Health Consultation

Soil Health Consultation

MILL VIEW (MILLVILLE) NEIGHBORHOOD

PORT ST. JOE, GULF COUNTY, FLORIDA

EPA FACILITY ID: FLN000407304

Prepared by the
Florida Department of Health

MARCH 18, 2010

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

Health Consultation: A Note of Explanation

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

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

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Foreword

The Florida Department of Health (DOH) evaluates the public health threat of hazardous waste sites through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia. This health consultation is part of an ongoing effort to evaluate health effects associated with soil/fill beneath Mill View subdivisions east and west in Port St. Joe. The Florida DOH evaluates site-related public health issues through the following processes:

■ Evaluating exposure: Florida 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 human exposures might occur. A consultant for the St. Joe Company provided the information for this assessment.

■ Evaluating health effects: If we find evidence that exposures to hazardous substances are occurring or might occur, Florida DOH scientists will determine whether that exposure could be harmful to human health. We focus this report on public health; that is, the health impact on the community as a whole, and base it on existing scientific information.

■ Developing recommendations: In this report, the Florida DOH outlines its conclusions regarding any potential health threat posed by surface soil, 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 for other agencies, including the US Environmental Protection Agency and the Florida Department of Environmental Protection. If, however, an immediate health threat exists or is imminent, Florida DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.

■ Soliciting community input: The evaluation process is interactive. The Florida DOH starts by soliciting and evaluating information from various government agencies, individuals or organizations responsible for cleaning up the site, and those living in communities near the site. We share any conclusions about the site with the groups and organizations providing the information. Once we prepare an evaluation report, the Florida DOH seeks feedback from the public.

If you have questions or comments about this report, we encourage you to contact us.

Please write to: Hazardous Waste Site Health Assessment Team
Bureau of Environmental Public Health Medicine
Florida Department Health
4052 Bald Cypress Way, Bin # A-08
Tallahassee, FL 32399-1712

Or call us at: 850 245-4299 or toll-free in Florida: 1-877-798-2772

Summary

INTRODUCTION	ATSDR and Florida DOH's top priority is to ensure Mill View residents have the best information to safeguard their health.
CONCLUSIONS	ATSDR and Florida DOH conclude that accidentally ingesting (swallowing) very small amounts of metals and polycyclic aromatic hydrocarbons (PAHs) found in the surface soil (0-6 inches deep) of the Mill View neighborhood are not expected to harm people's health. ATSDR and Florida DOH conclude that accidentally ingesting (swallowing) very small amount of metals and PAHs found in subsurface soil (deeper than 6 inches) in the area filled with paper mill waste, however, could harm people's health.
BASIS FOR DECISION	Children may be exposed to chemicals in surface soil by putting their soiled fingers or toys in their mouths. Adults may also be exposed by unintentionally swallowing very small amounts of soil. The amount of metals and PAHs that could get into a child's or adult's body from surface soil, however, is below levels that are known to cause illness. If gardening or tree planting in the area filled with paper mill waste brings subsurface soil (deeper than 6 inches) to the surface, children and adults could be exposed by unintentionally swallowing very small amount of soil. The amounts of metals and PAHs in the subsurface soil in the area filled with paper mill waste are above the levels known to cause illness.
NEXT STEPS	1. Mill View residents in the area filled with paper mill waste should not dig deeper than 6 inches when gardening. If digging deeper than 6 inches, they should avoid soil containing lime grits, woodchips, or ash/slag. 2. Mill View residents in the area filled with paper mill waste should continue good gardening practices. 3. Florida DOH and the Gulf CHD will test available homegrown leafy and root vegetables if any are found.
FOR MORE INFORMATION	If you have concerns about your health or the health of your children, you should contact your health care provider. You may also call the Florida Department of Health at 1-877-798-2772 and ask for information about the Mill View neighborhood.

Background

From the 1940s to the early 1950s, the St. Joe Company filled the Chickenhouse Branch and wetlands east of their paper mill with tree bark and other mill waste. This paper mill waste contained lime grits, boiler ash, unburned carbon, calcium, iron compounds, tree bark, and wood chips. An outline of the area with buried paper mill waste resembles a sock (Figure 3). In the mid 1950s, the St. Joe Company sold the land to a developer who built and sold homes there. The area, now known as Mill View (Figure 1), covers 520 acres: 447 acres in Mill View west and 73 acres in Mill View east. The majority of the Mill View community is African-American (ATSDR 2001).

