# Health Consultation

Mango Testing

LINCOLN PARK COMPLEX

FT. LAUDERDALE, BROWARD COUNTY, FLORIDA

EPA FACILITY ID: FLN000407550

**Prepared by the**
**Florida Department of Health**

SEPTEMBER 16, 2009

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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Bureau of Environmental Epidemiology
Under a cooperative agreement with the
Agency for Toxic Substances and Disease Registry
Department of Health and Human Services

## Foreword

This health consultation summarizes public health concerns arising from the Lincoln Park Complex in Ft. Lauderdale, Florida. A site evaluation prepared by the Florida Department of Health (DOH) provides the basis for this health consultation. A site evaluation involves a number of steps:

***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 (EPA), 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.

***Please write to**:* Susan Skye / Health Assessment Team
Division of Environmental Health
Florida Department of Health
4052 Bald Cypress Way, Bin # A-08
Tallahassee, FL 32399-1712

***Or call us at**:* (850) 245-4299, or toll-free during business hours: 1-877-798-2772

## Summary and Statement of Issues

The 16.5-acre Lincoln Park Complex (LPC) is in a commercial and light industrial area on the north side of Sistrunk Boulevard between NW 18th Avenue and Interstate 95, in Ft. Lauderdale. This complex includes the former municipal incinerator, the former Lincoln Park School, and the Lincoln Park properties. The Durrs neighborhood is north and east of this site.

Florida DOH first recommended testing of nearby homegrown produce in 2005 (DOH 2005). Florida DOH attempted to test homegrown produce in 2007 and 2008, but none were available.

Florida DOH evaluated off-site, residential soil test results and determined metals (arsenic, barium, and lead) and pesticides would be the most likely to be found in fruit. Florida DOH determined polycyclic aromatic hydrocarbons and dioxins would not likely be found in fruit.

On May 21, 2009, the Florida Department of Agriculture and Consumer Services (DACS) and the Broward County Health Department (CHD) collected twelve mangos from a resident's tree on NW 19th Avenue adjacent to the Lincoln Park Complex site. Also, on May 20, 2009, the Florida Department of Environmental Protection collected two soil samples (0-6" and 6"-2' deep) four feet from the base of this mango tree.

The calculated doses for metals found in mangos are all less than recommended dietary intake levels or US Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels. Therefore, these metals are not likely to cause illness. All tested pesticides were below the laboratory's detection limits and ATSDR Minimal Risk Levels. Therefore, pesticides in the mangos are not likely to cause illness. All tested metals and pesticides in soil near the mango tree were less than ATSDR comparison values and are not likely to cause illness. ATSDR concludes that eating mangos grown near the Lincoln Park Complex is a completed exposure pathway yet is not expected to harm people's health. The reason for this is because the levels of metals and pesticides are below ATSDR comparison values or dietary intake levels. Therefore, there is a no apparent health hazard from eating these mangos.

## Site Description and History

The 16.5-acre Lincoln Park Complex is in a commercial and light industrial area north of Sistrunk Boulevard between NW 18th Avenue and Interstate 95, in Ft. Lauderdale (Broward County), Florida (Figures 1-3). The complex includes the former City of Ft. Lauderdale (City) municipal incinerator and later a waste water treatment plant, the former Lincoln Park School (now the One-stop Shop for City permits), and the Lincoln Park playground. Remediation of the playground and One-stop properties and the fencing of the incinerator propriety prevent exposure to the on-site soil contamination.

From the late 1920s until the mid 1950s, the City operated an incinerator for municipal wastes on the western nine acres of the complex. In 1969, the City built a domestic

wastewater treatment plant on the former incinerator site. This plant operated until the mid-1990s when the City closed and dismantled it. The City used the western part of the former incinerator property as a transfer station for recyclable household trash until the summer of 2004. The eastern part of the incinerator property is a fenced grassy field. Lincoln Park is 2.5 acres on Sistrunk Boulevard across NW 19th Avenue from the incinerator site. The former Lincoln Park Elementary School property is on 5 acres immediately north of the park. Air emissions, residues from the incinerator, and residue from wastewater sludge dewatering vats could all be sources of chemicals measured in soil on and off the site.

At a November 2003 public meeting, the Florida Department of Environmental Protection (DEP) shared the results of environmental testing in the Lincoln Park Complex with nearby residents. Florida DEP found layers of ash in soil deeper than one to two feet. Residents living north of the complex reported finding similar buried debris in their yards. In response, Florida DEP tested 30 surface soil (0-3") and 10 subsurface residential soil samples north of the complex in July 2004.

In December 2004, Florida DEP, Florida DOH, and City staff walked door-to-door to deliver residents' soil testing results and the good gardening practices card (Appendix A). They handed out these guidelines to residents for good gardening practices for those yards with chemical(s) measured above the Florida DEPs soil cleanup target levels, just to be on the safe side, should someone be raising food crops.

