of PAHs aerating from shallow groundwater **in an enclosed space** for more than a few weeks could have adverse health effects. People who inhaled this level of PAHs from 6 months to 6 years suffered reduced lung function, abnormal chest x-rays, coughing, bloody vomiting, and throat and chest irritation (ATSDR 1995). Such an exposure route could also put people at a very high increased risk for lung cancer (ATSDR 1995), but this exposure route would only be completed if a well tapping the shallow groundwater was installed in the southeastern part of the north dump.

It is unlikely that daily, long-term ingestion of PAHs in on-site soil or groundwater, or on- or off-site sediments (as vapors or dust) would cause any noncancer illness. Daily, long-term ingestion of on-site surface soils, however, could result in a low increased risk of cancer.

Ingestion of PAHs in on-site groundwater or sediments, or off-site sediments, would not increase apparent or significant cancer risks.

PAHs are not absorbed easily or extensively through the skin. Specialists have used coal tar shampoos and ointments for the treatment of various skin disorders for many years. Studies have generally been unable to find evidence of increased tumors from skin exposure to PAHs in coal tar shampoos and ointments (Buck Grissom, personal communication 2004).

4.5.1.8 Polychlorinated Biphenyls (PCBs)—Non-cancer illnesses due to long-term, daily exposures to the highest measured levels of PCBs in soil are unlikely, and calculated increases in cancer risk are not apparent (ATSDR 2000c).

4.5.1.9 Pentachlorophenol—Daily, long-term inhalation or ingestion exposure to pentachlorophenol in the soil at this site is not likely to cause non-cancer illnesses.

While the increased cancer risk to humans from exposure to pentachlorophenol at the highest levels measured on the site are unknown, pentachlorophenol has been associated with liver cancer in one long-term study of mice (ATSDR 2001), and with other cancers in rats exposed at much higher levels. Extrapolating from the mouse study, long-term incidental ingestion of on-site surface soil with the highest level of pentachlorophenol is not likely to result in an apparent cancer risk increase.

4.5.1.10 Toxaphene—Daily, long-term inhalation or ingestion exposure to toxaphene in the soil at this site is not likely to cause non-cancer illnesses.

While the increased cancer risk to humans from exposure to toxaphene at the highest levels measured on the site are unknown, toxaphene has been associated with liver cancer in one long-term study of mice (ATSDR 2000a) and thyroid cancers at higher levels in rats. Extrapolating from the mouse study, long-term incidental ingestion of on-site surface soil with the highest level of toxaphene measured is unlikely to result in an apparent increase in cancer risk.

4.5.2 Children and Other Unusually Susceptible Populations

4.5.2.1 Child Health Considerations—ATSDR and DOH recognize that in communities faced with the contamination of their environment, the unique vulnerabilities of infants and children demand special attention. Children are at a greater risk than adults are for certain kinds of exposure to hazardous substances emitted from waste sites. Because they play outdoors and because they often carry food into contaminated areas, children are more likely to contact contaminants in the environment. Children are shorter than most adults are, which means they breathe dust, soil, and heavy vapors closer to the ground. They are also generally smaller than adults are, resulting in higher doses of chemical exposure per body weight. If toxic exposures occur during critical growth stages, the developing body systems of children can sustain permanent damage. Probably most important, however, is that children depend on adults for risk identification and risk management, housing, and access to medical care. Thus, adults should be aware of public health risks in their community, so they can guide their children accordingly.

In recognition of these concerns, ATSDR has developed screening values for the chemicals calculated specifically for children's exposures, which Florida DOH used in the preparation of this report. The consideration of children regarding this site is important

- Because their livers' enzyme detoxification systems are immature, embryos, fetuses, and babies up to age 2– 3 months may be at increased risk of illness following exposure to dieldrin, heptachlor, heptachlor epoxide, and toxaphene. Infants are also more susceptible to the endocrine effects of pentachlorophenol, which prevent them from regulating their body temperatures (ATSDR 2002, 1993, 2000a, 2001),
- Because children are more sensitive to the toxicity of lead, manganese, and gamma chlordane, and children may absorb metals from their intestines more efficiently than adults (ATSDR 1999, 2000d, 1989), and
- Because children with diets deficient in vitamins C & D and iron are at risk of increased uptake of ingested lead (ATSDR 1999).

4.5.2.2 Other Unusually Susceptible Populations— A susceptible population has different or enhanced responses to a toxic chemical than most persons exposed to the same levels. Specific factors that may limit individuals' abilities to detoxify or excrete harmful site-related chemicals (or may increase the effects of damage to their organs or systems) include:

- Persons with existing chronic respiratory or cardiovascular disease or problems would probably be at special risk for antimony and toxaphene exposure, because both are likely to worsen these types of health problems (ATSDR 1992b, 2000a).
- Persons with kidney dysfunction may be unusually susceptible to antimony, dieldrin, toxaphene, and pentachlorophenol exposure because persons excrete these substances in urine (ATSDR 1992b, 2002, 2000a, 2001).
- Persons with either impaired or enhanced liver function may be unusually susceptible to dieldrin, heptachlor and heptachlor epoxide, pentachlorophenol, polychlorinated biphenyls, toxaphene and chlordane toxicity (ATSDR 2002, 1993, 2001, 2000c, 2000a, 1989).
- Persons suffering from compromised immune function may be more susceptible to infections because dieldrin impairs cellular immunity. They may also be more susceptible to the effects of toxaphene (ATSDR 2002, 2000a).
- Asians may be more susceptible to heptachlor epoxide toxicity than other U.S. residents may (ATSDR 1993).
- Pregnant women may be more susceptible to lead and pentachlorophenol's toxic effects than the general population (ATSDR 1999, 2001).
- Smokers may be more susceptible to lead's toxic effects than are non-smokers (ATSDR 1999).
- Absorption and excretion of manganese and lead may be due to differences in dietary levels of iron or other metals, calcium, protein, alcohol. These differences in absorption or excretion rates may contribute to adults' wide range of susceptibility to manganese and lead exposure (ATSDR 2000d, 1999). Malnourished persons may be at greater-than-average risk of suffering from the toxic effects of pentachlorophenol (ATSDR 2001). Persons with protein-deficient diets may be at greater-than-average risk of suffering from the effects of toxaphene (ATSDR 2000a).

- The elderly are more likely to be susceptible to the toxicity of manganese and lead, possibly due to differential toxicokinetics and potential adverse effects superimposed on normal decline in fine motor function with age (ATSDR 2000d, 1999). The elderly are also possibly at greater-than-average risk of suffering from the toxic effects of pentachlorophenol (ATSDR 2001).
- Persons ingesting alcohol, and people consuming therapeutic or illicit drugs, may have increased susceptibility to lead and toxaphene (ATSDR 1999, 2000a).
- Persons working in hot environments and persons with an inability or decreased ability to disperse body heat may be at greater-than-average risk of suffering from the toxic effects of pentachlorophenol (ATSDR 2001).
- Persons with neurological diseases (particularly convulsive disorders) may be unusually susceptible to the toxic effects of toxaphene; those with nervous disorders may also be more susceptible to lead’s toxic effects (ATSDR 2000a, 1999).
- Persons with diseases of the adrenal glands may be unusually susceptible to the toxic effects of toxaphene (ATSDR 2000a).

5.0 COMMUNITY HEALTH CONCERNS

Health concerns reported to our Community Involvement person primarily concerned the Chloride Metals facility, which could have been the source for metals contamination at the site. People driving home past the Chloride Metals site can see the large piles of dirt stored under “carport” type structures, behind chain-link fencing with locked gates and “No trespassing” signs. They wonder if the site might affect their property values and if their health could be at risk from the soil piles.

DOH asked the DEP Hazardous Waste Regulation Section staff responsible for Chloride Metals site remediation about the potential for off-site contamination. DEP has been involved with the cleanup of this site since 1987. DEP staff recounted that only one business property east of the site still has off-site soil contamination (in addition to Delaney Creek sediments and the Raleigh Street Dump Property). Because roofs protect the soil piles from rainfall and tarps covering the soil piles prevent dust from moving, there is no current pathway for soil from these piles to move off site (see the photographs of Chloride Metals in Appendix A).

