

Health Consultation

Fruit and Vegetable Testing

THE FORMER HERNANDO COUNTY
DEPARTMENT OF PUBLIC WORKS SITE

BROOKSVILLE, HERNANDO COUNTY, FLORIDA

AUGUST 17, 2007

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

Health Consultation: A Note of Explanation

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

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

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HEALTH CONSULTATION

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BROOKSVILLE, HERNANDO COUNTY, FLORIDA

Prepared By:

Florida Department of Health
Bureau of Community Environmental 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 health consultation report evaluates fruit and vegetable test results. The Hernando County Health Department (CHD) and the Florida Department of Agriculture and Consumer Services (DACS) collected and tested collards, grapefruit, mustard greens, oranges, tangerines and turnips from four properties near the former Hernando County Department of Public Works (DPW) site. The Florida Department of Health (DOH) evaluated the test results to determine if eating these fruits and vegetables was a health threat.

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 people might be exposed to it. Usually, Florida DOH does not collect its own environmental sampling data. We rely on information provided by the Florida Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency (USEPA), and other government agencies, businesses, and the public.

Evaluating health effects: If evidence is found 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. Their assessment 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 an evaluation report—such as this health consultation report—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 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 Florida DEP. If, however, the health threat is immediate, 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. Florida DOH solicits and evaluates information from various government agencies, the organizations or individuals responsible for cleaning up the site, and from community members who live near the site. Any conclusions are shared with the organizations and individuals who provided information. Once an evaluation report has been prepared, Florida DOH seeks feedback from the public. If you have questions or comments about this exposure investigation report, we encourage you to contact us.

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Summary and Statement of Issues

This health consultation report evaluates metal and pesticide testing of collards, grapefruit, mustard greens, oranges, tangerines and turnips collected from four properties in the Mitchell Heights neighborhood in January 2007.

Mitchell Heights is a residential neighborhood adjacent to the former Hernando County Department of Public Works (DPW) site in Brooksville, Florida. Because of the chemicals used on site and potential runoff to nearby gardens, the Florida Department of Health (DOH) coordinated fruit and vegetable testing. The Florida Department of Agriculture and Consumer Services (DACS) tested fruits and vegetables (produce) from four nearby gardens for metals and pesticides. Because of its use on the site, malathion was the main pesticide of concern. However, this chemical was not found in the fruits or vegetables. Calculated doses of metals and other pesticides from eating the homegrown produce were less than recommended dietary intake levels and less than or equal to Agency for Toxic Substance and Disease Registry (ATSDR) Minimal Risk Levels. Therefore, the levels of metals and pesticides found in the fruits and vegetables in Mitchell Heights are not likely to cause illness.

Background

Site Description

The former Hernando County Department of Public Works, Fleet Maintenance Compound is at 201 West Martin Luther King Boulevard, Brooksville, Hernando County, Florida (Figure 1). In 1955, the property was purchased by Hernando County for use as a public works facility. The DPW site has been used for a variety of functions: storage of malathion for mosquito control, road striping and road maintenance equipment storage, road sign fabrication, election voting machine storage, heavy equipment parking and storage, vehicle maintenance operations, and pesticide, herbicide, paint, solvent, and petroleum product (gasoline, diesel, used waste oil, kerosene and hydraulic fluid) storage (Figure 2). The site has been closed since the late 1990s. The future use of this site is unknown. The former Department of Public Works (DPW) site encompasses approximately 5 acres and is surrounded by residential communities. The Mitchell Heights neighborhood is adjacent to the south side of the DPW site (Figure 3). This neighborhood is downhill from the site. Except for an area of petroleum tank removal, the DPW site is paved. A chain link fence surrounds the site and warning signs stating “No trespassing by order of the Board of County Commissioners” are posted. An earthen retention ditch borders the entire east, west and south edges of the DPW site. The site slopes to the south and storm water washes into the ditch. Two storm sewers are located on the paved area of the site and drain directly into the retention ditch. The retention ditch drains into a cement culvert located in the southeast corner of the site that flows south into the drainage ditches of the Mitchell Heights neighborhood. In September 2005, Florida DOH staff observed a small building on the northwest corner of the site that housed an above ground malathion storage tank on a concrete slab. They detected a very strong pesticide odor. Since that time, both the building and the concrete slab were disposed of by the county’s contractor leaving a dirt pit filled with water. The Florida DOH did not notice any signs of trespassing during their 2005 site visit.