In an October 2005 public health assessment report, Florida DOH reviewed all of the 2004 soil and groundwater test data for the Lincoln Park Complex (DOH 2005b). Florida DOH found the site posed "no apparent public health hazard," based on the information available at that time. They also found the health threat from past exposures was "indeterminate." In this public health assessment report, Florida DOH addressed arsenic, copper, dioxins and polycyclic aromatic hydrocarbons (PAHs) in on-site surface soil (0-6"); and arsenic, copper, lead, and PAHs in on-site subsurface soil (3-24"). Florida DOH concluded that recent exposures to surface soil are unlikely to have caused non-cancer illness. They also found "no apparent" increased theoretical cancer risk using the highest levels of all the chemicals measured in surface soil on the site. In addition, in 2005 Florida DOH's PHA included the following recommendations so nearby residents can "be on the safe side" as part of prudent public health practice:

- Residents nearest the site can follow the safe gardening practices (Appendix A).
- Persons who feel ill, especially with persistent symptoms, should see their doctors. They should tell their doctors about any concerns they might have about environmental exposures.

See Appendix B for additional site background information.

**Demographics**

In 2000, about 19,643 persons lived within a 1-mile radius of the site. Approximately 39% were 19 years of age or less. Approximately 88% were black, 8% were white, and less than 3% were Latino/Hispanic. American Indian/Alaska Native, Asian/Pacific

Islander, and all other racial/ethnic groups made up about 1% of the population (US Census Bureau 2000).

**Exposure Pathways**

Chemical contaminants in the environment can be harmful to public health, but only if people come into contact with the contaminants. It is essential to determine or estimate the frequency of contact people could have with hazardous substances in their environment to assess the public health significance of the contaminants.

We examine human exposure pathways to determine whether people can come into contact with contaminants at or from a site. An exposure pathway has five parts:

1. a contaminant source,
2. an environmental medium like groundwater or soil that can hold or move the contamination,
3. a point at which people come into contact with a contaminated medium a like a drinking well water well or garden soil,
4. a completed exposure pathway like drinking contaminated water from a well or eating contaminated soil on homegrown vegetables, and
5. a population that might contact the contaminants.

Ingestion of mangos grown near the Lincoln Park Complex is a complete exposure pathway. We eliminate an exposure pathway from consideration if one or more of these parts is not present and is unlikely ever to be present. Exposure pathways that are not eliminated in this way are either completed or potential pathways. Completed exposure pathways have all five parts present, and exposure to a contaminant has occurred in the past, is occurring in the present, or will occur in the future. Potential exposure pathways have one or more of the five parts missing now, but could be a completed pathway in the future, or could have been a completed pathway in the past.

## Discussion

Florida DOH first recommended testing of nearby homegrown produce in 2005 (DOH 2005b). Florida DOH attempted to test homegrown produce in 2007 and 2008, but no produce was available.

Florida DOH evaluated previous off-site, residential soil test results and determined metals (arsenic, barium, and lead) and pesticides would be the most likely to be found in fruit. Florida DOH determined PAHs and dioxins would not likely be found in fruit.

On May 21, 2009, the Florida Department of Agriculture and Consumer Services (DACS) and the Broward County Health Department (CHD) collected twelve mangos: five green, three partially ripe, and four ripe pieces of fruit. They collected these mangos from a resident's tree on NW 19$^{th}$ Avenue adjacent to the Lincoln Park Complex site. The average weight of the edible portion of the fruit was 76.2 g. Florida DACS shipped the mangos in a cooler at room temperature (23.5º centigrade) to their laboratory in Tallahassee. Florida DACS rinsed the mangos with metal free water and peeled them prior to analysis. Florida DACS only analyzed the edible portion of the fruit.

On May 20, 2009, per the DOH's request, the Florida DEP collected two soil samples (0-6" and 6"-2' deep) four feet from the base of this mango tree.

***Metals and Pesticides Results in Mangos***

The Florida DACS laboratory tested the mangos for 66 metals using inductively coupled plasma (ICP)-mass spectrometry. Most all of the metals were below the laboratory's detection limits. The laboratory only detected six metals: barium, boron, copper, lithium, rubidium, and strontium (Table I).

Dietary intake information is available for five of these metals - barium, boron, copper, rubidium and zinc (National Academies 2009). The calculated doses of these metals were less than or within the referenced daily dietary intake amounts. Therefore, the levels of barium, boron, copper, rubidium, and zinc in the mangos are not likely to cause illness.

In addition, the levels of barium, boron, copper, lithium, rubidium, and strontium were all significantly less than the ATSDR Minimal Risk Levels and Cancer Risk Evaluation Guidelines (Appendix C). This too indicates that none of these metals detected in the fruit are likely to cause illness.

