ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

NORTH SUWANNEE COMMUNITY
(113TH STREET AREA)
LIVE OAK, SUWANNEE COUNTY, FLORIDA
MARCH 9, 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

NORTH SUWANNEE COMMUNITY
(113TH STREET)

LIVE OAK, SUWANNEE COUNTY, FLORIDA

Prepared by:

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

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FOREWORD

This document summarizes public health concerns at a former illegal dumpsite on 113th Road in Live Oak, Florida. A number of steps are necessary to do such an evaluation:

1 Evaluating exposure: Florida Department of Health (DOH) scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is on the site, and how people might be exposed to it. Usually, the Florida DOH does not collect its own environmental sampling data. We rely on information provided by the Florida Department of Environmental Protection (DEP), U.S. Environmental Protection Agency (EPA), other government agencies, businesses, and the public.

2 Evaluating health effects: If there is evidence that people are being exposed - or could be exposed - to hazardous substances, Florida DOH scientists will take steps to determine whether that exposure could be harmful to human health. The report focuses on public health - the health impact on the community as a whole - and is based on existing scientific information.

3 Developing recommendations: In the evaluation report, the Florida DOH outlines its conclusions regarding any potential health threat posed by a site, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of the Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies - including the EPA and the Florida DEP. However, if there is an immediate health threat, the Florida DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.

4 Soliciting community input: The evaluation process is interactive. The Florida DOH starts by soliciting and evaluating information from various government agencies, the organizations responsible for cleaning up the site, and the community surrounding the site. Any conclusions about the site are shared with the groups and organizations that provided the information. Once an evaluation report has been prepared, the Florida 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 and Statement of Issues

1.1 Summary

In early 2002, nearby residents reported symptoms and illnesses they believed were caused by contamination from a former illegal dump. The Florida Department of Environmental Protection (DEP), the Florida Department of Health (DOH) and the Suwannee County Health Department (CHD) investigated air, soil, water, and symptoms between 2002 and 2004.

For current and future exposures, the Florida DOH categorizes the former illegal dump as **no apparent public health hazard**; there is no chemical identified in the environment from the former dump at levels likely to cause illness or explain all of the reported symptoms and illness. The Florida DOH categorizes the former illegal dump as an **indeterminate public health hazard** for past exposures; there is limited environmental sampling data prior to 2002.

Mold growth found in the air conditioning systems in all three area homes evaluated can cause sneezing, runny nose, red eyes, skin rash (dermatitis), and eye, skin, nose, throat and lung irritation in sensitive individuals. Residents should regularly inspect and clean air conditioners to prevent mold growth that can irritate eyes, nose, throat, lungs, and skin.

Hydrogen sulfide occurs naturally in groundwater in this area. Following a simulated hot water shower, bathroom air levels of hydrogen sulfide in 2 of 12 area homes tested may cause temporary headaches and labored breathing in people with asthma. People without asthma are not likely to experience symptoms or illness. The risk of illness from breathing hydrogen sulfide over the long-term (> 1 year), however, is not well known. For homes with elevated indoor air concentrations of hydrogen sulfide, residents should increase bathroom ventilation during and following showers. Residents can increase bathroom ventilation by installing a bathroom ventilation fan, leaving the bathroom door open, or opening a window.

Although the numbers and types of bacteria detected in private drinking water wells are not likely to cause the reported illness, they indicate possible intrusion of surface water. Residents should inspect their private drinking water wells for evidence of surface water intrusion.

With the possible exception of hydrogen sulfide in the air after showering, levels of sampled chemicals in soil, air, and private drinking water wells at and around this site are not likely to cause illness or explain all the reported symptoms and illness.

1.2 Statement of Issues

The Florida DOH prepared this public health assessment report in response to a request for assistance by the Suwannee County CHD. Area residents are concerned that

contaminants from an illegal dump are making them ill. The Florida DOH conducted this public health assessment in cooperation with the federal Agency for Toxic Substances and Disease Registry (ATSDR).

This is the first assessment of this site by either the Florida DOH or the ATSDR. Florida DOH prepared and mailed summary letters during the course of the investigation to report findings and assist residents. This report addresses data collected between January 2002 and October 2004 by the Florida DEP, the Florida DOH, and the Suwannee CHD.

2.0 Background

2.1 Site History

The North Suwannee Community is located within approximately ½ mile of the former illegal dumpsite on 113th Road, four miles north of Live Oak in Suwannee County, Florida (Figures 1 and 2, Appendix A). The area consists of approximately 31 homes on several unpaved streets. The area is rural with an abundance of trees and vegetation. The land was formerly agricultural.

In 1999, the State Attorney's office prosecuted an individual for illegal dumping at this site. Removal of illegally dumped material was part of his sentence. The Florida Department of Environmental Protection (DEP) oversaw the removal in 1999 and 2000.

In March 2002, at the request of a nearby resident, the Suwannee CHD sampled a resident's private drinking water well for metals, volatiles, and bacteria. In April 2002, other residents complained of various symptoms and illnesses. In May 2002, Suwannee CHD requested the Florida DOH evaluate the environmental data and community health concerns.

In October 2002, more residents reported symptoms and illnesses (e.g., headaches and stomachaches – see Table 5 in Appendix A) to the Suwannee CHD and the Florida DOH.

In November 2002, the Suwannee CHD and the Florida DOH sampled 11 more private drinking water wells closest to the dumpsite for metals, solvents, nitrate, nitrite, chloride, sulfates, pesticides, and bacteria. The Florida DOH notified residents of their test results.

In 2003, the Florida DEP tested soil and groundwater in the North Suwannee Community. From January 2003 through May 2003, the Florida DOH evaluated levels of hydrogen sulfide and semi-volatile chemicals in twenty-nine drinking water wells, as well as hydrogen sulfide levels in indoor air.

In April 2004, the Florida DEP excavated and properly disposed of approximately 3,000 tons of surface soil containing arsenic at levels slightly above the residential soil cleanup target levels. During the excavation process, the Florida DEP monitored the air for fugitive dust releases and cleaned up excavated soil that spilled out of the trucks used to

haul the soil from the site. Florida DEP reported no fugitive dust or remaining spilled soil.

In October 2004, Ecology and Environment, Inc., working for Florida DEP, tested indoor air concentrations, including simulated shower air concentrations, at 12 residences in the North Suwannee Community.