Site Background and History

Due to community concerns, in the fall of 2005 the Florida Department of Health (DOH) started the health assessment process at the former Hernando County DPW site.

In May and June 2006, consultants for Hernando County collected 35 off-site soil samples from 0-6" deep. They analyzed for pesticides (organophosphorus and organochlorine) and metals (arsenic, lead, chromium, cadmium, selenium and barium). These off-site soils will be evaluated for ingestion and inhalation in a separate health consultation.

In September/October 2006, the Hernando CHD tested 20 nearby residents for blood lead. Both children and adults were tested. The residents were tested because of the levels of lead found in sub-surface soils. Florida DOH will evaluate these blood lead results in a separate health consultation.

Demographics

In 2000, about 420 people lived within a 0.25-mile radius of the former DPW site. Approximately 84% were black and 14% were white. Other racial/ethnic groups include 2% American Indian, Hispanic or Latino (BOC 2000).

Community Health Concerns

The Florida DOH was concerned stormwater runoff from the site may have affected nearby homegrown fruits and vegetables.

Mitchell Heights residents are concerned that contamination from the former DPW site has affected their health. In July 2006, residents provided responses including health concern to DOH's public meeting questionnaire. Some of their health concerns include skin irritations, cystic fibrosis, cancer and digestive disease. Florida DOH will include detailed information on these health concerns in a separate health consultation

Discussion

In 2005, the Florida DOH and the Hernando CHD conducted a site visit and noticed four gardens adjacent to and a few blocks away from the site. Due to the chemicals used on site and potential runoff to nearby gardens, the Florida DOH coordinated fruit and vegetable testing.

In January 2007, the Florida DACS and the Hernando CHD collected fruit and vegetables from four properties near the site. They collected one pound of collard greens, 10 grapefruit and 12 oranges from House #1; 24 tangerines from House #2; 10 grapefruit and six oranges from House #3; and one pound of mustard greens and one pound of three turnip plants with roots from House #4.

In May 2007, the Florida DOH mailed letters to the four residents who had their gardens sampled and explained the metal and pesticide testing results.

Fruit and Vegetable Laboratory Methods and Results

Florida DACS rinsed the produce and analyzed the collards, grapefruit, mustard greens, oranges, tangerines and turnips for 67 metals using DACS's Food Laboratory ICP-MS semi quantitative method and 173 pesticides using Florida DACS's Food Laboratory Inductively Coupled Plasma Mass Spectrometry ICP-MS Semi quantitative method and 173 pesticides using DACS food laboratory pesticide method. The Chemical Residue Laboratory analyzed part per billion levels of pesticide residue on fresh fruits and vegetables using a rigorously validated acetonitrile extraction followed by solid phase extraction cleanup and analysis by gas and liquid chromatography tandem mass spectrometry and gas chromatography element specific detectors. Table I includes the fruit and vegetable test results. Only those metals and pesticides detected above the detection limit are included.

For both metals and pesticides, the calculated doses for eating the homegrown produce were less than recommended dietary intake levels and less than or equal to ATSDR's Minimal Risk Levels (Table I). Therefore, the levels of metals and pesticides found in the fruit and vegetables are not likely to cause illness.

Metals

Aluminum, barium, boron, cadmium, cerium, copper, lead, manganese, molybdenum, rubidium, strontium, titanium and thallium were all detected in either collard greens or turnip leaves from the four neighborhood gardens. Dietary intake information is available for barium, boron, copper, lead, manganese, molybdenum, rubidium and strontium. The calculated doses of these metals were less than or within the referenced daily dietary intake amounts. Therefore, the levels found in the collards, grapefruit, mustard greens, oranges, tangerines and turnips are not likely to cause illness.