Because the calculated doses for metals found in the mangos are less than recommended dietary intake levels and ATSDR's Minimal Risk Levels, eating them is not likely to cause illness.

The Florida DACS laboratory tested the mangos for 164 pesticides (Table II) using Chemical Residue Method 260. None were detected.

***Soil Testing Results Near the Mango Tree***

Florida DEP tested soils near the mango tree for selected chemicals including semivolatile compounds, organophophorous pesticides, carbamates, herbicides and three metals (arsenic, barium and lead). Test America Labs of Tallahassee found some metals and pesticides in the soils near the mango tree (Table III). The levels, however, were less than ATSDR comparison values for incidental ingestion (swallowing) and thus are not likely to cause illness.

Even though arsenic, barium and lead were found in the surface soils on-site and off-site from 2002-2004 as described in DOH's 2005 public health assessment report, and barium and lead were found at low levels in soils under the mango tree, these three metals were not found in the mangos. The tested pesticides found in the soils under the tree were also not found in the mangos.

## Child Health Considerations

ATSDR and Florida DOH recognize that in communities faced with the contamination of their environment, the unique vulnerabilities of infants and children demand special attention. Children are at a greater risk than adults are for certain kinds of exposures to hazardous substances emitted from waste sites. Because they play outdoors and because they often carry food into contaminated areas, children are more likely to be exposed to

contaminants in the environment. Children are shorter than adults, which mean they breathe dust, soil, and heavy vapors closer to the ground. They are also smaller, resulting in higher doses of chemical exposures per body weight. If toxic exposures occur during critical growth stages, the developing body systems of children can sustain permanent damage. Probably most important, however, is that children depend on adults for risk identification and risk management, housing, and access to medical care. Thus, adults should be aware of public health risks in their community, so they can guide their children accordingly.

Florida DOH found the levels of metals and pesticides in mangos and soil from a residential yard are not of health concern for children.

## Conclusions

ATSDR concludes that eating mangos grown near the Lincoln Park Complex is not expected to harm people's health. The reason for this is because the levels of metals and pesticides are below ATSDR comparison values or dietary intake levels. Therefore, there is a no apparent health hazard from eating these mangos.

## Recommendations

For best public health practice, nearby residents should follow safe gardening practices (Appendix A).

## Public Health Action Plan

Florida DOH will share the results of this mango testing and soil testing by the end of 2009.

## References

DOH 2005a. Department of Health. Health Consultation for the Lincoln Park Complex, Blood Lead Testing. Agency for Toxic Substances and Disease Registry. March 17, 2005.

DOH 2005b. Department of Health. Public Health Assessment for the Lincoln Park Complex. Agency for Toxic Substances and Disease Registry. October 25, 2005.

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Nielsen, F. H. (1996) Other Trace Elements. In: Present Knowledge in Nutrition (Ziegler, E. E. and Filer, L. J. Jr., eds.), 7th ed., pp. 353-377. International Life Sciences Institute Press, Washington, DC. http://jn.nutrition.org/nutinfo/content/trace.shtml. Last viewed July 27, 2009.

EPA 1997. Environmental Protection Agency. Exposure Factors Handbook Volume II – Food Ingestion Factors. Office of Research and Development Washington, D.C. August 1997.

[National Academies 2009] The National Academies. Boron, Chromium, Copper, Manganese, Molybdenum, Silicon and Zinc - Dietary Reference Intakes: Elements http://www.iom.edu/Object.File/Master/7/294/0.pdf. Last viewed July 20, 2009.

2000. U.S. Bureau of the Census. Landview 5 Software on DVD, A Viewer for EPA, Census and USGS Data and Maps. U.S. Department of Commerce.