In 2001, several Mill View residents expressed concerns about land subsidence and associated structural deterioration of their homes. They were also worried about possible chemical contamination in the paper mill waste under their homes. In three previous reports, the Florida Department of Health (DOH) and the US Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the physical and chemical risk associated with the mill waste under this area (ATSDR 2001, 2003, 2005). DOH/ATSDR recommended residents over the filled area follow "good gardening practices" (Figure 7). Since the community is on public water supply, they did not review ground water quality data but did recommend Mill View residents not install new private wells for drinking or bathing.

In 2007 and 2008 contractors for the St. Joe Company collected additional soil samples in the area of Mill View filled with paper mill waste (Figures 2 & 3) to further characterize the extent of contamination (PSI 2007 & 2008). They tested for arsenic, lead, vanadium, and polycyclic aromatic hydrocarbons (PAHs) including benzo(a)pyrene toxicity equivalents (BaP-TEQ). The Florida Department of Environmental Protection (DEP) requested Florida DOH assess the public health threat. This report reviews the results of 2007 and 2008 soil tests.

In the summer of 2009, Florida DOH and Gulf County Health Department (CHD) searched but found no gardens in the area of Mill View filled with paper mill waste. They left letters at homes in the filled area offering free vegetable testing but no one responded (Appendix).

Community Health Concerns

Mill View community members who purchased houses they later learned were built on top of paper mill waste are concerned about chemical contamination. They are concerned that they were, and are being, exposed to toxic chemicals.

Discussion

In 2008, consultants for the St. Joe Company collected 13 surface soil samples (0-6 inches deep) in the area of the Mill View neighborhood with buried paper mill waste (Figure 2) (PSI 2008). They tested these samples for metals and polycyclic aromatic hydrocarbons (PAHs) including benzo(a)pyrene toxicity equivalents (BaP-TEQ). Table 1 summarizes the results.

In 2007 and 2008, consultants for the St. Joe Company collected 24 <u>sub</u>surface soil samples (6 - 42 inches deep) from the area with buried paper mill waste (Figure 3) (PSI 2007, 2008). They found paper mill waste such as lime grits, wood chips, and ash/slag in most samples (Figures 4, 5, & 6). They analyzed the <u>sub</u>surface soil samples for metals and PAHs including BaP-TEQ.

They found elevated levels of arsenic, BaP-TEQ, lead, and vanadium associated with samples containing paper mill waste: lime grits, wood chips, and ash/slag. Table 2 summarizes the results.

On April 20, 2009, Florida DOH and Gulf CHD staff visited the Mill View neighborhood. They observed one vegetable garden, but it was outside the area filled with paper mill waste. They observed ground cover in some yards was sparse. They observed a few houses with obvious cracks in exterior walls and one house abandoned because of severe land subsidence and structural failure.

On July 17, 2009, the Gulf CHD staff observed fig trees, pecan trees, grapefruit trees, orange trees, pear trees, and sunflowers plants on Avenues D & E and Peters & Battle Streets in the Mill View neighborhood, but no leafy or root vegetables.

On July 30, 2009, Florida DOH and Gulf CHD staff went door-to-door in the Mill View neighborhood in an effort to find residents willing to participate in vegetable testing. Although Florida DOH and Gulf CHD were unable to find any participants, they left letters at 35 homes explaining the reason for testing. The letters also requested anyone who had homegrown root or leafy vegetables to contact DOH. Although recent soil tests did not show a health risk, the letters explained how the testing of vegetables might confirm that finding. No residents contacted Florida DOH or the Gulf CHD.

In September 2009 DOH spoke with one resident who used to have a garden but doesn't anymore because of poor yields. The resident promised to contact DOH with any new information about Mill View gardens.

Florida DOH estimated residential exposures by reviewing the 2007 and 2008 soil data and calculating doses. Mill View residents may have been exposed, and may continue to be exposed, to contaminants via incidental or accidental ingestion (swallowing) of very small amounts of surface soil during common activities such as gardening or working in the yard and eating/smoking before washing hands. For an average 150-pound (70-killogram) adult, we estimate the average incidental soil ingestion rate is 100 milligrams per day.