In addition, the levels of aluminum, barium, boron, cadmium, copper, manganese, strontium and thallium were all less or equal to the MRL (Minimal Risk Level). This too indicates that none of these metals detected in the fruit and vegetables are likely to cause illness.

The four remaining metals (cerium, molybdenum, rubidium and titanium) are found naturally in Florida soil. Titanium is also used as a pigment in foods, and silicon is in pectin in orange juice. Furthermore, these metals are added to liquid nutrient drinks sold in health food stores. In addition, these four metals were not identified as being contaminants of concern from the Hernando DWP site. We do not expect low levels of these metals in fruits and vegetables to cause illness.

Pesticides

The main reason the Florida DOH tested pesticides in produce from the four gardens near the site was to check for the pesticide malathion. Malathion was stored on the former DPW site.

Of the 173 pesticides tested in all produce from the four gardens, only chlorothalonil was found in collards from one garden (House #1). Chlorothalonil is a fungicide registered by the

Environmental Protection Agency (EPA) and is available for use on homegrown fruits and vegetables. In May 2007, the resident of House #1 confirmed use of a fungicide containing 29.6% chlorothalonil. The Hernando CHD advised the resident to carefully follow application instructions and to wash fruits and vegetables prior to eating.

Table I shows the level of chlorothalonil found and the EPA Reference Dose (RfD). Based on a 13-week rat and dog study (EPA 1988) the level of chlorothalonil is not likely to cause illness.

Consideration of Biological Testing

The level of metals and pesticides found in the collards, grapefruit, mustard greens, oranges, tangerines and turnips do not warrant blood or urine testing.

Child Health Considerations

The levels of metals and pesticides found in the collards, grapefruit, mustard greens, oranges, tangerines and turnips are not likely to cause illness in children. 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.

Conclusions

The levels of metals and pesticides in the collards, grapefruit, mustard greens, oranges, tangerines and turnips from Mitchell Heights gardens are not likely to cause illness. The calculated doses for eating the homegrown produce were less than recommended dietary intake levels and less than or equal to ATSDR's MRLs (Table I); therefore, the levels pose no apparent health hazard.

Recommendations

As with any home garden, gardeners should wash their hands after gardening and rinse fruits and vegetables before eating.

Public Health Action Plan

Past Actions: In May 2007, the Florida DOH mailed letters to the four residents who had their gardens sampled and explained the metal and pesticide testing results.

Planned Actions: In a separate report, Florida DOH will evaluate soil test results for the DPW site including evaluation of the off-site sampling results from 2006. In another separate report, Florida DOH will evaluate blood lead results from 20 nearby residents. They may hold an open house meeting to discuss the results of their findings.