**FIGURE 1**

**1 MILE RADIUS SURROUNDING LINCOLN PARK COMPLEX AREA**

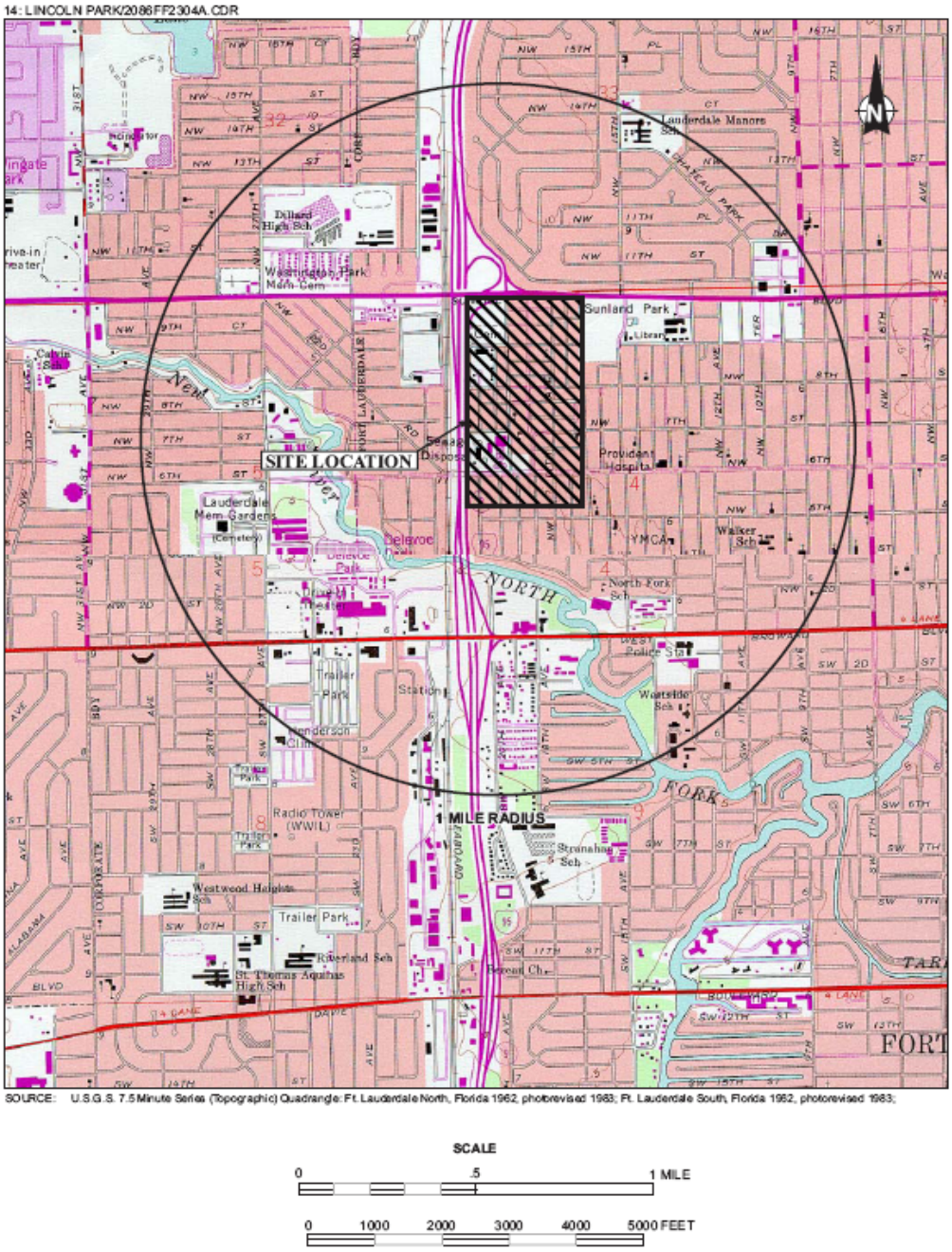



Figure 1 SITE LOCATION MAP – DURRS NEIGHBORHOOD
FT. LAUDERDALE, BROWARD COUNTY, FLORIDA