DEP Hazardous Waste Regulation Section staff is preparing a cleanup permit for the Chloride Metals-Exide Technologies site. They will issue the cleanup permit in December 2005; and will require a public meeting, which probably will be held in late January. Therefore, DEP does not expect to issue the permit until the beginning of March 2006. The permit contains a full plan for site cleanup to current land use standards. Exide Technologies is currently treating groundwater at the site for volatile organic compound contamination.

Health Outcome Data
DOH has not investigated cancer rates for the area near the site. Currently, EPA classifies lead as a “probable human carcinogen”, based on increased incidences in kidney (renal tubular) cancer in rats exposed to high-levels of lead (45 times the estimated doses for this site). Nonetheless, lead does not currently have a cancer slope; therefore, Florida DOH was unable to estimate the

increased likelihood of cancer for exposure to site soils. Other chemicals present at the highest levels in **soil and sediments** on and near the Raleigh Street Dump and Chloride Metals sites are not carcinogenic, and accidental ingestion of soil and sediment or dust are the current or potential exposure pathways. While nearby residents have not asked DOH to investigate the cancer rates for their neighborhood; if they had, such an investigation would have been problematic because the population near the site is small (Figure 4). If an investigated area's population is very small, there will be very few cases of cancer when compared to the rates compiled for the state.

6.0 CONCLUSIONS

Currently, the Raleigh Street Dump is categorized as a "public health hazard" based on evidence of trespassing activity and exposure to on-site soil contaminants and physical hazards. Someone removed the gate from the north dump fence, and 4-wheel drive recreational sport vehicle tire tread marks and trails indicate a completed exposure pathway to on-site soil for trespassers. Trespassers living on the site in the past may also have been exposed to on-site soil. Raleigh Street Dump may be continue to be a public health hazard in the future if trespassers go on the site to ride or live, or if land use changes before the site is cleaned up.

Prolonged ingestion of lead-contaminated soil on the site could affect an exposed person's liver, blood and neurological systems. Exposure to the levels of arsenic, dieldrin, and PAHs measured on the site could theoretically add a low increase in expected statistical cancer risk. Long-term ingestion of lead via soil southwest of the site could affect the blood-forming processes.

Groundwater in the surficial aquifer beneath the site contains levels of lead, PAHs, manganese, and arsenic that could cause illness, if it was ingested. Although no one is likely to drink shallow groundwater because of its high salt and iron content, indoor use of this water could also be hazardous due to inhalation of volatilized PAHs.

DOH does not expect significant exposure to most other chemicals measured on and off the site because:

- While on- and off-site surface water contains lead above the drinking water standard, no one is likely to drink this water due to its high salt content. Likewise, we do not expect persons to use shallow groundwater near the site, which contains arsenic above the drinking water standard, for potable purposes because of its high salt and iron content.
- It is unlikely that anyone would have daily long-term exposure to sediments in creeks on the site or in Delaney Creek or its tributaries near the site.

7.0 RECOMMENDATIONS

Because the exposure pathways that could cause illness and cancer are dependent on either the regular use of contaminated on-site groundwater or the incidental ingestion of on-site soil by trespassers, the following recommendations serve to prevent the completion of these pathways.

1. The site owner or EPA personnel should restrict site access and post hazardous waste warning signs. The EPA should continue to test off-site surface soil for lead

until they delineate a specific known area of elevated lead contamination (southeast of Tampa Fiberglass).

2. The EPA should require the site owner to enter deed restrictions to prevent the use of shallow on-site groundwater as a potable source, a source of water for indoor use that would allow vapor inhalation, a plant irrigation source, or a source for aquaculture of mussels or soft-shelled clams.

8.0 PUBLIC HEALTH ACTION PLAN

This section describes what ATSDR and/or DOH plan to do at this site. The purpose of a public health action plan is to reduce any existing health hazards and to prevent any from occurring in the future. ATSDR and/or DOH will do the following:

1. DOH, Bureau of Community Environmental Health, will inform and educate nearby residents about the potential public health hazard at this site by circulating a fact sheet, providing a copy of this report to any residents that may request it, and by providing a copy of this report in a nearby library repository. This report will also be available on-line at: http://www.myfloridaeh.com/community/SUPERFUND/PHA.htm
2. DOH, Bureau of Community Environmental Health, will continue to work with EPA and Department of Environmental Protection to ensure that any site clean up protects public health.

Florida DOH staff bases our conclusions and recommendations on the information reviewed. When additional information becomes available, DOH, Bureau of Community Environmental Health, will evaluate it to determine what additional recommendations, if any, to make.

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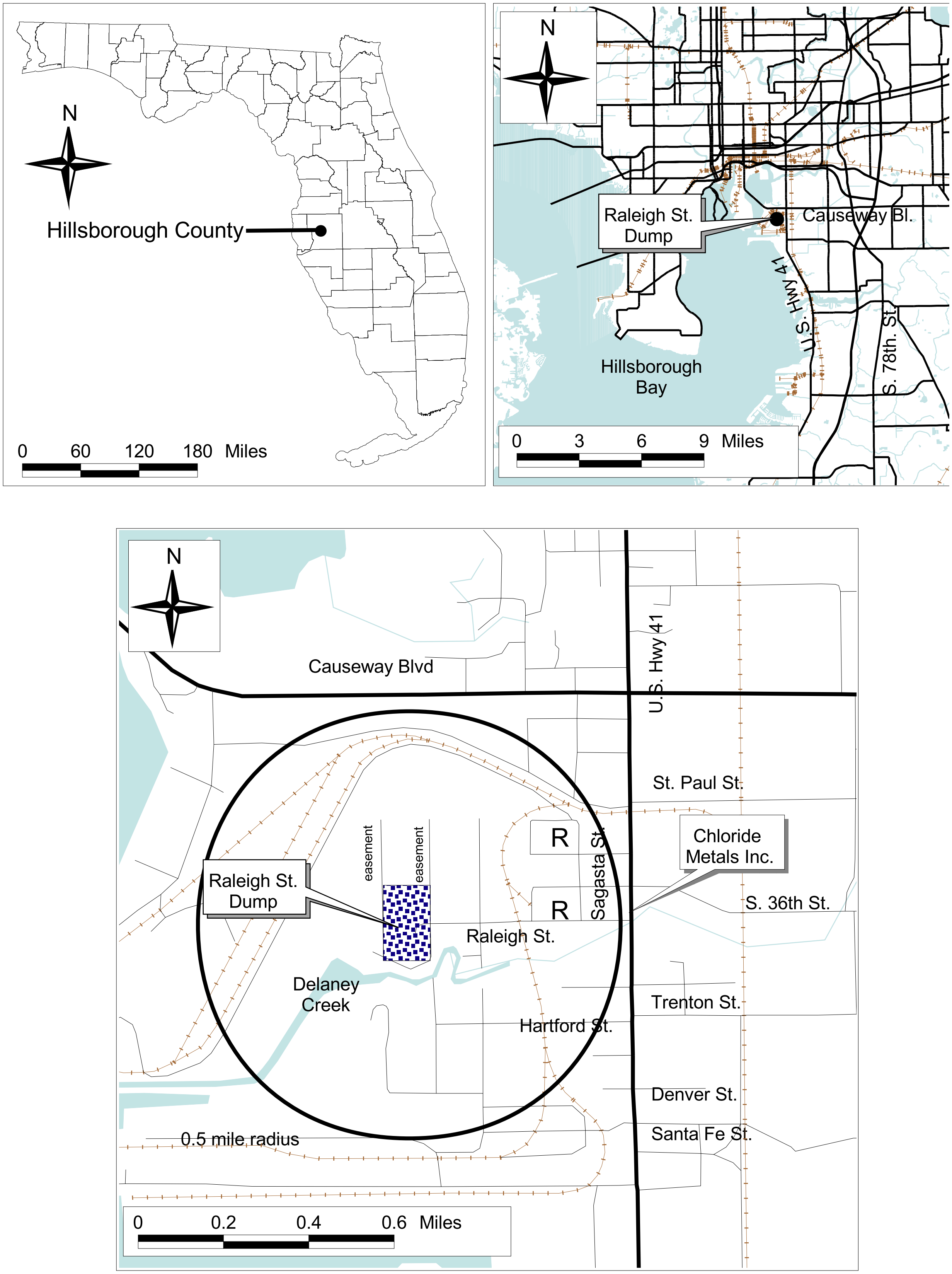
APPENDIX A. FIGURES