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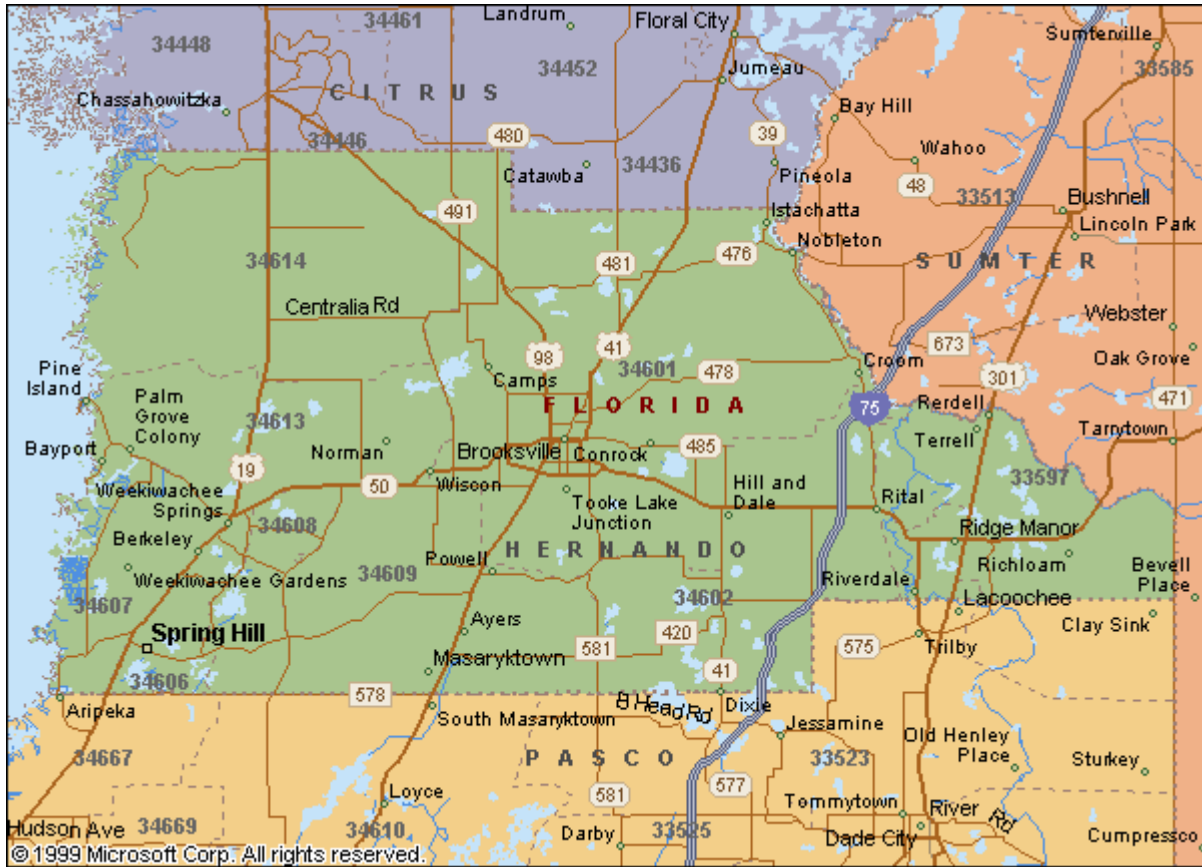
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Appendix A
Figures and Tables

FIGURE 1
Hernando County Maps



References: <http://www.florida-business-data.com/maps/zip-codes/Hernando-County.htm>