Reference: E&E April 09 Work plan to DEP

**FIGURE 2**

**LINCOLN PARK COMPLEX AREA**

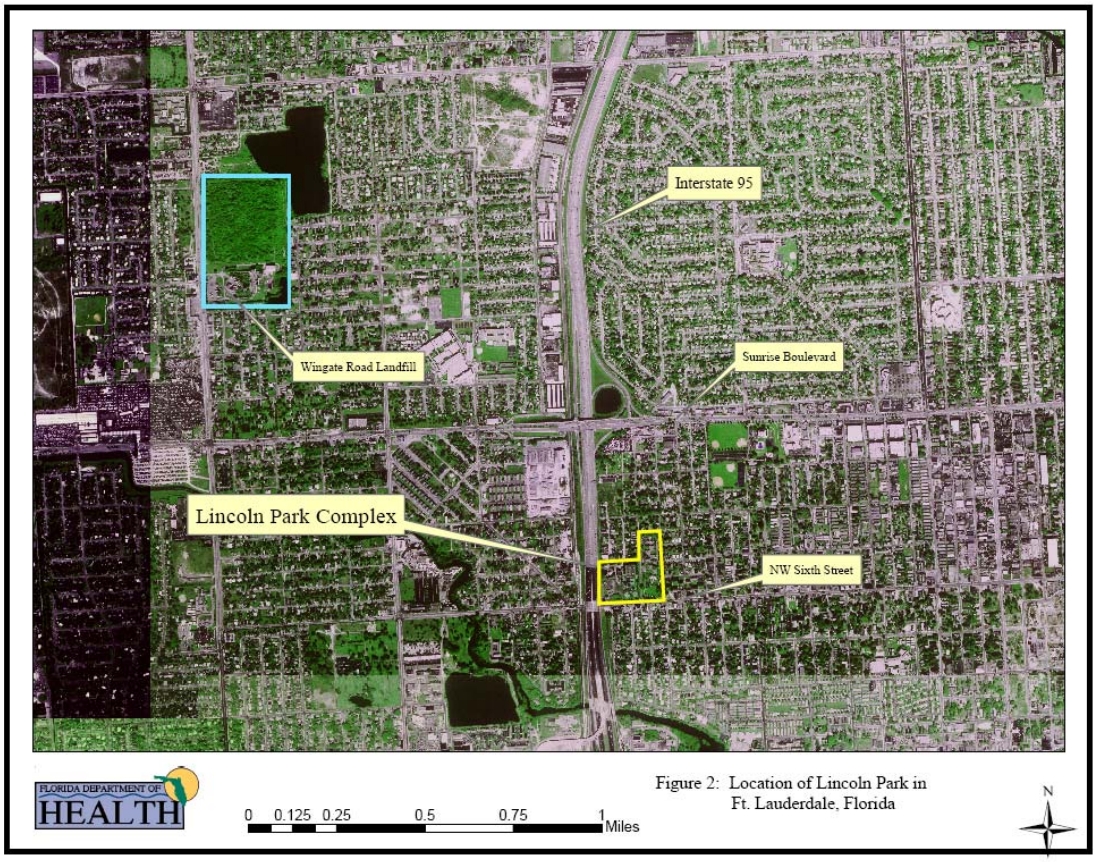
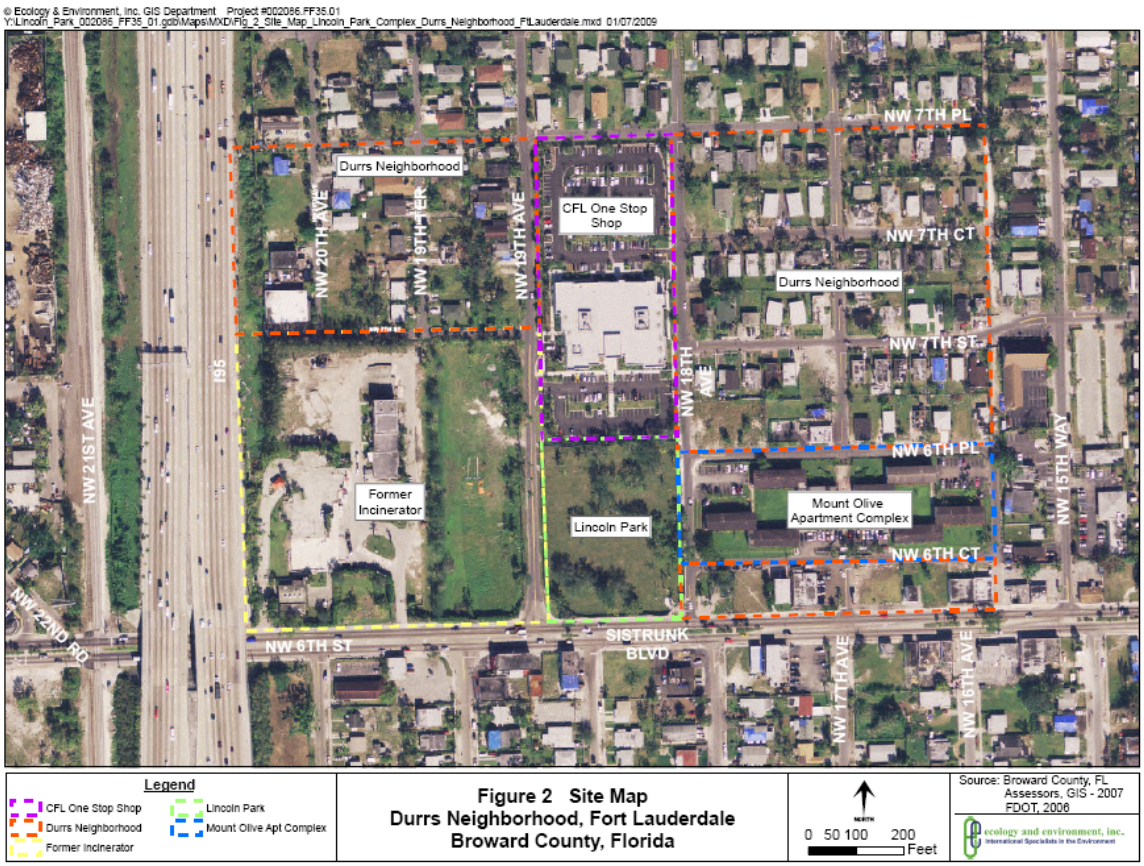