2.2 Site Description

The North Suwannee Community surrounds the former 113th Road dumpsite. The dumpsite is on the north side of 113th Road, between 24th Street and County Road 132. The former dumpsite property currently contains one mobile home, a small pond, and open space with some woodland.

Farmland, pasture, and undeveloped land surround the former dumpsite. There are approximately 31 single-family residences within 1/2 mile of the site. The site is approximately one mile south of the Suwannee River, the northern boundary of Suwannee County.

2.2.1 Demographics - In 2000, approximately 86 people lived within one mile of the site. Of the total population, 8% were black or African American, 91% were white, and 1% was Native American, Asian and/or other ethnic groups (US Bureau of the Census 2000).

2.2.2 Land Use - The site is in an agricultural and undeveloped area of Suwannee County.

2.2.3 Natural Resource Use – Area residents obtain drinking water from private wells supplied by the Floridan aquifer. Area private wells are 100 to 150 feet deep.

2.3 Site Visits

The Florida DOH, the Florida DEP, and the Suwannee CHD made numerous visits to the North Suwannee Community between January 2002 and January 2004. These visits included information sharing, data collection, and collection of community health concerns. No unusual site conditions or physical hazards were observed.

3.0 Community Health Concerns

At an October 2002 public meeting, community members expressed a number of health concerns. Florida DOH and Suwannee CHD recorded additional health concerns in June 2003 when they visited residents in their homes. Their primary health concerns were symptoms and illnesses they believe related to drinking contaminated groundwater from the former dumpsite (Table 5, Appendix A). This report addresses those health concerns.

4.0 Discussion

In this section, the Florida DOH reviews the available drinking water well test data, soil test data, indoor air test data, and community symptoms. The Florida DOH then considers possible exposures. Finally, the Florida DOH assesses the likelihood of illness from these exposures.
The public health assessment process has inherent uncertainties:

- Our assessment depends on available information,
- The science of toxicology is only now beginning to address the risk of illness from exposure to multiple chemicals, and
- Opinions on the implications of known information may differ.

ATSDR screening guidelines for evaluating environmental contamination include wide safety margins. The assumptions, interpretations, and recommendations made throughout this public health assessment all err on the side of protecting public health.

4.1 Environmental Contamination

This section examines environmental data collected at and near the site, sampling adequacy, and contaminants of concern. The maximum concentration and comparison values for the contaminants of concern in the various media are listed in Appendix A. Contaminants of concern are selected by considering the following factors:

1. Contaminant concentrations on and off the site. The only contaminants eliminated from further consideration were those in which both the background and on-site concentrations were below standard comparison values-although background concentrations are useful in determining if contaminants are site-related. This is necessary to assess the public health risk of all contaminants detected, whether site-related or not.

2. Field data quality, laboratory data quality, and sample design.

3. Community health concerns.

4. For media (soil, water and/or air) providing complete and potential exposure pathways, comparison of maximum concentrations with published ATSDR standard comparison values. The ATSDR's published standard comparison values are media-specific concentrations used to select contaminants for further evaluation. They are not used to predict health effects or to set cleanup levels. When ATSDR standard comparison values are absent, other regulatory guidelines can be used.
5. For complete and potential exposure pathways, a comparison of maximum concentrations with toxicological information published in ATSDR

toxicological profiles. These profiles are chemical-specific and summarize toxicological information found in scientific literature.

The Florida DOH used the following ATSDR and Florida DEP standard comparison values, in order of priority, to select contaminants of concern:

1. EMEGs (Environmental Media Evaluation Guides) - The ATSDR derives EMEGs from Minimal Risk Levels (MRLs) using standard exposure assumptions. MRLs are estimates of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous illnesses, generally for a year or longer.

2. RMEGs (Reference Dose Media Evaluation Guides) - The ATSDR derives RMEGs 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.

3. Cancer Risk Evaluation Guide (CREG). A CREG is the contaminant concentration estimated to result in no more than one excess cancer per 1 million persons exposed during a lifetime (i.e., 70 years). CREGs are calculated from EPA-established cancer slope factors.

4. CTLs (Cleanup Target Levels) - CTLs are the Florida Department of Environmental Protection's (DEP) minimum allowable concentrations of contaminants in soil (SCTLs) and groundwater (GCTLs). Florida DEP CTLs are enforceable and are required to be equal to or more strict (i.e., lower) than federal standards. Florida DEP CTLs were used when ATSDR does not have an applicable standard comparison value.

Using the above criteria, Florida DOH selected the following as potential contaminants of concern in groundwater (drinking water), surface soil and air exposure pathways:

- Aluminum
- Arsenic
- Hydrogen Sulfide / Sulfide
- Iron
- Lead
- Sulfate
- Total coliform and enterococci

Identification of a contaminant of concern in this section, however, does not necessarily mean that exposure will cause illness. Identification serves to narrow the focus of the public health assessment to those contaminants more likely to impact public health. The

contaminants of concern are evaluated to determine whether exposure is likely to cause illness.

This report discusses environmental data collected between January 2002 and October 2004 within ½-mile of the former dump site. It includes soil, water, and air data collected by the Florida DOH, the Florida DEP and the Suwannee CHD, as well as symptoms and illnesses reported by area residents.

4.1.1 Surface Soil – Between January 2002 and January 2004, the Florida DEP collected approximately 33 surface soil samples (0 to 12 inches below land surface) and 46 subsurface soil samples on and around the site. The Florida DEP tested the surface soil samples for metals, semivolatile organic compounds, volatile organic compounds, organochlorine pesticides, and organonitrogen/phosphorus pesticides (Table 1, Appendix A). For the purpose of this report, surface soil quality has been adequately characterized.

4.1.2 Groundwater – Between January 2002 and January 2004, the Florida DEP, the Florida DOH, and the Suwannee CHD collected more than 200 groundwater samples from drinking water wells and monitoring wells installed by the Florida DEP. They tested groundwater samples for metals, semivolatile organic compounds, volatile organic compounds, organochlorine pesticides, organonitrogen/phosphorus pesticides, nutrients, chloride, sulfate, sulfide, bacteria, and dioxin. Results for drinking water wells are summarized in Table 2, Appendix A. For the purpose of this report, groundwater quality has been adequately characterized.

4.1.3 Indoor Air – Hydrogen sulfide occurs naturally in the groundwater in this area of Suwannee County. Naturally occurring hydrogen sulfide in groundwater under this site could be augmented by decomposition of waste from the illegal dump. Levels in groundwater vary over time. Hydrogen sulfide can move easily from groundwater into air, especially when water is heated and used for showering. Hydrogen sulfide has a characteristic "rotten egg" smell. Most people can smell hydrogen sulfide levels at or above 0.5 parts per billion (ppb).