http://www.floridacountiesmap.com/hernando_county.shtml

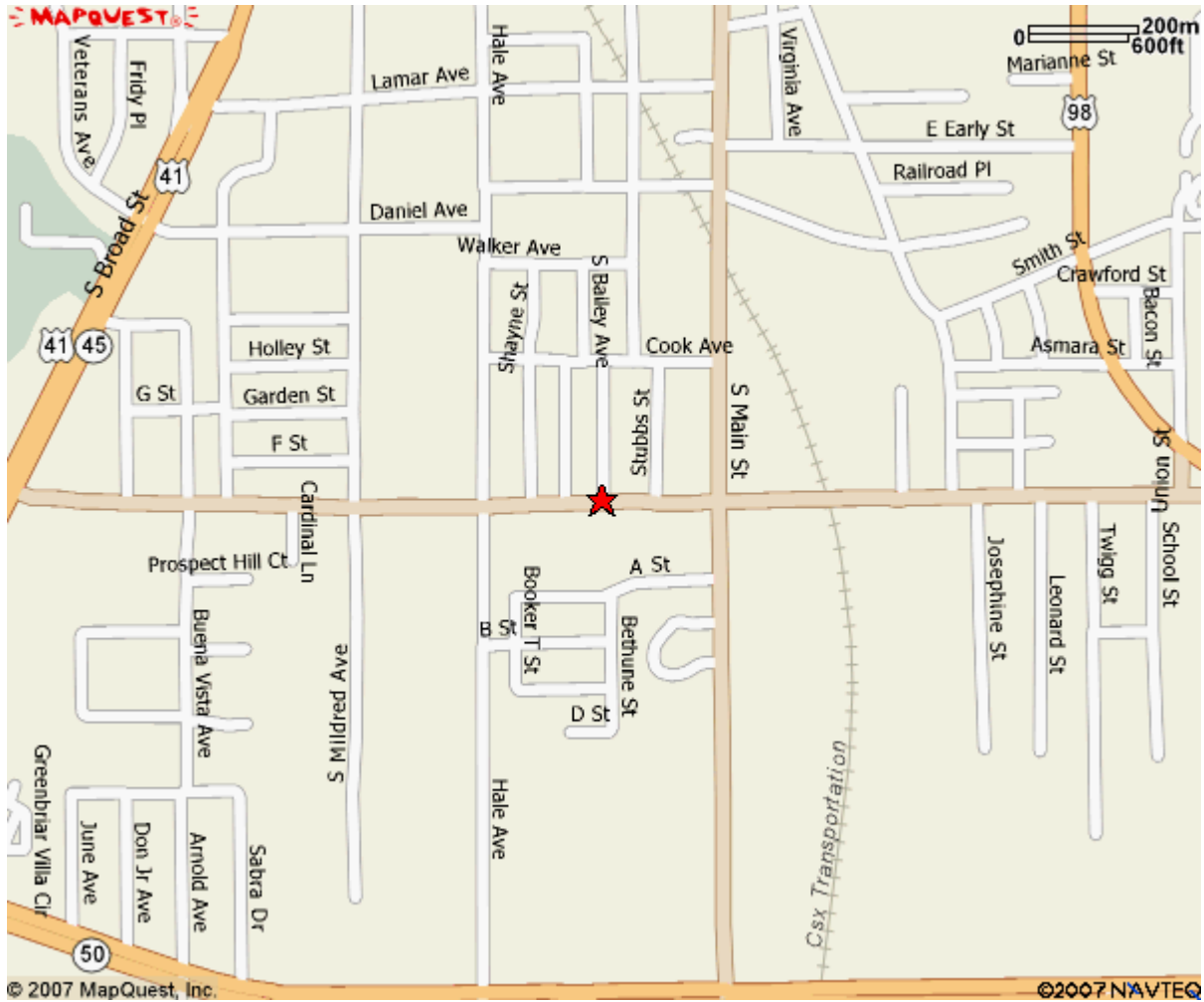
FIGURE 2 AERIAL SITE MAP



0 0.015 0.03 0.06 0.09 0.12 Miles

Reference: ArcView 9.2

FIGURE 3
Street Site Map



Reference: www.mapquest.com

TABLE I

2007 Metal and Pesticide Concentrations - Mitchell Heights collards, grapefruit, mustard greens, orange s, tangerines and turnips

Chemical	Highest Calculated	Highest Calculated		MRL	NOAEL	NOAEL	LOAEL	Tox Profile	Daily Dietary
	Doses* (mg/kg/day)	Doses (mg/day)**		oral mg/kg/day	humans mg/kg/day	animals mg/kg/day	animals	Date	Intake
Aluminum	0.065 (tlv H4)	0.975	4.55	1.0 interm 1.0 chronic				6-Aug	
Barium	0.0018(collards H1)	0.027	0.126	0.6 chronic 0.7 interm				Aug-05	1.3 mg/day typical dietary intake
Boron	0.0099 (collards H1)	0.1485	0.693	0.01 interm				Jul-92	3-5mg/day intake typical; high in fruits
Cadmium	0.00012 (collards H1)	0.0018	0.0084	0.0002 chronic				Jul-99	
Cerium	0.000099 (tlv H4)	0.0000001	0.0069	none					n/a but very low
Chlorothalonil	0.0019 (collards H1)***	N/A	N/A						
Copper	0.010 (tlv H4)	0.15	0.70	0.01acute 0.01 interm				Sep-04	1-10 mg/day 1 mg/day –1yr old 10 mg/day=30- 70yrs
Lead	0.0014 (tlv H4)	0.021	0.098	none	0.005 chronic			Sep-05	0.015-0.1 mg/day typical dietary intake
Manganese	0.0081 (collards H1)	0.122	0.567	none				Sep-00	2-5 mg/day daily intake
Molybdenum	0.00079 (collards H1)	0.012	0.06	none					
Rubidium	0.0025 (collards H1)	0.0375	0.175	none					some fruits and veggies are 0.035 mg/day
Strontium	0.014 (collards H1)	0.210	0.980	2.00 interm				Apr-04	1.8-2mg/day typical intake
Titanium	0.0032 (tlv H4)	0.048	0.224	none					
Thallium	0.0001 (collards H1)	0.0015	0.007			0.2 interm	0.1 acute	Jul-92	