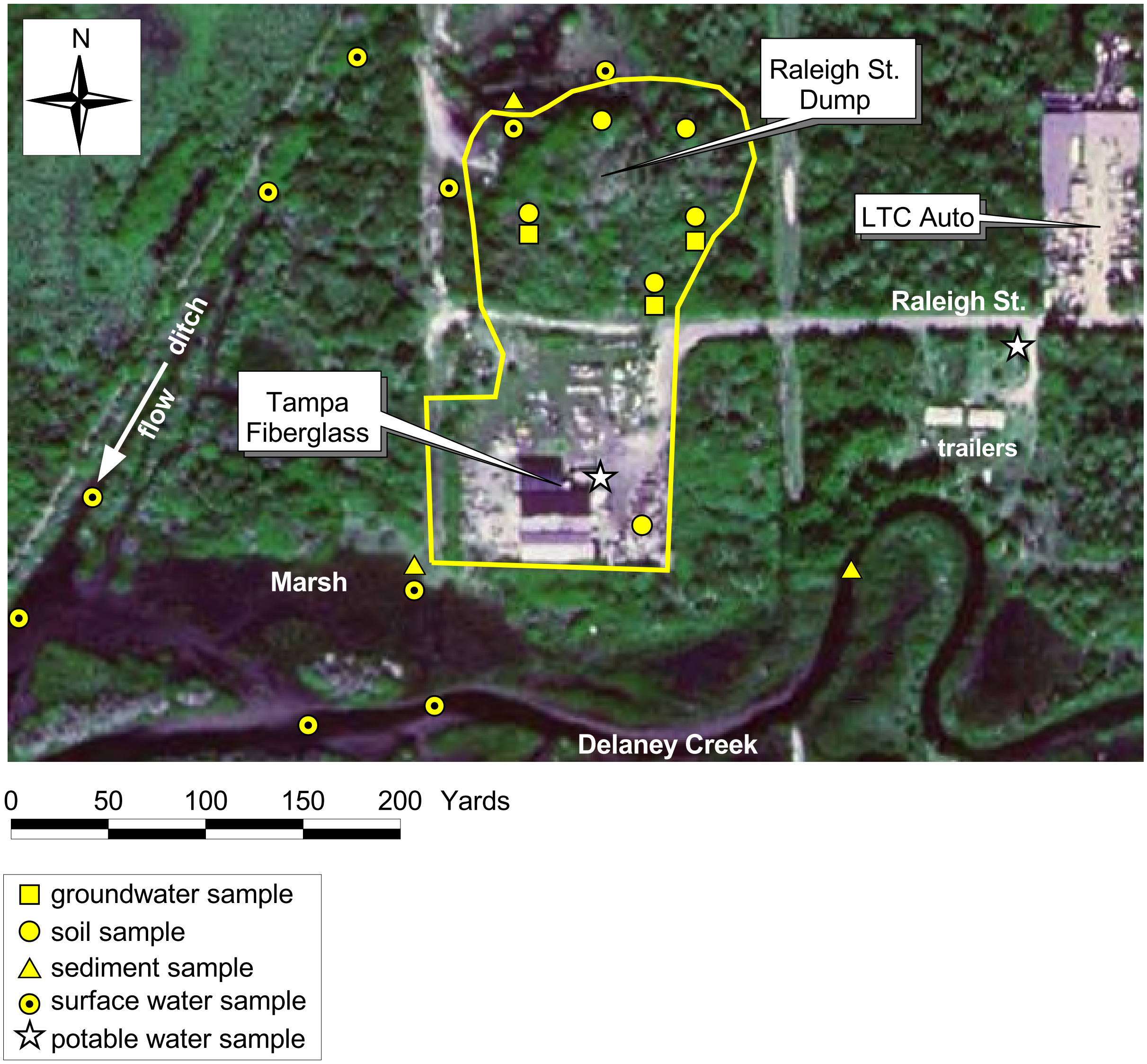


R - denotes residential development

Figure1. Site Location in Florida

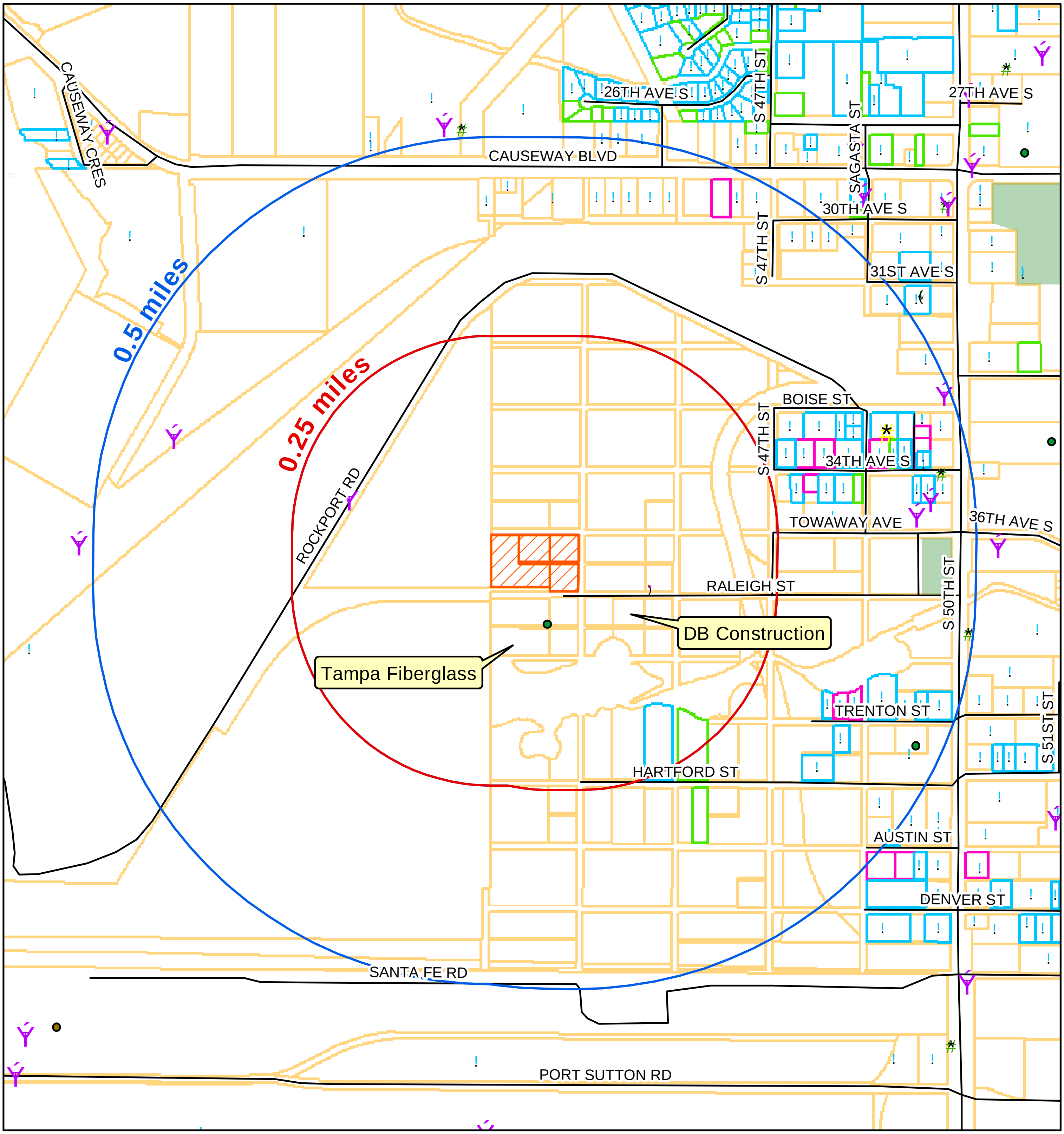
Figure 2. Site layout (U.S.G.S., 1994-1995)

Figure 3. Locations of Contaminants by Media from pre-2001studies



The above symbols indicate the approximate locations where either EPA or FDEP detected at least one contaminant at a concentration that exceeds it respective comparison value for that medium (i.e. soil).

Neither of the potable wells tested, denoted with a star, contained elevated levels of any of the contaminants.