In April 2003, Florida DOH tested the air in nine residences for hydrogen sulfide using a hand-held, portable hydrogen sulfide detector. They did not find any hydrogen sulfide above the instrument detection limit of 100 ppb. In one residence they also collected an air sample in a Summa® canister for laboratory analysis. No hydrogen sulfide was detected in the sample above the method detection limit of 5 ppb.

Also, Florida DOH made an indoor air quality specialist available to the residents to evaluate potential indoor air quality problems on April 3, 2003. Three residents agreed to have their homes evaluated.

In October of 2004, Ecology and Environment, Inc. working for Florida DEP, measured indoor air concentrations of hydrogen sulfide in 12 residences every 15 minutes over a 24-hour period using Zellweger Analytics ChemKey TLD H_2S monitors. Eight of these 12 residences had been tested previously in April 2003. The air intake for the monitor

was in a household common area about 60 inches above the floor. The monitor detection limits were 1 to 90 ppb. 24-hour time-weighted average (TWA) hydrogen sulfide levels ranged from less than 1 to 14 ppb. The 24-hour TWA in 9 of the 12 homes was less than 1 ppb. The other three homes had 24-hour TWA levels of 2, 4, and 14 ppb. In one residence, the hydrogen sulfide indoor air concentration was above the range of the detection for 90 minutes and was estimated (by regression analysis) to be 112 ppb. For fifteen minutes or less, the hydrogen sulfide indoor air concentration was above the range of the detector and estimated (by regression analysis) to be 97 ppb in another residence. Results are summarized in Table 3, Appendix A.

Ecology and Environment, Inc. also measured indoor air concentrations of hydrogen sulfide under simulated showering conditions (30-minute hot water shower 38.3-40.0°C) following National Institute of Occupational Health and Safety (NIOSH) Method 6013. This measurement was taken following the 24-hour monitoring described above. In one residence without a shower or hot water, the air sample was collected over the bathtub with cold water running from the spigot for 30 minutes. Hydrogen sulfide concentrations in bathrooms after simulated showering conditions ranged from less than 60 to 620 ppb. Nine of the 12 were below the detection limit of 60 ppb. One bathroom had a hydrogen sulfide concentration of 100 ppb. Two bathrooms (that share a well) had indoor air hydrogen sulfide concentrations of 620 ppb. Hydrogen sulfide concentrations are summarized in Table 4, Appendix A (Ecology and Environment, Inc., 2004). For the purpose of this report, indoor air quality has been adequately characterized.

4.1.4 Quality Assurance and Quality Control - This report uses existing environmental data. The Florida DOH assumes these data are valid because government consultants or consultants overseen by government agencies collected and analyzed the environmental samples. The Florida DOH also assumes that consultants who collected and analyzed these samples followed adequate quality assurance and quality control measures concerning chain-of-custody, laboratory procedures, and data reporting.

The completeness and reliability of the referenced information determines the validity of the analyses and conclusions drawn for this public health assessment. In each of the preceding subsections, the adequacy of the data was evaluated to estimate exposures. The estimated data and presumptive data were assumed valid due to the qualifications of the sampling agency and analytical laboratory. This assumption is protective of public health by assuming that a contaminant exists when in fact it might not exist.

4.2 Physical Hazards

The Florida DOH, the Florida DEP and the Suwannee CHD made numerous visits to the North Suwannee Community between January 2002 and January 2004. They did not observe any physical hazards that would not normally be found in residential areas during these visits.

4.3 Pathways Analyses

Chemical contaminants in the environment can harm people's health, but only if people have contact with those contaminants at a high enough concentration (dose) to cause illness. Knowing or estimating the frequency with which people could have contact with hazardous substances is essential to assessing the public health impact. To decide if people can contact contaminants at or near a site, the Florida DOH looks at the human exposure pathways. An exposure pathway has five parts. These parts are:

1. A source of contaminants, like a hazardous waste site,
2. An environmental medium like air, water or soil that can hold or move the contamination,
3. A point where people come in contact with a contaminated medium, like drinking water or soil in a garden,
4. An exposure route like drinking contaminated water from a well or eating contaminated soil on homegrown vegetables, and
5. A population who could be exposed to the contaminants.

An exposure pathway is eliminated if at least one of the five parts referenced above is missing and will not occur in the future. Exposure pathways not eliminated are either completed or potential. For completed pathways, all five pathway parts exist and exposure to a contaminant has occurred, is occurring, or will occur. For potential pathways, at least one of the five parts is missing, but could exist. Also for potential pathways, exposure to a contaminant could have occurred, could be occurring, or could occur in the future.

4.3.1 Completed Exposure Pathways - Nearby residents use groundwater for drinking, showering, and other household uses. Hydrogen sulfide can volatilize out of groundwater and into the indoor air during normal household use, as well as showering. Nearby residents also have contact with surface soil (Table 6, Appendix A).

4.4 Public Health Implications

In the following sections, the Florida DOH discusses exposure levels and possible illnesses that might occur in people exposed to the contaminants of concern at the site. Also in this subsection, general ideas such as the risk of illness, dose response and thresholds, and uncertainty in public health assessments are discussed as well.

To evaluate exposure, the daily dose of each contaminant of concern found at the site is estimated. Kamrin (1988) explains a dose in this manner:

> "...all chemicals, no matter what their characteristics, are toxic in large enough quantities. Thus the amount of a chemical to which a person is exposed is crucial in deciding the extent of toxicity that will occur. In attempting to place an exact number on the amount of a particular compound that is harmful, scientists recognize they must consider the size of an organism. It is unlikely, for example,

> that the same amount of a particular chemical that will cause toxic effects in a 1-pound rat will also cause toxicity in a 1-ton elephant."
>
> "Thus instead of using the amount that is administered or to which an organism is exposed, it is more realistic to use the amount per weight of the organism. Thus 1 ounce administered to a 1-pound rat is equivalent to 2000 ounces to a 2000-pound (1-ton) elephant. In each case, the amount per weight is the same: 1 ounce for each pound of animal. This amount per weight is the dose. We use dose in toxicology to compare the toxicity of different chemicals in different animals."