The incidental ingestion (swallowing) rate for young children is greater because of more hand to mouth behavior: mouthing of objects or hands. Mouthing behavior is a normal phase of early childhood development. For an average 33-pound (15-kilogram) child, we estimate the soil ingestion rate is about 200 milligrams a day.

Typically, the Florida DOH estimates the health risk from exposures to the top three inches of soil (surface soil). People are most likely to come into contact with the top three inches of soil. However, the available surface soil data for Mill View are 0-6 inches deep. Because these are the only data available, this assessment evaluates exposure to the top 6 inches of soil.

Although soil deeper than 6 inches (<u>sub</u>surface soil) is not typically accessible, exposure could occur if gardening or tree planning brought this soil to the surface. In addition to the health risk from exposure to existing surface soil, Florida DOH also estimates the health risk if <u>sub</u>surface soil was brought to the surface.

Surface Soil (0-6 Inches Deep)

Non-Cancer Risk – In 2008, the concentration of inorganic arsenic was above the ATSDR screening level in 10 of 13 Mill View surface soil samples (Table 1). The maximum inorganic arsenic dose for children (0.0001 milligrams per kilogram per day - mg/kg/day) and adults (0.00001 mg/kg/day) resulting from long-term accidental swallowing of very small amounts of surface soil are, however, less than the levels that don't cause non-cancer problems (cardiovascular, gastrointestinal, liver, kidney, neurological, or skin) in human studies (ATSDR 2007a). Therefore the levels of inorganic arsenic in Mill View surface soil are not likely to cause non-cancer illness in either children or adults.

The highest concentrations of the other two contaminants in the surface soil; BaP-TEQ and vanadium (Table 1) are below ATSDR screening levels and are thus not likely to cause any non-cancer illnesses in either children or adults (ATSDR 2009). The highest concentration of lead in the surface soil (Table 1) is below the EPA screening level and is not likely to cause any non-cancer illness in either children or adults.

Cancer Risk – Multiplying the EPA arsenic cancer slope factor of 1.5 $(mg/kg/day)^{-1}$ times the lifetime (70 year) maximum adult dose of 0.00001 mg/kg/day from incidental ingestion (swallowing) of the highest concentration of arsenic found in surface soil, results in, at most, an additional theoretical cancer risk of 2 in 100,000. This is a very low increased risk. This is the highest estimate of the increased cancer risk from exposure to arsenic in surface soil. The actual increased cancer risk from arsenic is likely lower and may be as low as zero.

Multiplying the EPA BaP cancer slope factor of 7.3 $(mg/kg/day)^{-1}$ times the lifetime (70 year) maximum adult dose of 0.0000001 mg/kg/day from incidental ingestion (swallowing) of the highest concentration of BaP-TEQ found in surface soil, results in, at most, an additional theoretical cancer risk of 1 in 10 million. This is an extremely low increased risk. This is the highest estimate of the increased cancer risk from exposure to BaP-TEQ in surface soil. The actual increased cancer risk from BaP-TEQ is likely lower and may be as low as zero.

The Department of Health and Human Services (DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens based on limited evidence from studies in humans and sufficient evidence from animal studies. These studies are, however, inadequate to quantify the cancer risk (2007b).

The toxicological data are inadequate to determine if vanadium causes cancer in animals or humans (ATSDR 1992).

Subsurface Soil (6 – 42 Inches Deep)

Non-cancer Risk - Most (19 of 24) of the subsurface soil samples (6 to 42 inches deep) had inorganic arsenic concentrations above the ATSDR screening guideline (Table 2). If this subsurface soil was brought to the surface by gardening or tree planting, the maximum inorganic arsenic dose for children (0.004 mg/kg/day) resulting from long-term incidental ingestion (swallowing) of this soil is associated with stroke, increase the risk of precancerous skin lesions (dermatosis), and decrease performance in neurobehavioral tests (ATSDR 2007a).

Eight of the 21 subsurface soil samples analyzed for BaP-TEQ exceeded the ATSDR screening guideline (Table 2). If subsurface soil was brought to the surface, the maximum BaP-TEQ doses for children (0.001 mg/kg/day) and adults (0.0001 mg/kg/day) resulting from long-term

incidental ingestion (swallowing) of this soil are not likely, however, to cause any non-cancer illness (ATSDR 1995).