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All units above are in milligram per kilogram per day (mg/kg/day) unless noted

H1 = house #1 H2= House #2 H3 = house #3 H4 = house #4

MRL = minimal risk level LOAEL = lowest observed adverse effect level tlv = turnip leaves

DOA = Dept of Agriculture *Note: Calculated Doses in mg/kg/day are for children and adults

**Note: Calculated doses in mg/day were calculated using the mean daily intake of leafy produce (all ages) Table 9-22 in EPA Factors handbook. The mean vegetable intake per day is 39,000 mg/day for collards and turnip leaves used as a comparison for cerium, lead, moly, rubidium and titanium. All mg/day for these metals were less than 39,000 mg

***Note: RfD (EPA reference dose) for chlorothalonil = 0.015 mg/kg/day

Elements screened for were: lithium, beryllium, boron, sodium, magnesium, aluminum, potassium, calcium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, gallium, germanium, arsenic, selenium, rubidium, strontium, yttrium, zirconium, niobium, molybdenum, ruthenium, rhodium, palladium, silver, cadmium, indium, tin, antimony, tellurium, cesium, barium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, hafium, tantalum, tungsten, rhenium, osmium, iridium, platinum, gold, mercury, thallium, lead, bismuth, thorium, and uranium.

Only the edible portion of the samples were analyzed. All fruits and vegetables were rinsed with metal free water prior to sampling. Oranges, grapefruits and tangerines were peeled and the seeds removed. Leafy vegetables (collards, mustard, and turnip greens) were prepared like they would be for cooking; dead and discolored leaves were removed prior to compositing the sample. The turnip sample consisted of greens with small roots; the roots were removed and analyzed separately from the greens. Approximately 0.5 grams of sample was digested by closed vessel microwave digestion using 5ml of optima grade nitric acid. Samples were diluted to 100ml with metal free water prior to analysis optima grade nitric acid. Samples were diluted to 100ml with metal free water prior to analysis by ICP-MS. All samples were analyzed in duplicate, the highest result from each pair has been reported. All samples were spiked at the 1ug/g level with Be, Cr, Mn, Ni, As, Se, Cd, Sn, Sb, Ba, Hg, Tl, Pb, and U; and at 5ug/g with Fe, Cu, and Zn. All spike recoveries for all samples were acceptable. The blank sample bag provided was acceptable with all elements below limit of quantitation (BLOQ) except a slightly elevated (but insignificant) level of sodium.

APPENDIX B

ATSDR Glossary of Environmental Health Terms

This glossary defines words used by the Agency for Toxic Substances and Disease Registry (ATSDR) in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-422-8737.

Absorption

The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute

Occurring over a short time [compare with chronic].

Acute exposure

Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Additive effect

A biologic response to exposure to multiple substances that equals the sum of responses of all the individual substances added together [compare with antagonistic effect and synergistic effect].

Adverse health effect

A change in body function or cell structure that might lead to disease or health problems

Aerobic

Requiring oxygen [compare with anaerobic].

The Agency for Toxic Substances and Disease Registry (ATSDR)

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances.

Ambient

Surrounding (for example, *ambient* air).

Anaerobic

Requiring the absence of oxygen [compare with aerobic].

Analyte

A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Analytic epidemiologic study

A study that evaluates the association between exposure to hazardous substances and disease by testing scientific hypotheses.

Antagonistic effect

A biologic response to exposure to multiple substances that is **less** than would be expected if the known effects of the individual substances were added together [compare with additive effect and synergistic effect].

Background level

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biodegradation

Decomposition or breakdown of a substance through the action of microorganisms (such as bacteria or fungi) or other natural physical processes (such as sunlight).