In expressing the daily dose, milligrams of contaminant per kilogram of body weight per day (mg/kg/day) are used. To calculate the daily dose of each contaminant, standard assumptions about body weight, ingestion and inhalation rates, exposure time length, and other factors needed for dose calculation are used (ATSDR 2005). In calculating the dose, the Florida DOH assumed people are exposed to the maximum concentration measured for each contaminant in each medium.

To estimate exposure, the Florida DOH uses the maximum measured concentration of each contaminant. Because the North Suwannee Community site has been widely sampled, it is possible, but not likely that unidentified "hot spots" with higher concentrations exist.

To estimate exposure from incidental ingestion of surface soil, the Florida DOH makes the following assumptions: (1) children between the ages of 1 and 6 ingest an average of 200 milligrams (mg) of soil per day, (2) adults ingest an average of 100 milligrams of soil per day, (3) children weigh an average of 15 kilograms (kg), (4) adults weigh an average of 70 kg, and (5) children and adults ingest soil at the maximum concentration measured for each contaminant.

To estimate possible future exposure from drinking groundwater, the Florida DOH makes the following assumptions: (1) children between the ages of 1 and 6 ingest an average of 1 liter of water per day, (2) adults ingest an average of 2 liters of water per day, (3) children weigh an average of 15 kilograms (kg), (4) adults weigh an average of 70 kg, and (5) children and adults ingest contaminated groundwater at the maximum concentration measured for each contaminant.

To estimate exposure from inhalation of indoor air, the Florida DOH makes the following assumptions: (1) all of the concentration of hydrogen sulfide measured is inhaled and (2) children and adults inhale contaminated air at the maximum 24-hr TWA concentration (indoor air) and the maximum simulated showering concentration measured for hydrogen sulfide.

4.4.1 Surface Soil – None of the chemical levels found in surface soil on and around the site is likely to cause illness either from incidental ingestion, skin absorption, or dust inhalation. If a person was exposed to the maximum concentration of arsenic measured in surface soil daily for a period of 30 years, that person would be unlikely to experience

cancer or non-cancer illness. The maximum concentration of arsenic measured in surface soil did not generate an exposure dose large enough to contribute to an increased risk for a cancer or non-cancer adverse health effect. The dose of arsenic from ingestion of soil (0.00006 mg/kg/day) for the most sensitive population (children) is approximately 10 times below the minimum risk level (0.0003 mg/kg/day) for chronic exposures. All other chemicals besides arsenic that were analyzed for were found at levels below ATSDR screening guidelines.

4.4.2 Groundwater - Levels of chemicals measured in area drinking water wells between January 2002 and January 2004 are not likely to cause an increased risk of cancer or non-cancer illness in either children or adults. Although in a few wells arsenic and lead levels were slightly above drinking water standards, the levels are not likely to cause illness. The concentrations of arsenic and lead found in drinking water were converted into exposure doses, which were below levels known to cause adverse health effects. The arsenic dose from ingestion of water (0.0006 mg/kg/day) for a person from birth to 30 years old is less than the dose (0.0011 mg/kg/day) that may cause lung cancer. The dose of lead from water ingestion (0.0006 mg/kg/day) for a person from birth to 30 years old is less than the lowest no-observable-effects-level (0.0015 mg/kg/day). Aluminum, iron, sulfate and sulfide were found at levels above secondary drinking water standards. Secondary drinking water standards are, however, based on appearance and taste, not health. The measured levels of aluminum, iron, sulfate and sulfide are not likely to cause illness. Though not contaminants of concern: calcium, magnesium, potassium, chloride and phosphorus were also measured in well water. These minerals are generally non-toxic and do not have drinking water standards.

Although the numbers and types of bacteria detected in groundwater are not likely to cause the reported illness, they indicate possible intrusion of surface water into groundwater. Surface water could be getting into groundwater either around well casings, through sinkholes, or through porous limestone connected to the Suwannee River. Florida DEP tested water from the Suwannee River but did not find chemicals that would explain the reported illnesses. However, bacteria are found in surface water in rural, agricultural areas like north Suwannee County. Drinking untreated surface water can cause illness.

4.4.3 Indoor Air – The Florida DOH indoor air expert found mold growth in the air conditioning systems of all 3 homes he visited. Mold can cause sneezing, runny nose, red eyes, skin rash (dermatitis), and eye, skin, nose, throat, and lung irritation in sensitive individuals. In addition, mold can trigger asthma attacks in asthmatics allergic to mold.

The levels of hydrogen sulfide measured in indoor air in April 2004 and over a 24-hour period in October 2004 are not likely to cause any symptoms or illnesses from short-term exposure (< 1 year). The risk of illness from long-term exposure (> 1 year) however, is not well known. The U.S. Environmental Protection Agency (EPA) has estimated that long-term exposure to hydrogen sulfide levels less than 1 ppb are not likely to cause illness (IRIS 2004). Most of the homes tested in October 2004 had 24-hour TWA levels less than 1 ppb.

The levels of hydrogen sulfide measured in bathrooms of 10 of 12 homes following simulated showers in October 2004 are not likely to cause symptoms or illnesses from short-term exposures (< 1 year). The highest bathroom hydrogen sulfide level after a simulated shower (620 ppb) was found in two homes that share a well. Levels of hydrogen sulfide in groundwater vary considerably. The highest groundwater hydrogen sulfide level measured was approximately 4.4 times higher than the level on the day the indoor air was sampled. If a linear relationship between groundwater and indoor air hydrogen sulfide levels is assumed, then the indoor hydrogen sulfide air levels could get up to 4.4 times higher. It is possible that bathroom hydrogen sulfide levels after a shower could get up to 2,700 ppb when groundwater hydrogen sulfide levels are high in those two homes. At indoor air hydrogen sulfide levels above 2,000 ppb, people with asthma could experience temporary headaches and labored breathing. This finding is based on a study of 10 people with asthma who breathed 2,000 ppb hydrogen sulfide for 30 minutes. Three of the 10 experienced headaches and two experienced labored breathing (Jappinen, et al. 1990). People without asthma would not likely experience any symptoms or illness. The risk of illness from long-term exposure (> 1 year) to hydrogen sulfide is, however, not well known.

4.4.4 Symptoms – Based on reports from area residents, neither the incidence and/or prevalence of symptoms and illnesses changed when they switched from well water to bottled water. This suggests that reported symptoms and illnesses may be attributed to something other than well water and may be a normal occurrence within the population.