Figure 2: Location of Lincoln Park in Ft. Lauderdale, Florida

Reference: DOH 2005

**FIGURE 3**

**NEIGHBORHOODS SURROUNDING LINCOLN PARK COMPLEX**




Reference: E&E April 09 Work plan to Florida DEP

## TABLE I. MANGO METAL TEST RESULTS

| Element | ug/g |
|---|---|
| Lithium | 0.071 |
| Boron | BLOQ |
| Manganese | BLOQ |
| Copper | 1.1 |
| Rubidium | 1.8 |
| Strontium | 0.94* |
| Barium | 0.19 |

ug/g = micrograms per gram  BLOQ = below limits of quantitaiton

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

Results for the nutrient elements Calcium, Iron, Magnesium, Potassium, Sodium and Zinc were at levels expected for fruit and are not reported.

All results are reported in ug/g. Results less than 0.05 ug/g are not reported; results at less the 3 times the calibration blank are below the detection limit and are not reported; results that are more than 3 time the calibration blank but less than 10 times are reported as “BLOQ”(below limit of quantitation).

The method used was a screening method and reported levels should be considered approximate concentrations.

*Strontium results maybe high due to contamination from gloves used during sample collection Approximately 0.5 grams of sample was digested by closed vessel microwave digestion using 5 ml of 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 average result from each pair has been reported.

All samples were spiked at the 1 ug/g level with Antimony, Arsenic, Barium, Beryllium, Cadmium, Cobalt, Chromium, Manganese, Nickel, Lead, Tin, Selenium, Tin, Uranium, and Vanadium; and at 5ug/g with Copper, Iron, and Zinc. All spike recoveries were acceptable.

Blank sample bag was acceptable with only trace levels of Barium, Sodium, Silicon, Yttrium, and Zinc.

Blank gloves contained low levels of Aluminum, Barium, Calcium, Magnesium, Manganese, Sodium, Lead, Silicon, Zinc, and Zirconium with significant Strontium levels.

# TABLE II. PESTICIDES TESTED IN MANGOS

| |
|---|
| 3-HYDROXYCARBOFURAN |
| ACEPHATE |
| ACETAMIPRID |
| ALDICARB SULFONE |
| ALDICARB SULFOXIDE |
| ALDRIN |
| AMETRYN |
| ATRAZINE |
| AZOXYSTROBIN |
| BENDIOCARB |
| BHC-ALPHA |
| BIFENTHRIN |
| BITERTANOL |
| BOSCALID |
| BUPROFEZIN |
| CAPTAN |
| CARBARYL |
| CARBENDAZIM |
| CARBOFURAN |
| CARFENTRAZONE ETHYL |
| CHLORDANE CIS |
| CHLORDANE TRANS |
| CHLOROTHALONIL |
| CHLORPROPHAM |
| CHLORPYRIFOS |
| CLOMAZONE |
| CLOTHIANIDIN |
| CYFLUTHRIN |
| CYHALOTHRIN TOTAL |
| CYPERMETHRIN |
| CYPRODINIL |
| DCPA |
| DDD-pp |
| DDE-pp |
| DDT-pp |
| DELTAMETHRIN |
| DIAZINON |
| DIAZINON O-ANALOG |
| DICHLOBENIL |
| DICHLORVOS |
| DICOFOL-pp' |
| DIELDRIN |
| DIFENOCONAZOLE |
| DIMETHOATE |
| DIMETHOMORPH |
| DINOTEFURAN |
| DIPHENAMID |
| DIPHENYLAMINE |
| DISULFOTON |
| DISULFOTON SULFONE |
| ENDOSULFAN I |

| |
|---|
| ENDOSULFAN II |
| ENDOSULFAN SULFATE |
| ENDRIN |
| Esfenvalerate+Fenvalerate Total |
| ETHIOFENCARB |
| ETHION |
| ETHOPROP |
| ETRIDIAZOLE |
| FENAMIPHOS |
| FENAMIPHOS SULFONE |
| FENAMIPHOS SULFOXIDE |
| FENBUCONAZOLE |
| FENPROPATHRIN |
| FENPYROXIMATE |
| FENTHION |
| FLUDIOXONIL |
| FLUOXASTROBIN |
| FLURIDONE |
| FOLPET |
| FONOFOS |
| HALOSULFURON METHYL |
| HEPTACHLOR |
| HEPTACHLOR EPOXIDE |
| HEXACHLOROBENZENE |
| HEXACONAZOLE |
| IMAZALIL |
| IMIDACLOPRID |
| INDOXACARB |
| IPRODIONE |
| LINDANE |
| LINURON |
| MALATHION |
| MALATHION O-ANALOG |
| METALAXYL |
| METHAMIDOPHOS |
| METHIDATHION |
| METHIOCARB |
| METHOMYL |
| METHOXYCHLOR total |
| METHOXYFENOZIDE |
| METOLACHLOR |
| MEVINPHOS E/Z |
| MONOCROTOPHOS |
| MPCPS |
| MYCLOBUTANIL |
| NALED (based on dichlorvos) |
| NAPROPAMIDE |
| NORFLURAZON |
| NORFLURAZON DESMETHYL |
| NOVALURON |
| OMETHOATE |