Biologic indicators of exposure study

A study that uses (a) biomedical testing or (b) the measurement of a substance [an analyte], its metabolite, or another marker of exposure in human body fluids or tissues to confirm human exposure to a hazardous substance [also see exposure investigation].

Biologic monitoring

Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred. A blood test for lead is an example of biologic monitoring.

Biologic uptake

The transfer of substances from the environment to plants, animals, and humans.

Biota

Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

CAP [see Community Assistance Panel.]

Cancer

Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk

A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen

A substance that causes cancer.

Case study

A medical or epidemiologic evaluation of one person or a small group of people to gather information about specific health conditions and past exposures.

Case-control study

A study that compares exposures of people who have a disease or condition (cases) with people who do not have the disease or condition (controls). Exposures that are more common among the cases may be considered as possible risk factors for the disease.

Central nervous system

The part of the nervous system that consists of the brain and the spinal cord.

CERCLA [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

Chronic

Occurring over a long time [compare with acute].

Chronic exposure

Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Cluster investigation

A review of an unusual number, real or perceived, of health events (for example, reports of cancer) grouped together in time and location. Cluster investigations are designed to confirm case reports; determine whether they represent an unusual disease occurrence; and, if possible, explore possible causes and contributing environmental factors.

Community Assistance Panel (CAP)

A group of people from a community and from health and environmental agencies who work with ATSDR to resolve issues and problems related to hazardous substances in the community. CAP members work with ATSDR to gather and review community health concerns, provide information on how people might have been or might now be exposed to hazardous substances, and inform ATSDR on ways to involve the community in its activities.

Comparison value (CV)

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see exposure pathway].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Concentration

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Delayed health effect

A disease or an injury that happens as a result of exposures that might have occurred in the past.

Dermal

Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact

Contact with (touching) the skin [see route of exposure].

Descriptive epidemiology

The study of the amount and distribution of a disease in a specified population by person, place, and time.

Detection limit

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Dose (for chemicals that are not radioactive)

The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An “exposure dose” is how much of a substance is encountered in the environment. An “absorbed dose” is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Dose (for radioactive chemicals)

The radiation dose is the amount of energy from radiation that is actually absorbed by the body. This is not the same as measurements of the amount of radiation in the environment.

Dose-response relationship

The relationship between the amount of exposure [dose] to a substance and the resulting changes in body function or health (response).

Environmental media

Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

Environmental media and transport mechanism

Environmental media include water, air, soil, and biota (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The environmental media and transport mechanism is the second part of an exposure pathway.

EPA

United States Environmental Protection Agency.

Epidemiologic surveillance [see Public health surveillance].

Epidemiology

The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Exposure

Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure assessment

The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

Exposure-dose reconstruction

A method of estimating the amount of people’s past exposure to hazardous substances. Computer and approximation methods are used when past information is limited, not available, or missing.

Exposure investigation

The collection and analysis of site-specific information and biologic tests (when appropriate) to determine whether people have been exposed to hazardous substances.

Exposure pathway

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has

five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Exposure registry

A system of ongoing follow up of people who have had documented environmental exposures.

Feasibility study

A study by EPA to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well.

Groundwater

Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

Hazard

A source of potential harm from past, current, or future exposures.

Hazardous Substance Release and Health Effects Database (HazDat)

The scientific and administrative database system developed by ATSDR to manage data collection, retrieval, and analysis of site-specific information on hazardous substances, community health concerns, and public health activities.

Hazardous waste

Potentially harmful substances that have been released or discarded into the environment.

Health investigation

The collection and evaluation of information about the health of community residents. This information is used to describe or count the occurrence of a disease, symptom, or clinical measure and to evaluate the possible association between the occurrence and exposure to hazardous substances.

Indeterminate public health hazard

The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

Incidence

The number of new cases of disease in a defined population over a specific time period [contrast with prevalence].

Ingestion

The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].

Inhalation

The act of breathing. A hazardous substance can enter the body this way [see route of exposure].

Intermediate duration exposure

Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].

In vitro

In an artificial environment outside a living organism or body. For example, some toxicity

testing is done on cell cultures or slices of tissue grown in the laboratory, rather than on a living animal [compare with in vivo].