Florida DOH matched reported symptoms and illnesses with chemicals known to cause these symptoms and illnesses. The levels of chemicals found in the soil, groundwater, and air at this site are not likely to cause all of the reported symptoms and illnesses. Levels of hydrogen sulfide found in 2 of the 12 bathrooms during simulated showering events could cause temporary headaches and labored breathing in people with asthma when groundwater hydrogen sulfide levels are elevated. People without asthma are not likely to experience these symptoms. The risk of illness from breathing hydrogen sulfide over the long-term (> 1 year) however, is not well known.

4.4.5 Risk of Illness, Dose Response/Threshold and Uncertainty - Appendix B discusses limitations on estimating the risk of illness, the theory of dose response and the concept of thresholds. Appendix B also discusses the sources of uncertainty inherent in public health assessments.

4.5 Health Outcome Data

The Florida DOH did not review health outcome data using the Florida Cancer Data System (FCDS) at the North Suwannee site for the following two reasons:

1. None of the levels found are likely to cause illness, especially cancer, and
2. Cancer was not a community concern at this site.

5.0 Child Health Considerations

Children could be at greater risk than adults from exposure to hazardous substances emitted from waste sites. Children are more likely exposed because they play outdoors and because they could bring food into contaminated areas. Children are shorter than adults and therefore children breathe dust, soil, and heavy vapors close to the ground. Pound for pound of body weight, children drink more water, eat more food, and breathe more air than do adults. The obvious implication for environmental health is that children can have much greater "doses" than adults to contaminants that are present in soil, water, and air (ATSDR 1998).

In a separate health consultation, Florida DOH reviewed the children's blood and urine test results supplied by their physicians and found that the levels would not likely contribute to their illnesses. Some residents had their blood and/or urine tested for a few metals, others had test results for several metals. Metals included aluminum, total arsenic, barium, cadmium, chromium, lead, and mercury (ATSDR 2004).

6.0 Conclusions

For current and future exposures, the Florida DOH categorizes the former illegal dump site as a **no apparent public health hazard**; there is no chemical identified in the environment at levels likely to cause illness or explain all of the reported symptoms and illness.

The Florida DOH categorizes the former illegal dump site as an **indeterminate public health hazard** for past exposures; there is limited environmental sampling data prior to 2002.

The cause of reported symptoms and illnesses has not been identified, but it does not appear to be related to the former illegal dump.

- Mold growth found in the air conditioning systems in all three area homes evaluated can cause sneezing, runny nose, red eyes, skin rash (dermatitis), and eye, skin, nose, throat and lung irritation in sensitive individuals.
- In this area, hydrogen sulfide is naturally occurring. Following a simulated hot water shower, bathroom air levels of hydrogen sulfide in two of 12 area homes tested may cause temporary headaches and labored breathing in people with asthma if the groundwater levels of hydrogen sulfide become elevated. People without asthma are not likely to experience symptoms or illness. The risk of illness from breathing hydrogen sulfide over the long-term (> 1 year), however, is not well known.
- Although the numbers and types of bacteria detected in private drinking water wells are not likely to cause the reported illness, they indicate possible intrusion of surface water.

- Levels of chemicals in soil and private drinking water wells at and around this site are not likely to cause illness or explain all the reported symptoms and illness.

7.0 Recommendations

- Regularly inspect and clean air conditioners to prevent mold growth that can irritate eyes, nose, throat, lungs, and skin.
- For homes with elevated indoor air concentrations of hydrogen sulfide, increase bathroom ventilation during/following showers. Increase bathroom ventilation by installing a bathroom ventilation fan, leaving the bathroom door open, or opening a window.
- Inspect private drinking water wells for evidence of surface water intrusion.

8.0 Public Health Action Plan

This section describes what the ATSDR and the Florida 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 hazards from occurring in the future. The ATSDR and Florida DOH will do the following:

1. The Florida DOH, Bureau of Community Environmental Health will inform nearby residents about the findings in this report.

9.0 References

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APPENDIX A. FIGURES AND TABLES