| |
|---|
| ORYZALIN |
| OXAMYL |
| OXAMYL OXIME |
| OXYDEMETON METHYL |
| OXYDEMETON METHYL SULFONE |
| OXYFLUORFEN |
| PARATHION METHYL |
| PEBULATE |
| PENDIMETHALIN |
| PENTACHLOROANILINE |
| PENTACHLOROBENZENE |
| PENTACHLORONITROBENZENE |
| PERMETHRIN TOTAL |
| PHENOTHRIN |
| PHORATE |
| PHORATE SULFONE |
| PHORATE SULFOXIDE |
| PHOSALONE |
| PHOSPHAMIDON |
| PIRIMICARB |
| PIRIMIPHOS METHYL |
| PRALLETHRIN |
| PROCHLORAZ |
| PROCYMIDONE |
| PROFENOFOS |
| PRONAMIDE |
| PROPAMOCARB HCL |
| PROPETAMPHOS |
| PROPICONAZOLE |
| PYMETROZINE |
| PYRACLOSTROBIN |
| PYRIDABEN |
| PYRIMETHANIL |
| PYRIPROXYFEN |
| QUINOXYFEN |
| RESMETHRIN |
| SPINOSAD A |
| SPINOSAD D |
| SPIRODICLOFEN |
| SPIROMESIFEN |
| TEBUCONAZOLE |
| TEBUFENOZIDE |
| TECNAZENE |
| TERBACIL |
| TERBUFOS |
| TETRADIFON |
| TETRAMETHRIN |
| THIABENDAZOLE |
| THIACLOPRID |
| THIAMETHOXAM |

| |
|---|
| THIOPHANATE ME (based on carbendazim) |
| TRIADIMEFON |
| TRIADIMENOL |
| TRIALLATE |
| TRIFLOXYSTROBIN |
| TRIFLUMIZOLE |
| TRIFLURALIN |
| TRITICONAZOLE |
| VERNOLATE |
| VINCLOZOLIN |

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Note: all pesticides were below the laboratory's detection limits

## TABLE III. SOIL SAMPLE RESULTS (ug/kg)

| Chemicals | Soil Sample #1 | Soil Sample #2 | Chronic EMEG Child | Chronic EMEG Adult | CREG | Interm EMEG Child | Interm EMEG Adult | RMEG Child | RMEG Adult | Acute EMEG Pica Child | Interm EMEG Pica Child |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Acenaphthene** | 0.005 | ND | None | None | None | 30,000 | 400,000 | 3,000 | 40,000 | None | 1,000 |
| **Acenaphthylene** | 0.0034 | ND | None | None | None | None | None | None | None | None | None |
| **Anthracene** | 0.0094 | 0.002 | None | None | None | 500,000 | 1,000,000 | 20,000 | 200,000 | None | 20,000 |
| **Benzo[a]anthracene** | 0.06 | 0.012 | None | None | None | None | None | None | None | None | None |
| **Benzo[a]pyrene** | 0.069 | 0.013 | None | None | 0.01 | None | None | None | None | None | None |
| **Benzo[b]fluoranthene** | 0.100 | 0.022 | None | None | None | None | None | None | None | None | None |
| **Benzo[g,h,i]perylene** | 0.056 | 0.010 | None | None | None | None | None | None | None | None | None |
| **Benzo[k]fluoranthene** | 0.038 | 0.008 | None | None | None | None | None | None | None | None | None |
| **Chrysene** | 0.074 | 0.014 | None | None | None | None | None | None | None | None | None |
| **Dibenz(a,h)anthracene** | 0.019 | 0.002 | None | None | None | None | None | None | None | None | None |
| **Fluoranthene** | 0.120 | 0.020 | None | None | None | 20,000 | 300,000 | 2,000 | 30,000 | None | 800 |
| **Fluorene** | 0.003 | ND | None | None | None | 20,000 | 300,000 | 2,000 | 30,000 | None | 800 |
| **Heptachlor** | 0.0003 | 0.0005 | None | None | 0.2 | 5 | 70 | 30 | 400 | 1 | 0.2 |
| **Heptachlor epoxide** | ND | 0.0006 | None | None | 0.08 | None | None | 0.7 | 9 | None | None |
| **Indeno[1,2,3-cd]pyrene** | 0.046 | 0.009 | None | None | None | None | None | None | None | None | None |
| **1-Methylnaphthalene** | 0.001 | ND | 4,000 | 50,000 | None | None | None | None | None | None | None |
| **2-Methylnaphthalene** | 0.002 | ND | 2,000 | 30,000 | None | None | None | 200 | 3,000 | None | None |
| **Phenanthrene** | 0.054 | 0.008 | None | None | None | None | None | None | None | None | None |
| **Pyrene** | 0.098 | 0.020 | None | None | None | None | None | 2,000 | 20,000 | None | None |
| **Chlordane (cis+trans)** | .014 | 0.006 | 30 | 400 | 2 | 30 | 400 | 30 | 400 | 2 | 1 |
| **p.p'-DDD** | 0.001 | 0.0004 | None | None | 3 | None | None | None | None | None | None |
| **p.p'-DDE** | 0.023 | 0.007 | None | None | 2 | None | None | None | None | None | None |
| **p.p'-DDT** | 0.029 | 0.011 | None | None | 2 | 30 | 400 | 30 | 400 | 1 | 1 |
| **Barium** | 0.021 | 0.010 | 10,000 | 100,000 | None | 10,000 | 100,000 | 10,000 | 100,000 | None | 400 |
| **Lead** | 0.063 | 0.030 | None | None | None | None | None | None | None | None | 400 ppm is EPAs screening level for lead in residential soil at CERCLA & RCRA sites (OSWER Directive #9355.4-12). Also TSCA established a soil lead hazard of 400 ppm lead (see 40 CFR Part 745, 2001). |