Of the 24 subsurface soil samples analyzed for lead, only one exceeded the EPA screening guideline (Table 2). We used EPA's Intergraded Exposure Uptake Biokinetic (IEUBK) model for lead to estimate the blood lead levels in children from incidental ingestion (swallowing) if subsurface soil from this one location was brought to the surface. Using the IEUBK model, the maximum estimated blood lead levels for 1-2 year olds (11 micrograms per deciliter – ug/dL) is associated with blood pressure, decrease red blood cell production, decrease kidney function, and lead to weakened teeth and dental cavities (ATSDR 2007b).

Only two of the 24 subsurface soil samples analyzed for vanadium exceeded the ATSDR screening guideline (Table 2). If this subsurface soil was brought to the surface, the maximum vanadium dose for children (0.004 mg/kg/day) and adults (0.0004 mg/kg/day) would not be likely to cause any non-cancer illness (ATSDR 1992).

Cancer Risk - Multiplying the EPA arsenic cancer slope factor of 1.5 $(mg/kg/day)^{-1}$ times the lifetime (70 year) maximum adult dose of 0.0004 mg/kg/day from incidental ingestion (swallowing) of the highest concentration of arsenic found subsurface soil, results in at most an additional theoretical skin cancer risk of 6 in 10,000. This is a moderate increased risk. This is the highest estimate of the increased cancer risk from exposure to arsenic in subsurface soil. The assumptions in this estimate are health protective and tend to overestimate the risk. The actual increased skin cancer risk from arsenic is likely lower and may be as low as zero.

Multiplying the EPA BaP cancer slope factor of 7.3 $(mg/kg/day)^{-1}$ times the lifetime (70 year) maximum adult dose of 0.0001 mg/kg/day from incidental ingestion (swallowing) of the highest concentration of BaP-TEQ found in subsurface soil, results in at most an additional theoretical stomach cancer risk of 1 in 1,000. This is a moderate increased risk. This is the highest estimate of the increased cancer risk from exposure to BaP-TEQ in subsurface soil. The assumptions in this estimate are health protective and tend to overestimate the risk. The actual increased stomach cancer risk from BaP-TEQ is likely lower and may be as low as zero.

The Department of Health and Human Services (DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens based on limited evidence from studies in humans and sufficient evidence from animal studies. These studies are, however, inadequate to quantify the cancer risk (ATSDR 2007b).

The toxicological data are inadequate to determine if vanadium causes cancer in animals or humans (ATSDR 1992).

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally,

children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health. By taking into account the weight and soil ingestion (swallowing) rates for children, this assessment takes into account their special vulnerabilities.

This assessment specifically addresses the health risk for children in the Mill View neighborhood who may accidentally ingest (swallow) small amounts of surface soil or subsurface soil.

Conclusions

1. ATSDR and Florida DOH conclude that incidental ingestion (swallowing) surface soil (0-6 inches deep) in the Mill View neighborhood is not expected to harm people's health. This is because the levels of metals and polycyclic aromatic hydrocarbons (PAHs) are not high enough to cause illness.

2. ATSDR and Florida DOH conclude that if subsurface soils (deeper than 6 inches) in the area of the Mill View neighborhood with buried paper mill waste are brought to the surface by gardening or tree planting, incidental ingestion (swallowing) of this soil for a year or longer could harm people's health.

Recommendations

1. Mill View residents in the area with buried paper mill waste should avoid any activity such as gardening or planting trees that brings subsurface soils (deeper than 6 inches) to the surface. They should avoid any subsurface soil containing lime grits, wood chips, or ash/slag (Figures 4, 5, & 6).

2. As recommended in previous Florida DOH/ATSDR reports, Mill View residents in the area with buried paper mill waste should follow "good gardening practices" to minimize accidental ingestion (swallowing) of surface soil (Figure 7). Residents should wash/rinse vegetables carefully, especially leafy greens such as collards and turnips. They should also peel root crops such as carrots and potatoes.

3. As recommended in previous Florida DOH/ATSDR reports, Mill View residents should not install or use private wells for drinking or bathing.

4. Available homegrown leafy and root vegetables should be tested for contaminants found in subsurface soils. These vegetables may accumulate some contaminants.