Figure 1: Suwannee County in Florida

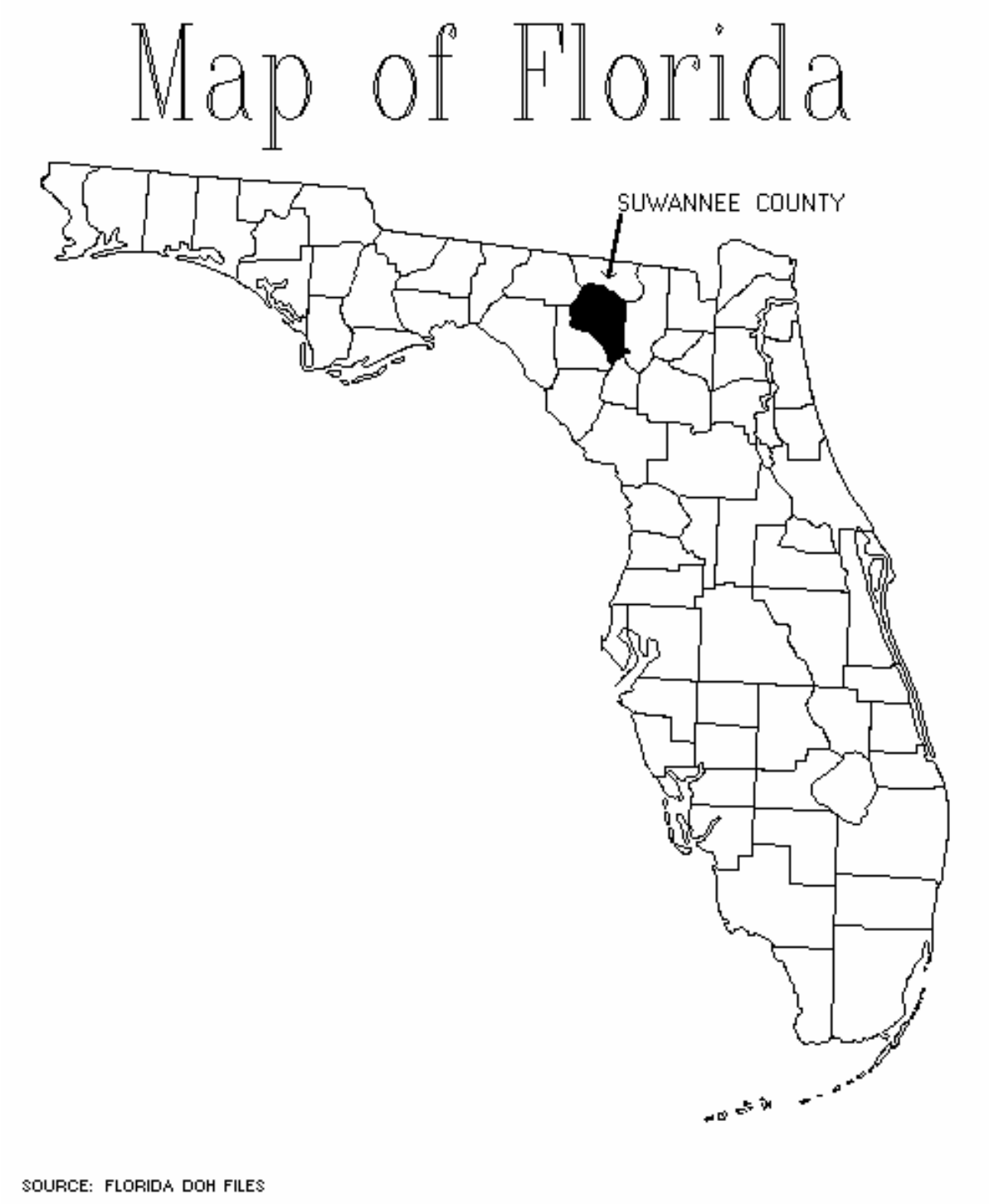
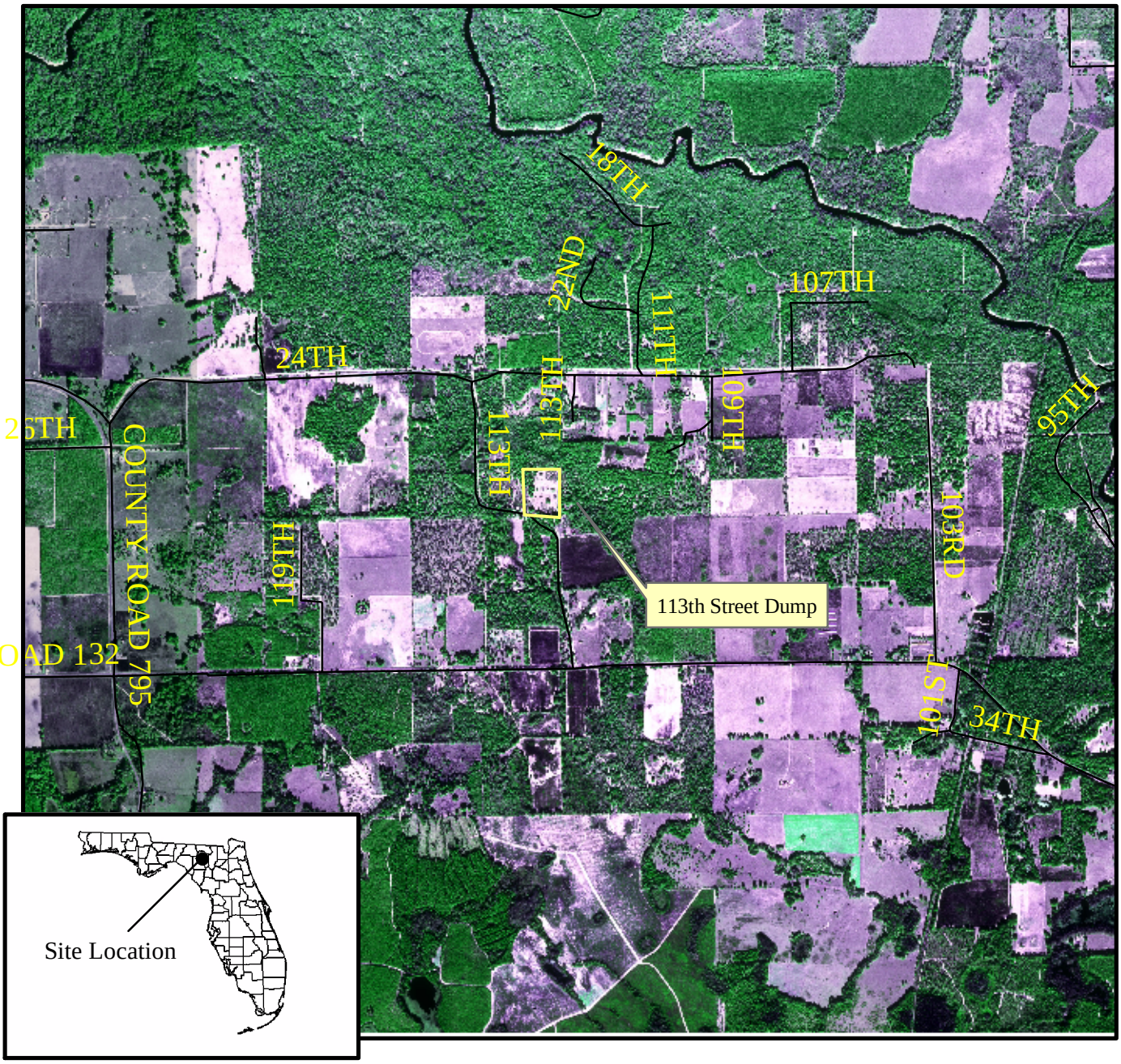


Figure 2. North Suwannee County Community - 113th Street Dump



Florida Department of Health

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Table 1: Surface Soil Test Results

Chemical ¥	Florida DEP SCTL§	ATSDR Screening Guideline ‡	Maximum Soil Concentration
Arsenic	0.8 mg/kg	20 (0.5†) mg/kg	**4.29 mg/kg**

§ - Florida Department of Environmental Protection Soil Cleanup Target Level for residential use
‡ - Environmental Media Evaluation Guide - ATSDR comparison value (ATSDR 2002).
† - Cancer Risk Evaluation Guide (CREG) - ATSDR comparison value (ATSDR 2002).
mg/kg = milligrams per kilogram = parts per million (ppm)
¥ - All other values for chemicals detected were below ATSDR screening values