Raleigh Street Dump Site

0 0.1 0.2
Miles

DOH Limited Use Wells	EPA TRI
Tanks (STCM)	City of Tampa Meters
DEP PWS Wells	Old Landfills
HAZ WASTE (CHAZ)	Brown Fields
DEP SQG	GW Contamination
DEP LQG	Raleigh Street Dump
DOH SUPER Act Facilities	MOBILE HOMES
DOH SUPER Act Wells	SINGLE FAMILY
DEP WSRP Wells	VACANT RESIDENT

Figure 4 from the :

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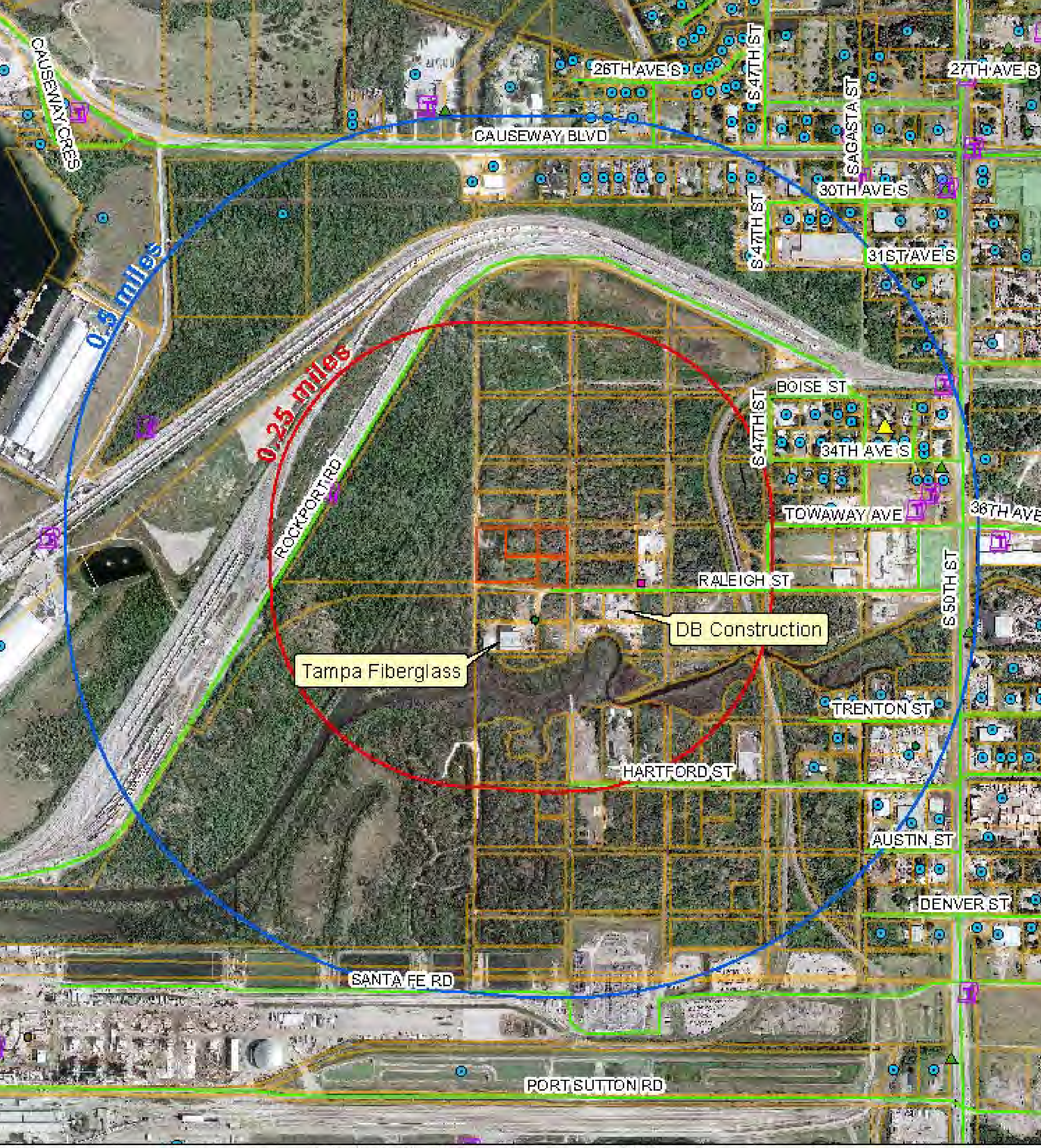

Raleigh Street Dump Site

N
W E
S

0 0.1 0.2

■	DOH Limited Use Wells	●	DEP WSRP Wells
T	Tanks (STCM)	■	EPA TRI
⊙	DEP PWS Wells	●	City of Tampa Meters
H	HAZ WASTE (CHAZ)		Old Landfills
●	DEP SQG		Brown Fields
●	DEP LQG		GW Contamination
▲	DOH SUPER Act Facilities		Raleigh Street Dump

Figure 5 from

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Photo 1. Aerial photo of the site.

Photo 2. Entrance to Tampa Fiberglass.

Photo 3. Fiberglass forms at Tampa Fiberglass.

Photo 4. Chemical drums at Tampa Fiberglass

Photo 5. Fence and warning sign at Chloride Metals, Inc.

Photo 6. Cover over stored soil at Chloride Metals, Inc.

Photo 7. View of Chloride Metals, Inc. from intersection of Yocam Diamond and Raleigh Streets.

Photo 8. Raleigh Street Dump entrance.

Photo 9. Vegetation on northern part of dump site.

Photo 10. Discards on northern part of dump site.

Photo 11. Dwellings on the northern part of the site.

Photo 12. Close-up of the dwellings.

Photo 13. Dwellings are constructed of castoff materials.

Photo 14. Outside sitting area; photographer also reported seeing a boat that they did not photograph.

Photo 15. Fire pit and chairs.

Photo 16. Makeshift chairs.

Photo 17. Small wetlands on the northern part of the site.

Photo 18. View southwest from wetlands in the utilities easement.

APPENDIX B. TABLES

Table 1. Total Exposed Population Estimation Table

Pathway Types	Estimated Total Population in Potential Exposure Pathways	Minimum Population	Maximum Population
Potential Pathways On-site	10	2	1-50
Potential Pathways Off-site	1100	0	501 - 2500
Total Potential On and Off-site	1100	0	501 - 2500
Completed Pathways On-site	0	2	0
Completed Pathways Off-site	0	0	0
Total Completed On and Off-site	0	2	0
Potential and Completed Pathways On-site	10	0	1-50
Potential and Completed Pathways Off-site	1100	0	501 - 2500
Total Potential and Completed On and Off-site	1110	0	501 - 2500

DOH prepared this table for use by the ATSDR in their “HazDat” tracking system that includes people potentially impacted by hazardous waste sites.

Table 2. Maximum concentrations in on-site surface soil (0-6 inches below ground surface)

Contaminants of Concern	Maximum Concentration (mg/kg)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value*	
				(mg/kg)	Source
Antimony	130	TF- SE	1/59	20/300 RMEG	ATSDR 2002
Arsenic	44	TF- SE	1/72	20/200 EMEG	ATSDR 2002
Dieldrin	0.99	Dump- NW	14/72	0.04 CREG	ATSDR 2002
Gamma Chlordane	3.5	Dump- SE	1/33	0.04 CREG	ATSDR 2002
Heptachlor	0.430	Dump- SE	1/33	0.2 CREG	ATSDR 2002
Heptachlor Epoxide	0.85	Dump- SE	3/72	0.08 CREG	ATSDR 2002
Lead	41000	Dump- SE	19/72	400 SCTL	DEP 1999
Manganese	5900	Dump- SW	1/33	3000/40000 RMEG	ATSDR 2002
PAH	42.6	Dump- SE	20/72	0.1 CREG	ATSDR 2002
PCB	0.85	Dump- Center	2/72	0.4 CREG	ATSDR 2002
Pentachlorophenol	54	Dump- S Center	1/33	4 CREG	ATSDR 2002
Toxaphene	2	Dump- SW	1/33	0.6 CREG	ATSDR 2002

*Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE—**Northeast **NW—**Northwest **SW—**Southwest **S—**South **PCB—**polychlorinated biphenyl
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
SCTL—DEP Soil Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, 2001 and 2003.