Public Health Action Plan

Florida Department of Health and the Gulf County Health Department will continue to search for homegrown leafy and root vegetables growing in the filled area of the Mill View neighborhood.

The Florida Department of Health will review additional data as they become available.

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Tables

Table 1. 2008 Surface Soil (0-6 inches deep) Contaminant Concentrations in the Filled Area of the Mill View Neighborhood

Contaminant	Concentration Range (parts per million)	Soil Comparison Value (parts per million)	# Samples Above Soil Comparison Value/ Total # Soil Samples
Arsenic	0.3 – 7.4	0.5 ATSDR	10/13
BaP -TEQ	0 – 0.1	0.1 ATSDR	0/13
Lead	1.6 –151	400 EPA	0/13
Vanadium	0.1 – 10	200 ATSDR	0/13

Source: PSI 2008
BaP TEQ = Benzo(a)pyrene toxicity equivalence

Table 2. 2007-2008 Subsurface Soil (6-42 inches deep) Contaminant Concentrations in the Filled Area of the Mill View Neighborhood

Contaminant	Concentration Range (parts per million)	Soil Comparison Value (parts per million)	# Samples Above Soil Comparison Value/ Total # Soil Samples
Arsenic	0.3 – 279	0.5 ATSDR	19/24
BaP - TEQ	0 – 98.7	0.1 ATSDR	8/21
Lead	0.2 - 991	400 EPA	1/24
Vanadium	0.7 – 314	200 ATSDR	2/24