Table 2: Drinking Water Well Test Results

Chemical ¥	Florida DEP Drinking Water Standard (ug/L)	ATSDR Screening Guideline (ug/L)	Maximum Drinking Water Concentration (ug/L)
Aluminum	200 **(s)**	20,000	**1,070**
Arsenic	10 **(p)**	3 (0.5†)	**17**
Iron	300 **(s)**	*	**1000**
Lead	15 **(p)**	*	**16**
Sulfate	250,000 **(s)**	*	**370,000**
Sulfide	*	*	**1,900**
Total Coliforms (CFU)	< 1 CFU **(p)**	< 1 CFU	**196 CFU**
Enterococci (CFU)	< 1 CFU **(p)**	< 1 CFU	**60 CFU**

ug/L = micrograms per liter CFU = colony forming units * no standard available
(p) = primary, health-based standard (s) = secondary, non health-based standard
(†) = ATSDR Cancer Risk Evaluation Guide for $1x10^{-6}$ excess cancer risk
ATSDR screening guidelines are for children; Adult screening guidelines are higher
¥ - All other values for chemicals detected were below ATSDR screening values

Table 3: 24-hour Time-weighted Average Indoor Air Test Results

Chemical ¥	Number of homes tested	Average (ppb)	Minimum Concentration (ppb)	Maximum Concentration (ppb)	Florida DEP Air Standard (ppb)	ATSDR Screening Guideline (ppb)
Hydrogen Sulfide	12	2	Below detection limit of 1 ppb for full 24-hour period	14	*	20

ppb = parts per billion * no standard available
ATSDR screening guidelines are for children; Adult screening guidelines are higher
¥ - All other values for chemicals detected were below ATSDR screening values

Table 4: 30-minute Simulated Showering Indoor Air Test Results

Chemical ¥	Number of homes above screening value/ Number of homes tested	Average (ppb)	Minimum Concentration (ppb)	Maximum Concentration (ppb)	Florida DEP Air Standard (ppb)	ATSDR Screening Guideline (ppb)
Hydrogen Sulfide	2/12	130	Below detection limit of 60 ppb	**620**	*	200

ppb = parts per billion * no standard available
ATSDR screening guidelines are for children; Adult screening guidelines are higher
Sampling done following NIOSH method 6013
¥ - All other values for chemicals detected were below ATSDR screening values

Table 5: North Suwannee Community Reported Symptoms and Illnesses

Symptom	New	Continued	Stopped	Total
Headaches	5	33	7	45
Stomach Ache/Upset	6	16	7	29
Joint Pain	0	20	4	24
Rash / Sores	6	11	6	23
Fatigue / Weakness	1	15	3	19
Diarrhea	4	11	2	17
Sinus Problems	6	7	2	15
Memory Problems	6	7	1	14
Nosebleeds	4	4	5	13
Dizziness	3	5	3	11
Muscle Pain/Spasms	5	4	1	10
Hair Loss	0	4	5	9
Chest Pain	1	4	4	9
Nausea	4	4	1	9
Depression	1	5	2	8
Stomach Cramps	0	3	3	6
Allergies	3	0	3	6
Dry Skin	6	0	0	6
Vomiting	1	4	0	5
Menstrual Problems	2	2	1	5
Insomnia / Sleep	0	4	1	5
Ear Infection / Ache	1	3	0	4
Weight Loss	1	1	2	4
Sore Throat	1	2	1	4
Shortness of Breath	3	1	0	4
Vision Problems	2	2	0	4
High Blood Pressure	0	1	2	3
Lymph Swelling	0	1	2	3
Bone Pain	2	0	1	3
Back Pain	3	0	0	3
Gall Bladder Removal	ND	ND	ND	7

New = Symptom Began After Potable Water Available
Continued = No Change in Symptom After Potable Water Available
Stopped = Symptom Cleared After Potable Water Available
Total = Total Number of Residents Reporting That Symptom
Population (P) = 79
Sample size (S) = 70 (nine data points rejected because of incomplete or no symptoms)
ND = not determined

Table 6: Completed Exposure Pathways

PATHWAY NAME	SOURCE	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	TIME
Surface Soil	On-Site Soil	Surface Soil (On-site)	Incidental Ingestion/Dust Inhalation	**10 - 31**	Past
Drinking Water	Groundwater	Private Wells	Ingestion	**31 - 100**	Past, Current, Future
Air	Groundwater	Showering	Inhalation	**48**	Past, Current, Future

APPENDIX B. RISK OF ILLNESS

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

Risk of Illness

In this public 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, Florida DOH uses the risk of illness to decide if the site needs a follow-up health study 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 persons 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. Nevertheless, 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, to relying only 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 is used to estimate a person's risk of illness. The actual shape of the dose-response curve requires scientific knowledge of how a hazardous substance affects different cells in the human body. There is one important difference between the dose-response curves used to estimate the risk of non-cancer illnesses and those used to estimate the risk of cancer: the existence of a threshold dose. A threshold dose is the highest exposure dose at which there is no risk of illness. The dose-response curves for non-cancer illnesses include a threshold dose that is greater than

zero. 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. It is estimated from information gathered in human and animal studies. By contrast, the dose-response curves used to estimate the risk of cancer assume no threshold dose (or, in other words, the cancer threshold dose is zero). This assumes a single contaminant molecule could be sufficient to cause a clinical case of cancer. Such an assumption is very conservative; indeed, many scientists also 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 can cause risk to be overestimated or underestimated. And 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 former illegal dumpsite on 113th Road .

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. These errors can be controlled to some extent by increasing the number of samples collected and analyzed and by sampling the same locations over several different periods. These actions tend to minimize any uncertainty caused by random sampling errors.

Two areas of uncertainty affect exposure parameter estimates. The first is the exposure-point concentration estimate. The second is the estimate of the total chemical exposures. In this assessment maximum detected concentrations were used as the exposure point concentration. Using the maximum measured value is considered appropriate because one cannot be certain of the peak contaminant concentrations, and cannot statistically predict peak values. Nevertheless, this assumption introduces uncertainty into the risk assessment that could over or underestimate the actual risk of illness. When selecting parameter values to estimate exposure dose, default assumptions and values within the ranges recommended by the ATSDR or the EPA were used. These default assumptions and values are conservative (health protective) and can contribute to the overestimation of risk of illness. Similarly, the maximum exposure period was assumed to have occurred regularly for each selected pathway. Both assumptions are likely to contribute to the overestimation 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 found at the site, when present,

is qualitative; that is, a description instead of a number-a mathematical formula cannot be applied to estimate the dose. These data gaps can 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 underestimation of risk of illness. Finally, there are great uncertainties in extrapolating from high doses 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 the extent to which the actual risks are overestimated and what the resultant risk estimates really mean.