Table 3. Maximum concentrations in on-site subsurface soil (greater than 6 inches below ground surface)

Contaminants of Concern	Maximum Concentration (mg/kg)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value*	
				(mg/kg)	Source
Antimony	100	TF- NE	4/38	20/300 RMEG	ATSDR 2002
Arsenic	35	TF- NE	1/48	20/200 EMEG	ATSDR 2002
Dieldrin	0.62	Dump- N	5/48	0.04 CREG	ATSDR 2002
Gamma Chlordane	ND	-	-	0.04 CREG	ATSDR 2002
Heptachlor	ND	-	-	0.2 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	-	0.08 CREG	ATSDR 2002
Lead	25000	TF N Central	5/48	400 SCTL	DEP 1999
Manganese	ND	-	-	3000/40000 RMEG	ATSDR 2002
PAH	3.2	Dump- N	9/48	0.1 CREG	ATSDR 2002
PCB	ND	-	-	0.4 CREG	ATSDR 2002
Pentachlorophenol	ND	-	-	4 CREG	ATSDR 2002
Toxaphene	ND	-	-	0.6 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE—**Northeast **NW—**Northwest **SW—**Southwest **S—**South **PCB—**polychlorinated biphenyl
ND—none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
SCTL—DEP Soil Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 4. Maximum concentrations in on-site groundwater

Contaminants of Concern	Maximum Concentration (ug/L)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value	
				(ug/L)	Source
Antimony	76	TF- NE	2/8	6 MCL	EPA 2002
Arsenic	27.8	Dump- SE	3/17	10 MCL	EPA 2002
Dieldrin	ND	-	0/17	0.002 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/17	2 CREG	ATSDR 2002
Heptachlor	ND	-	0/17	0.008 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/17	0.004 CREG	ATSDR 2002
Lead	9050	Dump- SE	4/17	15 GWCTL	DEP 1999
Manganese	640	Dump- NW	1/8	500/2000 RMEG	ATSDR 2002
PAH	1.44	Dump- SE	1/17	0.005 CREG	ATSDR 2002
PCB	ND	-	0/17	0.2/0.7 EMEG	ATSDR 2002
Pentachlorophenol	ND	-	0/17	0.2 CREG	ATSDR 2002
Toxaphene	ND	-	0/17	0.03 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
ug/L—micrograms per liter0
TF—Tampa Fiberglass **SE—**Southeast **NE—**Northeast **NW—**Northwest **SW—**Southwest **S—**South **PCB—**polychlorinated biphenyl
ND—none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
GWCTL—DEP Groundwater Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 5. Maximum concentrations in on-site surface water

Contaminants of Concern	Maximum Concentration (ug/L)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value	
				(ug/L)	Source
Antimony	ND	-	0/3	6 MCL	EPA 2002
Arsenic	ND	-	0/3	10 MCL	EPA 2002
Dieldrin	ND	-	0/3	0.002 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/3	2 CREG	ATSDR 2002
Heptachlor	ND	-	0/3	0.008 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/3	0.004 CREG	ATSDR 2002
Lead	40	Dump—SE	2/3	15 GWCTL	DEP 1999
Manganese	ND	-	0/3	500/2000 RMEG	ATSDR 2002
PAH	ND	-	0/3	0.005 CREG	ATSDR 2002
PCB	ND	-	0/3	0.2/0.7 EMEG	ATSDR 2002
Pentachlorophenol	ND	-	0/3	0.2 CREG	ATSDR 2002
Toxaphene	ND	-	0/2	0.03 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South **PCB**—polychlorinated biphenyl
ND—none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
GWCTL—DEP Groundwater Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 6. Maximum concentrations in on-site sediments

Contaminants of Concern	Maximum Concentration (mg/kg)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value*	
				(mg/kg)	Source
Antimony	ND	-	0/3	20/300 RMEG	ATSDR 2002
Arsenic	ND	-	0/3	20/200 EMEG	ATSDR 2002
Dieldrin	ND	-	0/3	0.04 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/3	0.04 CREG	ATSDR 2002
Heptachlor	ND	-	0/3	0.2 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/3	0.08 CREG	ATSDR 2002
Lead	980	-	2/3	400 SCTL	DEP 1999
Manganese	ND	-	0/3	3000/40000 RMEG	ATSDR 2002
PAH	0.118	Dump NE	1/3	0.1 CREG	ATSDR 2002
PCB	ND	-	0/3	0.4 CREG	ATSDR 2002
Pentachlorophenol	ND	-	0/3	4 CREG	ATSDR 2002
Toxaphene	ND	-	0/3	0.6 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South **PCB**—polychlorinated biphenyl
ND — none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
SCTL—DEP Soil Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 7. Maximum concentrations in off-site surface soil

Contaminants of Concern	Maximum Concentration (mg/kg)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value*	
				(mg/kg)	Source
Antimony	ND	-	0/9	20/300 RMEG	ATSDR 2002
Arsenic	ND	-	0/9	20/200 EMEG	ATSDR 2002
Dieldrin	ND	-	0/9	0.04 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/9	0.04 CREG	ATSDR 2002
Heptachlor	ND	-	0/9	0.2 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/9	0.08 CREG	ATSDR 2002
Lead	1400	SE of TF	3/9	400 SCTL	DEP 1999
Manganese	ND	-	0/9	3000/40000 RMEG	ATSDR 2002
PAH	ND	-	0/9	0.1 CREG	ATSDR 2002
PCB	ND	-	0/9	0.4 CREG	ATSDR 2002
Pentachlorophenol	ND	-	0/9	4 CREG	ATSDR 2002
Toxaphene	ND	-	0/9	0.6 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South **PCB**—polychlorinated biphenyl
PCB—polychlorinated biphenyl **ND** — none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
SCTL—DEP Soil Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 8. Maximum concentrations in off-site groundwater

Contaminants of Concern	Maximum Concentration (ug/L)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value	
				(ug/L)	Source
Antimony	ND	-	0/5	6 MCL	EPA 2002
Arsenic	28	ESE of TF	1/9	10 MCL	EPA 2002
Dieldrin	ND	-	0/9	0.002 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/9	2 CREG	ATSDR 2002
Heptachlor	ND	-	0/9	0.008 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/9	0.004 CREG	ATSDR 2002
Lead	ND	-	0/9	15 GWCTL	DEP 1999
Manganese	ND	-	0/9	500/2000 RMEG	ATSDR 2002
PAH	ND	-	0/9	0.005 CREG	ATSDR 2002
PCB	ND	-	0/9	0.2/0.7 EMEG	ATSDR 2002
Pentachlorophenol	ND	-	0/9	0.2 CREG	ATSDR 2002
Toxaphene	ND	-	0/9	0.03 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
ug/L—micrograms per liter
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South
PCB—polychlorinated biphenyl **ND**—none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
GWCTL—DEP Groundwater Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 9. Maximum concentrations in off-site surface water

Contaminants of Concern	Maximum Concentration (ug/L)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value	
				(ug/L)	Source
Antimony	7.1	E on Delaney Creek	1/31	6 MCL	EPA 2002
Arsenic	19	-	10/50	10 MCL	EPA 2002
Dieldrin	ND	-	0/50	0.002 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/50	2 CREG	ATSDR 2002
Heptachlor	ND	-	0/50	0.008 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/50	0.004 CREG	ATSDR 2002
Lead	130	SW of TF	18/50	15 GWCTL	DEP 1999
Manganese	ND	-	0/50	500/2000 RMEG	ATSDR 2002
PAH	ND	-	0/50	0.005 CREG	ATSDR 2002
PCB	ND	-	0/50	0.2/0.7 EMEG	ATSDR 2002
Pentachlorophenol	ND	-	0/50	0.2 CREG	ATSDR 2002
Toxaphene	ND	-	0/50	0.03 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
ug/L—micrograms per liter
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South **PCB—**polychlorinated biphenyl
PCB—polychlorinated biphenyl **ND** — none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
GWCTL— DEP Groundwater Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003.