Source: PSI 2007 & 2008
BaP TEQ = Benzo(a)pyrene toxicity equivalence

Figures

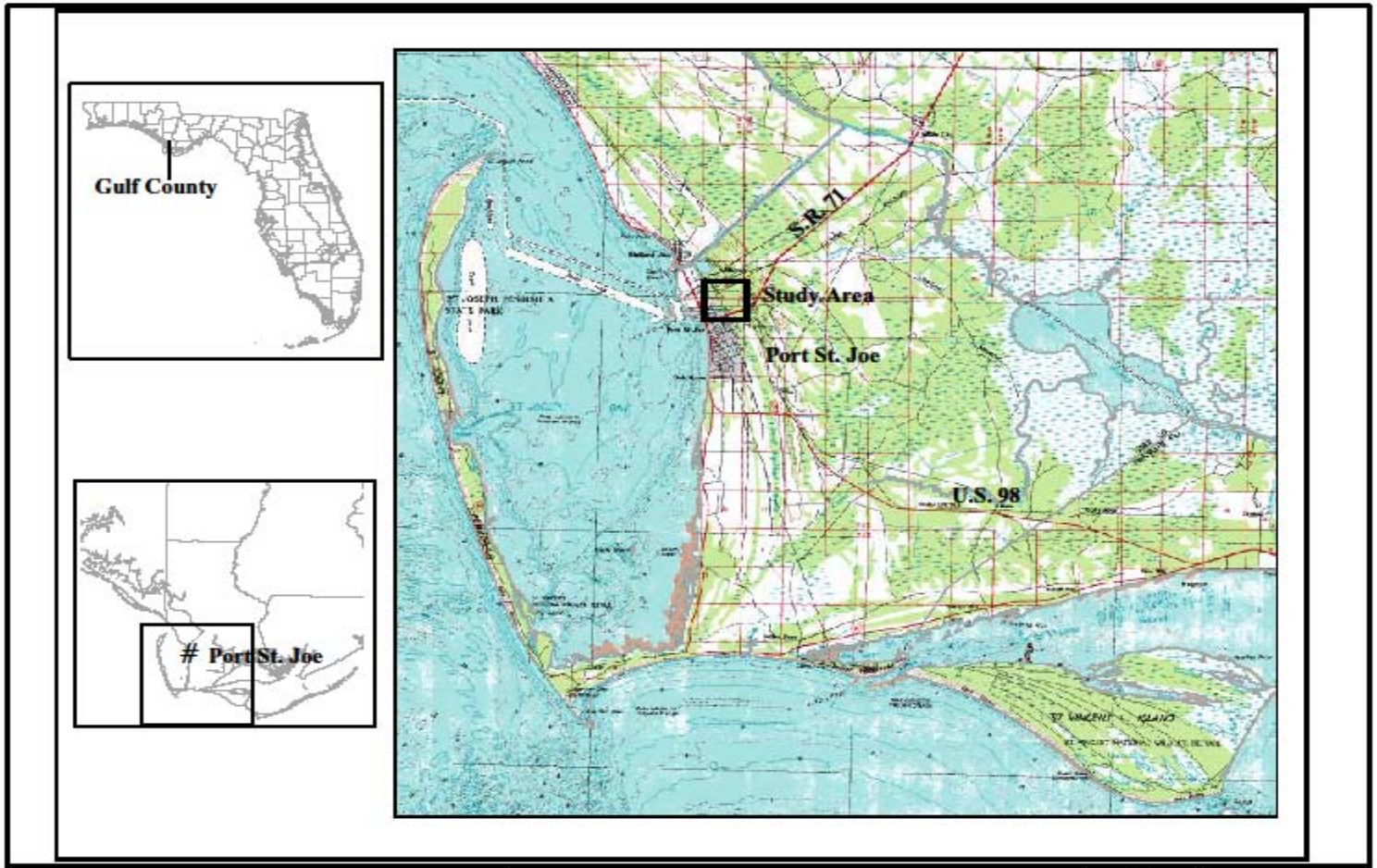
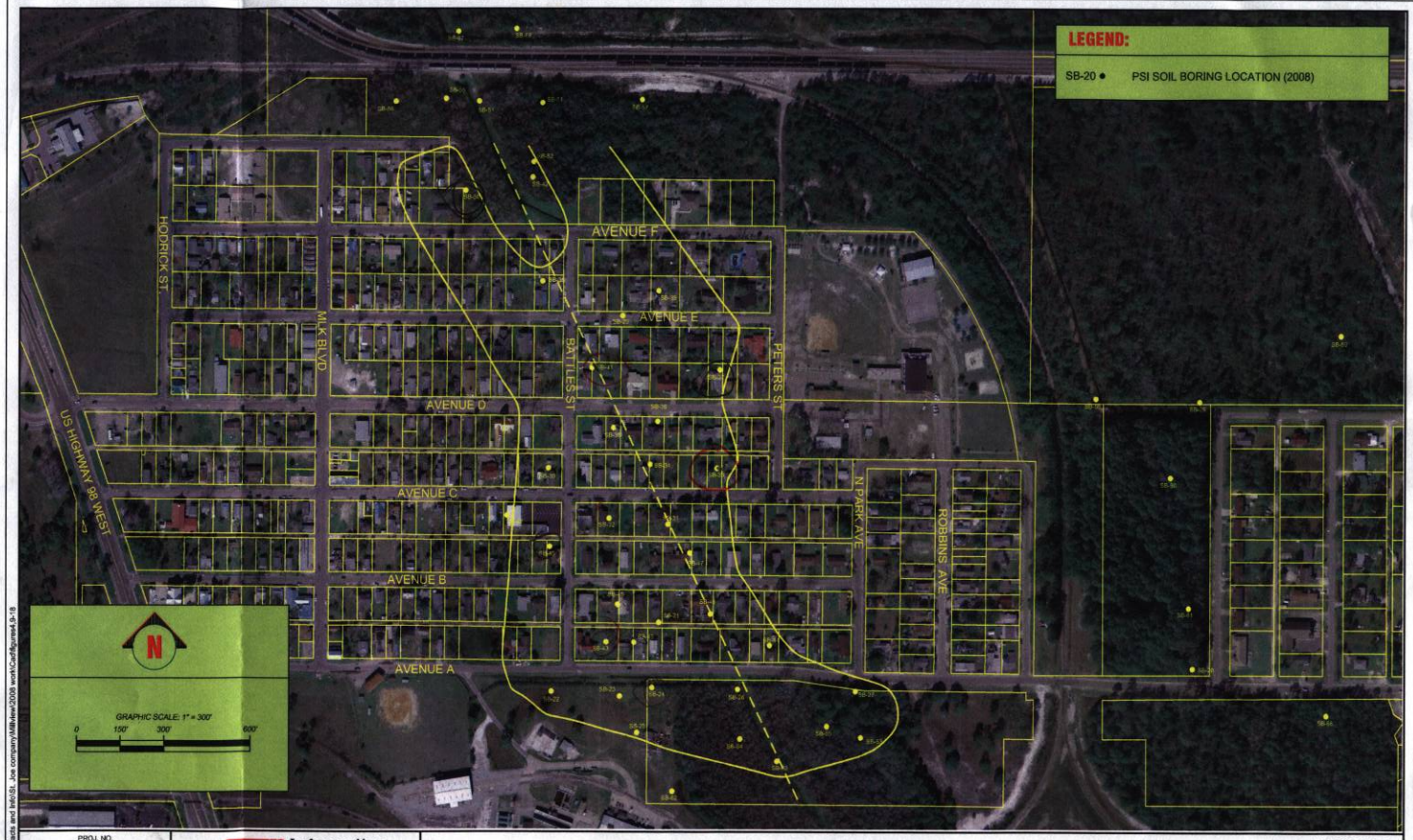