APPENDIX C. PUBLIC COMMENTS AND FLORIDA DOH RESPONSES

The North Suwannee Community Public Health Assessment (PHA) was available for public review and comment from November 15, 2005 through January 15, 2006. We mailed 37 copies of the PHA to residents who live or have lived in the 113th Road area. We also sent it to the County Commissioners. The PHA was available from the Suwannee County Health Department and online at our website: http://www.myfloridaeh.com/community/SUPERFUND/pha.htm.

We received one phone call and one written public comment form. We responded to the phone call with a letter that addresses each concern point by point. The letter is included here with the name removed to protect privacy. The following are our responses to the written comments we received.

Comment: Page 11 repeats 2 sentences about hydrogen sulfide. Tell us something new or do not say it again.

Response: Some information is repeated to aid in reader comprehension.

Comment: Report says unlikely health effects even though wells tested above standards for lead and arsenic. Aren't these standards based on health effects? Why does it appear contradictory when it is converted into an exposure dose?

Response: EPA and DEP standards are based on health effects, but safety factors are applied so that the standards are 100s or even 1000s of times lower than levels that are likely to cause health effects. Also, the exposure scenario used to calculate standards may not be the same as the exposure scenario present at a particular site. We converted the highest level found into a dose by taking into account the exposure scenario present near the 113th Road Landfill. Then we compared this dose to the lowest dose found to cause adverse health effects in reliable peer-reviewed toxicological literature.

Comment: Page 25: Uncertainty text mentions United Metals, Inc – Why?

Response: Appendix B: Risk of Illness contains standard language that we like to include to help put the report's information in context for the reader. Unfortunately, it mentioned a previous site and we did not catch it. We fixed the error – thank you for spotting it.

Comment: Has any site ever been found to be an urgent public health hazard?

Response: The urgent public health hazard category is used for sites where short-term exposures (<1 yr) to hazardous substances or conditions could result in adverse health effects that require *rapid* intervention to stop people from being exposed. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable / explosive substances, or medical devices which, upon rupture, could release radioactive materials.

If a site is identified as an urgent public health hazard, then ATSDR and Florida DOH will promptly issue a health advisory that includes strong recommendations to immediately stop or reduce exposure to mitigate the health risks posed by the site. We work with the Florida Department of Environmental Protection, County Health

Departments and other agencies to quickly address urgent public health hazards so that by the time the report is written, the site no longer poses an urgent public health hazard.

In the past 15 years, Florida has not had a site that was found to be an urgent public health hazard.

Jeb Bush
Governor

FLORIDA DEPARTMENT OF HEALTH

M. Rony François, M.D., M.S.P.H., PhD
Secretary

January 3, 2006

Resident Name
Address
Live Oak, FL 32060

Dear Resident:

Thank you for calling on December 15 with your comments on our draft N. Suwannee County public health assessment report.

Florida Department of Health (DOH) in cooperation with the US Agency for Toxic Substances and Disease Registry reviewed levels of chemicals found in the soil, ground water, surface water, and air near the 113th Rd. landfill of N. Suwannee County. The levels of chemicals found are not likely to cause illness. Florida DOH advised nearby residents. Since the levels of chemicals were not likely to cause illness, a health advisory was unnecessary.

Additional testing of the Suwannee River would be up to the Florida Department of Environmental Protection (DEP). The Florida DEP draft report for the 113th Rd. landfill in N Suwannee County is nearing completion. Please contact Jeff Newton, Site Investigation Section, at 850-245-8955. Florida DEP regulates industrial sludge/sewage waste. Please contact Mike Fitzsimmons, program administrator for waste management, at 904-807-3354 regarding your sludge/sewage waste concerns. Florida DOH regulates septic sludge/sewage waste and you can contact Dale Holcomb at 850-245-4093 to discuss your concerns with him.

Thanks again for calling with your comments. I will include your comments and Florida DOH response in an appendix of our final report. Please call me if I can be of any further assistance.

Sincerely,

Elise Waltman
Environmental Specialist III
Bureau of Community Environmental Health
1-877-798-2772

Cc: Mike Fitzsimmons
Jeff Newton
Nancy McCullers
Dale Holcomb

4052 Bald Cypress Way, Bin A-08 • Tallahassee, FL 32399-1721

GLOSSARY OF ENVIRONMENTAL HEALTH TERMS

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

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

ATSDR: The Agency for Toxic Substances and Disease Registry. ATSDR is a federal health agency in Atlanta, Georgia, that deals with hazardous substance and waste site issues. ATSDR provides information about harmful chemicals in the environment and how people can protect themselves from 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.

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

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

CERCLA: See Comprehensive Environmental Response, Compensation, and Liability Act.

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

Completed Exposure Pathway: See Exposure Pathway.

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 enacted in 1980. It is also known as Superfund. This act concerns releases of hazardous substances into the environment, the cleanup of these substances, and the health issues related to hazardous waste sites. ATSDR was created by this act.

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

Contaminant: See Environmental Contaminant.

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

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

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 those 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 regulations and enforces environmental laws to protect the environment and public health.

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

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

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

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

ATSDR defines an exposure pathway as having five parts:

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

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

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

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

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

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

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

MRL: Minimal Risk Level: 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 National Priorities List: (Which is part of Superfund.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site requires investigation or clean up, or both, to determine whether people can be exposed to chemicals from the site.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals might 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: Public Health Assessment. A report or document that looks at chemicals at a hazardous waste site and determines whether people could be harmed from coming into contact with those chemicals. The PHA also determines whether possible further public health actions are needed.

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For example, the area of a playground containing contaminated dirt, a contaminated spring used for drinking water,

a location where fruits or vegetables are grown in contaminated soil, or a backyard area where someone might breathe contaminated air.

Public Health Hazard: The category is used in PHAs for sites that show credible 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 tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

(a) Urgent Public Health Hazard
(b) Public Health Hazard
(c) Indeterminate Public Health Hazard
(d) No Apparent Public Health Hazard
(e) No Public Health Hazard

Reference Dose (RfD): An estimate, with safety factors (see safety factor) built in, of the daily, life-time 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).

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.

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.

CERTIFICATION

The Florida Department of Health, Bureau of Community Environmental Health prepared this Public Health Assessment under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It followed approved methodology and procedures existing at the time it began. The Cooperative Agreement Partner completed editorial review.

Jennifer Freed
Technical Project Officer
CAT, SPAB, DHAC, ATSDR

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

Alan Yarbrough
Team Lead
CAT, SPAB, DHAC, ATSDR