Table 10. Maximum concentrations in off-site sediments

Contaminants of Concern	Maximum Concentration (mg/kg)	Location of sample with maximum	# Greater Than Comparison Value/ Total # of Samples	Comparison Value*	
				(mg/kg)	Source
Antimony	34	Wetlands to East	1/40	20/300 RMEG	ATSDR 2002
Arsenic	ND	-	0/40	20/200 EMEG	ATSDR 2002
Dieldrin	ND	-	0/40	0.04 CREG	ATSDR 2002
Gamma Chlordane	ND	-	0/40	0.04 CREG	ATSDR 2002
Heptachlor	ND	-	0/40	0.2 CREG	ATSDR 2002
Heptachlor Epoxide	ND	-	0/40	0.08 CREG	ATSDR 2002
Lead	1200	Wetlands to East	5/40	400 SCTL	DEP 1999
Manganese	ND	-	0/40	3000/40000 RMEG	ATSDR 2002
PAH	1.18	Delaney Creek East of site	5/40	0.1 CREG	ATSDR 2002
PCB	ND	-	0/40	0.4 CREG	ATSDR 2002
Pentachlorophenol	ND	-	0/40	4 CREG	ATSDR 2002
Toxaphene	ND	-	0/40	0.6 CREG	ATSDR 2002

Comparison values used to select chemicals for further scrutiny, not for determining the possibility of illness.
mg/kg—milligrams per kilogram of soil
TF—Tampa Fiberglass **SE—**Southeast **NE**—Northeast **NW**—Northwest **SW**—Southwest **S**—South **PCB**—polychlorinated biphenyl
PCB—polychlorinated biphenyl **ND**—none detected
PAH—polycyclic aromatic hydrocarbons are expressed in terms of benzo(a)pyrene equivalents
CREG—ATSDR Cancer Risk Evaluation Guide
RMEG—ATSDR gives doses for child and adult Reference Dose Medial Evaluation Guide
EMEG—ATSDR gives doses for child and adult Environmental Medial Evaluation Guide
SCTL—DEP Soil Cleanup Target Level
Sources of Data: EPA 1980, DEP 1994, EPA 1999, CDM 2000, CDM 2001 and 2003

Table 11. Completed exposure pathways

Pathway Name	Exposure Pathway Elements					Time
	Source	Environmental/ Exposure Media	Point of Exposure	Route of Exposure	Exposed Population and land use	
On-site Soil	Contaminated On-site Soil	Surface Soil	On-site property	Incidental ingestion and inhalation	On-site trespassers	Past
Off-site Soil	Contaminated Off-site Soil	Surface Soil	Off-site property	Incidental ingestion and inhalation	Off-site residents/owners	Past/ Current

Table 12. Potential exposure pathways

Pathway Name	Exposure Pathway Elements					Time
	Source	Environmental/ Exposure Media	Point of Exposure	Route of Exposure	Exposed Population and land use	
On-site Soil	Contaminated On-site Soil	Surface Soil	On-site property	Incidental ingestion and inhalation	On-site residents and trespassers	Current/ Future
On-site Groundwater	Contaminated On-site Soil	Groundwater	On-site wells/ Tap water	Ingestion, skin absorption and inhalation	On-site residents or employees	Future
Off-site Soil	Contaminated Off-site Soil	Surface Soil	Off-site property	Incidental ingestion and inhalation	Off-site residents/owners	Current/ Future

Model Parameters and Assumptions for Tables 5, 6, and 7

Exposure Medium: Groundwater

Exposure Point:	**On-site tap water**
Scenario Time-frame:	Future
Land Use Conditions:	Residential

Receptor Population: Residents

These doses were calculated using Risk Assistant software by Hampshire Research Institute, Version 2.0. The part of this software DOH uses allows us to set custom exposures that we can use for every site with accepted values for groundwater consumption, shower inhalation exposure and dermal exposure parameters (EPA, 1991).

The following doses were calculated using the following values:

Adult body weight-	70 kg
Child body weight-	15 kg
Adult water consumption-	2 liters/day
Child water consumption-	1 liter/day
Adult shower time-	0.2 hours
Adult skin surface area-	23,000cm2
Child skin surface area-	7,200cm^2

* The air concentration is given in milligrams per cubic meter because the values for inhalation studies in most of the Toxicological Profiles are given in these units. The air concentration is not a dose, therefore it is the same for adults and children.

μg/L = microgram per liter of water
mg/kg/day = milligrams per kilogram body weight per day
mg/^{M3} = milligrams per cubic meter

N.D.- Not detected
N.A.- Not applicable
N.S.- Not significant

Exposure Medium: Soil

Exposure Point:	**On-site soil and dust**
Scenario Time frame:	Future
Land Use Conditions:	Residential

Receptor Population: Residents

These doses were calculated using Risk Assistant software and accepted values for soil consumption, dust inhalation exposure and dermal exposure parameters (EPA, 1991).

The following doses were calculated using the following values:

Adult body weight-	70 kg
Child body weight-	15 kg
Adult soil consumption-	100 mg/day
Child soil consumption-	200 mg/day
Adult/Child shower time-	0.2 hours
Adult skin surface area-	23,000cm^2
Child skin surface area-	7,200cm^2

* The air concentration is given in milligrams per cubic meter because the values for inhalation studies in most of the Toxicological Profiles are given in these units. The air concentration is not a dose, therefore it is the same for adults and children.

mg/kg = milligram per kilogram of soil
mg/kg/day = milligrams per kilogram body weight per day

Table 13. Estimated dose from exposure to on-site surface soil

Contaminant of Concern (maximum concentration)	Oral MRL (mg/kg/day)	Soil/dust-Ingestion (mg/kg/day)		Soil/dust-Dermal (mg/kg/day)		Inhalation MRL (mg/m^3)	Soil/dust-Inhalation (mg/m^3)
		Child	Adult	Child	Adult		Child and Adult
Antimony (130 mg/kg)	-	0.002	0.0002	N.S.	N.S.	-	0.000007
Arsenic (44 mg/kg)	0.0003 Chr	**0.0004**	0.00006	N.S.	N.S.	-	0.000002
Dieldrin (0.99 mg/kg)	0.00005 Chr	0.00001	0.000001	N.S.	N.S.	-	0.00000006
Gamma Chlordane (3.5 mg/kg)	0.0006 Chr	0.00005	0.000005	N.S.	N.S.	0.00002 Chr	0.0000002
Heptachlor (0.43 mg/kg)	-	0.000006	0.0000006	N.S.	N.S.	-	0.00000002
Heptachlor Epoxide (0.16 mg/kg)	-	0.00001	0.000001	N.S.	N.S.	-	0.00000005
Lead (41,000 mg/kg)	-	Model	Model	N.S.	N.S.	Model	Model
Manganese (5,400 mg/kg)	-	0.08	0.008	N.S.	N.S.	-	0.0003
PAHs (42.6 mg/kg)	-	0.0006	0.00006	N.S.	N.S.	-	0.000002
PCBs (0.85 mg/kg)	0.01 Acute	0.00001	0.000001	N.S.	N.S.	-	0.00000005
Pentachlorophenol (54 mg/kg)	0.01 Chr	0.0007	0.00008	N.S.	N.S.	-	0.000003
Toxaphene (2 mg/kg)	0.001 Int	0.00003	0.000003	N.S.	N.S.	-	0.0000001

Acute—Acute exposure length of 0-14 days **Int** —Intermediate exposure length of 15—364 days **Chr**—Chronic exposure length of more than 365 days
N.S. — Not Significant **mg/kg/day** — milligram chemical per kilogram body weight per day **mg/m^3** — microgram of chemical per cubic meter of air
Bolded values are greater than the chemical's MRL (Minimum Risk Level)

Table 14. Estimated dose from exposure to on-site groundwater

Contaminant of Concern (maximum concentration)	Oral MRL (mg/kg/day)	Groundwater-Ingestion (mg/kg/day)		Groundwater-Dermal (mg/kg/day)		Inhalation MRL (mg/m^3)	Groundwater-Inhalation (mg/m^3)
		Child	Adult	Child	Adult		Child and Adult
Antimony (76 µg/L)	-	0.005	0.001	0.000007	0.000005	-	M.D.
Arsenic (27.8 µg/L)	0.0003 Chr	0.002	0.0004	0.000003	0.000002	-	M.D.
Dieldrin	0.00005 Chr	-	-	-.	-	-	-
Gamma Chlordane	0.0006 Chr	-	-	-	-.	0.00002 Chr	-
Heptachlor	-	-	-	-	-.	-	-
Heptachlor Epoxide)		-	-	-	-	-	-
Lead (9,050 µg/L)	-	Model	Model	Model	Model	Model	Model
Manganese (640 µg/L)	-	0.04	0.009	0.000061	0.00004	-	M.D.
PAHs (1.44 µg/L)	-	0.0001	0.00002	0.002	0.001	-	0.02
PCBs	0.01 Acute	-	-	-	-	-	-
Pentachlorophenol	0.01 Chr	-	-	-	-	-	-
Toxaphene	0.001 Int	-	-	-	-	-	-