In vivo

Within a living organism or body. For example, some toxicity testing is done on whole animals, such as rats or mice [compare with in vitro].

Lowest-observed-adverse-effect level (LOAEL)

The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.

Medical monitoring

A set of medical tests and physical exams specifically designed to evaluate whether an individual's exposure could negatively affect that person's health.

Metabolism

The conversion or breakdown of a substance from one form to another by a living organism.

Metabolite

Any product of metabolism.

mg/kg

Milligram per kilogram.

mg/cm²

Milligram per square centimeter (of a surface).

mg/m³

Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.

Migration

Moving from one location to another.

Minimal risk level (MRL)

An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)

EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

National Toxicology Program (NTP)

Part of the Department of Health and Human Services. NTP develops and carries out tests to predict whether a chemical will cause harm to humans.

No apparent public health hazard

A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No-observed-adverse-effect level (NOAEL)

The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.

No public health hazard

A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see National Priorities List for Uncontrolled Hazardous Waste Sites]

Plume

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure

The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially responsible party (PRP)

A company, government, or person legally responsible for cleaning up the pollution at a hazardous waste site under Superfund. There may be more than one PRP for a particular site.

ppb

Parts per billion.

ppm

Parts per million.

Public availability session

An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.

Public comment period

An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

Public health action

A list of steps to protect public health.

Public health advisory

A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

Public health assessment (PHA)

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health.

Public health hazard

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.

Public health hazard categories

Public health hazard categories are statements about whether people could be harmed by

conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

Public health statement

The first chapter of an ATSDR toxicological profile. The public health statement is a summary written in words that are easy to understand. The public health statement explains how people might be exposed to a specific substance and describes the known health effects of that substance.

Public health surveillance

The ongoing, systematic collection, analysis, and interpretation of health data. This activity also involves timely dissemination of the data and use for public health programs.

Receptor population

People who could come into contact with hazardous substances [see exposure pathway].

Reference dose (RfD)

An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Remedial investigation

The CERCLA process of determining the type and extent of hazardous material contamination at a site.

RfD [see reference dose]

Risk

The probability that something will cause injury or harm.

Risk reduction

Actions that can decrease the likelihood that individuals, groups, or communities will experience disease or other health conditions.

Risk communication

The exchange of information to increase understanding of health risks.

Route of exposure

The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Safety factor [see uncertainty factor]

SARA [see Superfund Amendments and Reauthorization Act]

Sample

A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size

The number of units chosen from a population or an environment.

Source of contamination

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Special populations

People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics

A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance

A chemical.

Superfund [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)]

Superfund Amendments and Reauthorization Act (SARA)

In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface water

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

Surveillance [see public health surveillance]

Survey

A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people [see prevalence survey].

Synergistic effect

A biologic response to multiple substances where one substance worsens the effect of another substance. The combined effect of the substances acting together is greater than the sum of the effects of the substances acting by themselves [see additive effect and antagonistic effect].

Teratogen

A substance that causes defects in development between conception and birth. A teratogen is a substance that causes a structural or functional birth defect.

Toxic agent

Chemical or physical (for example, radiation, heat, cold, microwaves) agents that, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile

An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology

The study of the harmful effects of substances on humans or animals.

Tumor

An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).

Uncertainty factor

Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a safety factor].

Urgent public health hazard

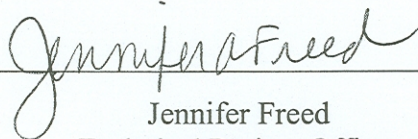
A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

Volatile organic compounds (VOCs)

Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, and methylene chloride.

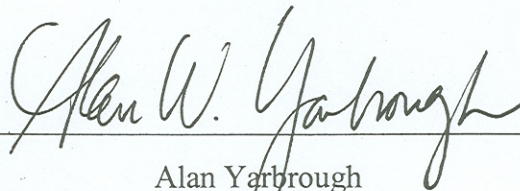
CERTIFICATION

The Florida Department of Health, Bureau of Community 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. The Cooperative Agreement Partner completed editorial review.



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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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