Figure 1: Mill View Subdivision Location Map
Port St. Joe, Gulf County, Florida

Figure 2. 2007 Mill View Subsurface Soil Sample Locations (PSI 2007)



PROJ. NO. 552-7G009	Information To Build On Engineering • Consulting • Testing 5801 Benjamin Center Drive, Suite 112 Tampa, Florida 33634 (813) 886-1075 (813) 249-0301 fax	SOIL BORING LOCATION MAP NORTH PORT ST. JOE STUDY PORT ST. JOE, GULF COUNTY, FLORIDA
DRAWN BY DCB		FIGURE 3
DATE CREATED 09/02/08		

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Figure 3. 2008 Mill View Soil Sample Locations (PSI 2008)

Figure 4. Lime Grits in Mill View Subsurface Soil (DEP 2003)

Figure 5. Decomposing Wood Chips in Mill View Subsurface Soil (DEP 2003)

Figure 6. Ash/Slag in Mill View Subsurface Soil (DEP 2003)

Safe Gardening Tips

REMEMBER THESE FEW SIMPLE STEPS, IF YOU WANT TO BE SAFE IN THE GARDEN:

PREPARING YOUR GARDEN

- Add clean compost or soil to your garden.
- Be sure phosphate and pH levels do not fall below recommendations.
- Ask your county agriculture extension office to evaluate your soil.

WORKING IN THE GARDEN

- Be sure to wear gloves.
- Don't eat, drink or smoke while in the garden.
- Avoid dust. Use mulch and do not garden in dry soil when it is windy.
- Remove shoes before entering the house.
- Wash your hands and dirty clothing after gardening.

PREPARING FRUITS AND VEGETABLES

- Limit the amount of homegrown root crops you eat, especially carrots.
- Use raised beds of clean topsoil to grow root crops.
- Wash leafy vegetables growing close to the ground (like collards). Add a little vinegar to the wash water to help remove dirt.

FOR MORE INFORMATION see the Florida Department of Health website at: http://www.myfloridaeh.com/community/SUPERFUND/index.html. Or call toll-free during business hours at 877-798-2772.

HEALTH

DIVISION OF Environmental Health

ATSDR

Figure 7. Florida Department of Health and Agency for Toxic Substances and Disease Registry Safe Gardening Tips.

Appendix

Charlie Crist
Governor

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

July 30, 2009

Millview Resident:

The Florida Department of Health (DOH) wants to test vegetables from the Millview neighborhood for chemicals from the former paper mill. We want to test root vegetables like sweet potatoes, carrots or potatoes or leafy vegetables such as lettuce, cabbage or collard greens. Recent soil tests do not show a health risk but vegetable testing is needed to confirm this.

If you are growing any of these vegetables and would like them tested, please call me toll-free 877-798-2772 by August 28. **This testing is free**. If you are not growing these vegetables, but know of a neighbor who is, please give them this letter.

We will send a letter explaining the test results to people whose vegetables we test. We will also send them a copy of our summary report.

Sincerely,

Susan Skye
Biological Scientist
Florida Department of Health
Bureau of Environmental Public Health Medicine
Toll Free 877-798-2772

Cc: Gulf CHD

CERTIFICATION

The Florida Department of Health, Division of Environmental Health prepared this Health Consultation 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 and completed editorial review.

Jennifer Freed
Technical Project Officer,
CAT, CAPEB, DHAC

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

Alan Yarbrough
Team Lead
CAT, CAPEB, DHAC, ATSDR