Acute—Acute exposure length of 0-14 days **Int** —Intermediate exposure length of 15—364 days **Chr** — Chronic exposure length of more than 365 days
N.S. — Not Significant **mg/kg/day** — milligram chemical per kilogram body weight per day **mg/m^3** — microgram of chemical per cubic meter of air
Bolded values are greater than the chemical's MRL (Minimum Risk Level) **M.D.** — Missing Data

Table 15. Estimated dose from exposure to off-site groundwater

Contaminant of Concern (maximum concentration)	Oral MRL (mg/kg/day)	Groundwater-Ingestion (mg/kg/day)		Groundwater-Dermal (mg/kg/day)		Inhalation MRL (mg/m^3)	Groundwater-Inhalation (mg/m^3)
		Child	Adult	Child	Adult		Child and Adult
Antimony	-	-	-	-	-	-	-
Arsenic (28µg/L)	0.0003 Chr	0.002	0.0004	0.000003	0.000002	-	M.D.
Dieldrin	0.00005 Chr	-	-	-.	-	-	-
Gamma Chlordane	0.0006 Chr	-	-	-	-.	0.00002 Chr	-
Heptachlor	-	-	-	-	-.	-	-
Heptachlor Epoxide)	-	-	-	-	-	-	-
Lead	-	Model	Model	Model	Model	Model	Model
Manganese	-	-	-	-	-	-	-
PAHs	-	-	-	-	-	-	-
PCBs	0.01 Acute	-	-	-	-	-	-
Pentachlorophenol	0.01 Chr	-	-	-	-	-	-
Toxaphene	0.001 Int	-	-	-	-	-	-

Acute—Acute exposure length of 0-14 days **Int** —Intermediate exposure length of 15—364 days **Chr** — Chronic exposure length of more than 365 days
N.S. — Not Significant **mg/kg/day** — milligram chemical per kilogram body weight per day **mg/m^3** — microgram of chemical per cubic meter of air
Bolded values are greater than the chemical's MRL (Minimum Risk Level) **M.D.** Missing Data

Table 16. Estimated dose from exposure to off-site sediments

Contaminant of Concern (maximum concentration)	Oral MRL (mg/kg/day)	Soil/dust-Ingestion (mg/kg/day)		Soil/dust-Dermal (mg/kg/day)		Inhalation MRL (mg/m^3)	Soil/dust—Inhalation (mg/m^3)
		Child	Adult	Child	Adult		Child and Adult
Antimony (34 mg/kg)	-	0.0005	0.00005	N.S.	N.S.	-	0.000002
Arsenic	0.0003 Chr	-	-	-	-	-	-
Dieldrin	0.00005 Chr	-	-	-	-	-	-
Gamma Chlordane	0.0006 Chr	-	-	-	-	0.00002 Chr	-
Heptachlor	-	-	-	-	-	-	-
Heptachlor Epoxide	-	-	-	-	-	-	-
Lead (12,000 mg/kg)	-	Model	Model	Model	Model	Model	Model
Manganese	-	-	-	-	-	-	-
PAHs (1.8 mg/kg)	-	0.0001	0.000002	N.S.	N.S.	-	0.00000007
PCBs	0.01 Acute	-	-	-	-	-	-
Pentachlorophenol	0.01 Chr	-	-	-	-	-	-
Toxaphene	0.001 Int	-	-	-	-	-	-

Acute—Acute exposure length of 0-14 days **Int** —Intermediate exposure length of 15—364 days **Chr** — Chronic exposure length of more than 365 days
N.S. — Not Significant **mg/kg/day** — milligram chemical per kilogram body weight per day **mg/m^3** — microgram of chemical per cubic meter of air
Bolded values are greater than the chemical's MRL (Minimum Risk Level)

Table 17. Estimated Blood Lead Concentrations in Children Ingesting On-site Surface Soil (micrograms per deciliter —µg/dl)

Media	Conc. *		Time	Slope§		**Low**	**High**
	low	**high**		**low**	**high**		
Air (out) *	0.1	0.2	0.125	2.46	3.04	0.03075	0.076
Air (in) *	0.3	0.6	0.125	2.46	3.04	0.09225	0.228
Food*	5	5	0.125	0.24	0.24	0.15	0.15
Water*	4	4	0.125	0.16	0.16	0.08	0.08
Soil	41000	41000	0.125	0.002	0.016	10.25	82
Dust	41000	41000	0.125	0.004	0.004	20.5	20.5
Total						**31.103**	**103.034**

*Default Value from ATSDR 1999a, Appendix D.
§These slopes were for children from ATSDR 1999a, Appendix D.
ATSDR's Regression Analysis with Multiple-uptake Parameters to Estimate Blood Lead from Environmental Exposures (ATSDR 1999a, Appendix D)

Table 18. Estimated Blood Lead Concentrations in Adults Ingesting On-site Surface Soil (micrograms per deciliter—µg/dl)

Media	Conc. *		Time	Slope§		**Low**	**High**
	low	**high**		**low**	**high**		
Air (out) *	0.1	0.2	0.125	1.59	3.56	0.01988	0.089
Air (in) *	0.3	0.6	0.125	1.53	3.56	0.05738	0.267
Food*	5	5	0.125	0.016	0.0195	0.01	0.01219
Water*	4	4	0.125	0.03	0.06	0.015	0.03
Soil	41000	41000	0.125	0.002	0.016	10.25	82
Dust	41000	41000	0.125	0.004	0.004	20.5	20.5
Total						**30.8523**	**102.898**

*Default Value from ATSDR 1999a, Appendix D.
§Slopes for adults from ATSDR 1999a, Appendix D.
ATSDR's Regression Analysis with Multiple-uptake Parameters to Estimate Blood Lead from Environmental Exposures (ATSDR 1999a, Appendix D)

Similarly ATSDR's Regression Analysis with Multiple-uptake Parameters to Estimate Blood Lead from Environmental Exposures (ATSDR 1999a, Appendix D) was used to estimate Blood Lead Concentrations from other media. Water estimates did not add any soil value contributions, so ground and surface water could be looked at as separate exposure pathways issues.)

Table 19. Estimated Blood Lead Concentrations from other Media

Media	Children	Adults
	Low-High **(**µg/dl)	Low-High **(**µg/dl)
On-site Surface Soil	31-103	31-103
On-site Subsurface Soil	19-63	19-63
On-site Groundwater	181-181	34-68
On-site Surface Water	1-1	0.23-0.82
Off-site Surface Soil	1-4	1-4
Off-site Surface Water	3-3	0.5-1.51
Off-site Sediment	0.6-3	0.4- 4

APPENDIX C. RISK OF ILLNESS, DOSE RESPONSE/THRESHOLD, AND UNCERTAINTY IN PUBLIC HEALTH ASSESSMENTS

Risk of Illness

In this health assessment, the risk of illness is the chance that exposure to a hazardous contaminant is associated with a harmful health effect or illness. The risk of illness is not a measure of cause and effect; only an in-depth health study can identify a cause and effect relationship. Instead, we use the risk of illness to decide if a follow-up health study is needed and to identify possible associations.

The greater the exposure to a hazardous contaminant (dose), the greater the risk of illness. The amount of a substance required to harm a person's health (toxicity) also determines the risk of illness. Exposure to a hazardous contaminant above a minimum level increases everyone's risk of illness. Only in unusual circumstances, however, do many people become ill.

Information from human studies provides the strongest evidence that exposure to a hazardous contaminant is related to a particular illness. Some of this evidence comes from doctors reporting an unusual incidence of a specific illness in exposed individuals. More formal studies compare illnesses in people with different levels of exposure. However, human information is very limited for most hazardous contaminants, and scientists must frequently depend upon data from animal studies. Hazardous contaminants associated with harmful health effects in humans are often associated with harmful health effects in other animal species. There are limits, however, in only relying on animal studies. For example, scientists have found some hazardous contaminants are associated with cancer in animals, but lack evidence of a similar association in humans. In addition, humans and animals have differing abilities to protect themselves against low levels of contaminants, and most animal studies test only the possible health effects of high exposure levels. Consequently, the possible effects on humans of low-level exposure to hazardous contaminants are uncertain when information is derived solely from animal experiments.

Dose Response/Thresholds

The focus of toxicological studies in humans or animals is identification of the relationship between exposure to different doses of a specific contaminant and the chance of having a health effect from each exposure level. This dose-response relationship provides a mathematical formula or graph that we use to estimate a person's risk of illness. The dose-response curves used to estimate the risk of noncancerous illnesses have a threshold dose, while cancer-slope dose-curves do not. A threshold dose is the highest exposure dose at which there is no risk of a noncancerous illness. Scientists include a threshold dose in these models because the human body can adjust to varying amounts of cell damage without illness. The threshold dose differs for different contaminants and different exposure routes, and we estimate it from information gathered in human and animal studies. In contrast, the dose-response curves used to estimate the risk of cancer assume there is no threshold dose (or, the cancer threshold dose is zero). This assumes a single contaminant molecule may be sufficient to cause a clinical case of cancer. This assumption is very conservative, and many scientists believe a threshold dose greater than zero exists for the development of cancer.

Uncertainty

All risk assessments, to varying degrees, require the use of assumptions, judgments, and incomplete data. These contribute to the uncertainty of the final risk estimates. Some more important sources of uncertainty in this public health assessment include environmental sampling and analysis, exposure parameter estimates, use of modeled data, and present toxicological knowledge. These uncertainties may cause risk to be overestimated or underestimated to a different extent. Because of the uncertainties described below, this public health assessment does not represent an absolute estimate of risk to persons exposed to chemicals at or near the Raleigh Street Dump.

Environmental chemistry analysis errors can arise from random errors in the sampling and analytical processes, resulting in either an over- or under-estimation of risk. We can control these errors to some extent by increasing the number of samples collected and analyzed and by sampling the same locations over several different periods. The above actions tend to minimize uncertainty contributed from random sampling errors.

There are two areas of uncertainty related to exposure parameter estimates. The first is the exposure-point concentration estimate. The second is the estimate of the total chemical exposures. In this assessment we used maximum detected concentrations as the exposure point concentration. We believe using the maximum measured value to be appropriate because we cannot be certain of the peak contaminant concentrations, and we cannot statistically predict peak values. Nevertheless, this assumption introduces uncertainty into the risk assessment that may over- or under-estimate the actual risk of illness. When selecting parameter values to estimate exposure dose, we used default assumptions and values within the ranges recommended by the ATSDR or the EPA. These default assumptions and values are conservative (health protective) and may contribute to the over-estimation of risk of illness. Similarly, we assumed the maximum exposure period occurred regularly for each selected pathway. Both assumptions are likely to contribute to the over-estimation of risk of illness.

There are also data gaps and uncertainties in the design, extrapolation, and interpretation of toxicological experimental studies. Data gaps contribute uncertainty because information is either not available or is addressed qualitatively. Moreover, the available information on the interaction among chemicals measured at the site, when present, is qualitative (that is, a description instead of a number) and we cannot apply a mathematical formula to estimate the dose. These data gaps may tend to underestimate the actual risk of illness. In addition, there are great uncertainties in extrapolating from high-to-low doses, and from animal-to-human populations. Extrapolating from animals to humans is uncertain because of the differences in the uptake, metabolism, distribution, and body organ susceptibility between different species. Human populations are also variable because of differences in genetic constitution, diet, home and occupational environment, activity patterns, and other factors. These uncertainties can result in an over- or under-estimation of risk of illness. Finally, there are great uncertainties in extrapolating from high to low doses, and controversy in interpreting these results. Because the models used to estimate dose-response relationships in experimental studies are conservative, they tend to overestimate the risk. Techniques used to derive acceptable exposure levels account for such variables by using safety factors. Currently, there is much debate in the scientific community about how much we overestimate the actual risks and what the risk estimates really mean.

APPENDIX D. PUBLIC COMMENTS AND FLORIDA DOH RESPONSES

People from two of the 26 residences that received a fact sheet outlining the findings of this report responded to Florida DOH.

Comment: Both respondents live closer to the Chloride Metals site than they do the Raleigh Street Dump. They wanted to know if it was possible that the soil in their yards might be contaminated from the Chloride Metals site.

Response: Florida DOH asked DEP's Hazardous Waste Regulation Section staff responsible for Chloride Metals site remediation about the potential for off-site contamination. DEP has been involved with the cleanup of this site since 1987. DEP staff recounted that soils in yards north of Chloride Metals had shown lead contamination in the past. DEP staff said Chloride Metals had changed its name to Exide Technologies, and that Exide Technologies had cleaned up the contaminated soils in the neighborhood north of the site in the late 1990s. DEP required extensive soil sampling to confirm that Exide Technologies had removed the lead-contaminated soils from the neighborhood. DEP staff recounted that only one business property east of the site still has off-site soil contamination (in addition to Delaney Creek and the Raleigh Street Dump Property).

Comment: Both respondents were concerned about children's potential exposures to contaminated soil. One remarked that the problem of children contacting contaminated soil could be greater than the report suggests because the site that was the source for the lead and antimony in the Raleigh Street Dump, Chloride Metals, is also present in the neighborhood.

Response: While DEP did not ask Florida DOH to evaluate the public health threats from Chloride Metals, the contaminated soil on the Chloride Metals site is under protective covering and the site is fenced and posted (see the photographs of Chloride Metals in Appendix A). Florida DOH staff's recent discussions with the EPA project manager for the Chloride Metals site confirmed that EPA found little off-site contamination associated with that site, other than the Raleigh Street Dump, the business property mentioned by DEP (located east of the site), and sediments in Delaney Creek. As reported in the previous response, DEP had earlier had the Chloride Metals-Exide Technologies site owners remove contaminated soil from the neighborhood north of the site. Keeping people off the Raleigh Street Dump Site continues to be a challenge for the EPA because access to the Utilities Corridor is through the gate on the northern part of the property and then on a road through the property.

Comment: Both respondents remarked the Chloride Metals site needs to be cleaned up as soon as possible, one said it is an eyesore as well as a health hazard.

Response: DEP Hazardous Waste Regulation Section staff is preparing a cleanup permit now for the Chloride Metals-Exide Technologies site. This cleanup permit will be issued in December 2005 and will require a public meeting, which probably will be held in late January. Therefore, DEP does not expect the permit to be issued until the beginning of March 2006. The permit contains a full plan for site cleanup to current land use standards. Groundwater at the Chloride Metals-Exide Technologies site is being treated for volatile organic compound contamination.

Comment: One respondent raised three children and six grandchildren in this area. The respondent reported that at least two of them (they did not explain whether it was children or grandchildren) had elevated blood lead levels in the past. The respondent asked if children with high lead levels could be mentally challenged.

Response: Florida DOH does not have specific information on the blood lead levels the respondent reported. For additional information or to discuss this issue further, the respondent can call us toll free at 850-798-2772. The respondent can also look at the potential health effects for the blood lead levels modeled for this report.

Generally, in Florida, if a county health department is involved with the blood lead testing and the levels in children are elevated, county health department staff will investigate the lead poisoning source. The Hillsborough County Health Department has a Lead Poisoning Prevention Program. The person in charge, Cynthia O. Keeton, can be reached at 813-307-8015 extension 6611 if anyone has specific concerns they would like followed up.

Comment: One respondent said you can tell children 100 times what the problem is but they do not comprehend the long-term consequences.

Response: Florida DOH agrees with this statement. There is a physiological reason behind this. The judgment centers of the human brain do not finish growing until a person reaches their early twenties. Therefore, as we say earlier in the **Child Health Considerations** portion of this report "children depend on adults for risk identification and risk management, housing, and access to medical care. Thus, adults should be aware of public health risks in their community, so they can guide their children accordingly." We also agree that some children are not ***guided accordingly*** as easily as others are.

APPENDIX E. Glossary of Environmental Health Terms

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

Acute Exposure: Contact with a chemical that happens once or for 14 days or less. 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 – including animals, fish and plants.

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

Cancer: A group of diseases, which 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 for over a year. 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, 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 hazardous waste site health issues.

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 from 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 "an 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: Contact with a chemical substance. (For the three ways people can contact substances, see **Route of Exposure**.)

Exposure Assessment: The process of finding the ways people contact chemicals, how often and how long they contact the 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 contact (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, 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 contact them.

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

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 – 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 a subset of the 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 underground water sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can contact 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:

1. Urgent Public Health Hazard
2. Public Health Hazard
3. Indeterminate Public Health Hazard
4. No Apparent Public Health Hazard
5. No Public Health Hazard

Receptor Population: People who live or work in the path of one or more chemicals, and who could contact 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 Raleigh Street Dump site public health assessment was prepared by the 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. Editorial review was completed by the Cooperative Agreement partner.

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

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