Soil Sample #1 = 0-6" below surface, #2 = 6"- 2' below surface ND= not detected ug/kg = micrograms per kilogram

Interm. = intermediate

CREG = Cancer Risk Evaluation Guide

EMEG = Environmental Media Evaluation Guide

RMEG = Reference Dose Media Evaluation Guide

Note: other chemicals were tested in soils however this table shows those chemicals TestAmerica Laboratories detected

**APPENDIX A**

**SAFE GARDENING TIPS**

**APPENDIX B**
**ADDITIONAL SITE BACKGROUND INFORMATION**

In 2005, the City secured grant funding for additional off-site soil testing. In February and March 2006, the City tested 25 more surface and subsurface soil samples in the surrounding Durrs neighborhood. In June 2006, the Florida DEP asked the Florida DOH to evaluate these soil test results. In October 2006, the Lincoln Park property was reopened to the public after excavation of contaminated soils and relocating the soils to the center of the Lincoln Pack property; installation of a plastic liner; backfilling with clean soil; and confirmation sampling.

In 2007, Florida DOH reviewed 2004 and 2006 soil test results from residential properties in the Durrs Neighborhood. The Florida DOH concluded, based on limited available data, the public health hazard associated with surface soil contamination at the residential properties was "No Apparent Public Health Hazard." Florida DOH also concluded that some offsite surface and subsurface soils in non-residential areas (rights-of way) would be a "public health hazard" if people had daily long-term exposures. Florida DOH recommended the collection of additional surface and subsurface soils from the residential areas north and east of the Lincoln Park Complex (DOH 2007).

In May 2007, the City found metals, PAHs, dioxins, and furans in off-site soils. Based upon these results and visual observations, it appears that contamination from former incinerator activities has impacted the offsite soil in the vicinity of the former incinerator (E&E 2009).

Between May 27 and June 19, 2008, the City removed 2,713 tons of impacted soils along street right-of-ways north of the site. They removed soil from the western side of NW 19th Avenue between 6th and 7th Streets and the northern and southern side of NW 7th Street between 19th and 29th Avenue (Figure 4). In September 2008, the City also removed incinerator debris from a residential property at 701 NW 19th Terrace (E&E 2009).

## APPENDIX C

## DOSE CALCULATIONS FOR METALS IN MANGOS

$$\frac{(\text{X } \mu\text{g/g metal in vegetable})\ (\text{consumption intake rate } \frac{\text{grams vegetable}}{\text{kg bw per day}})\ (\text{bw in kg})}{\text{bw in kg}} = \text{dose in } \mu\text{g/kg/day}$$

Then convert to mg/kg/day and compare final dose with ATSDR MRL to see if above or below the guidelines.

Example:

1.1 µg/g of copper is detected in mangos
The Average Consumption Rate for mangos is 0.0006 grams of mangos per kg bw per day*
Avg kg bw for an adult is 70 kg; for a child is 15 kg

$$\frac{(1.1\ \mu\text{g/g copper in mangos})(0.0006\ \text{g mangos/kg bw/day})(70\ \text{kg bw})}{70\ \text{kg}} = 0.00066\ \mu\text{g/kg/day} = 6.6 \times 10^{-7}\ \text{mg/kg/day}$$

The ATSDR comparison value (MRL) for oral ingestion of copper (Cu) for acute and intermediate exposure = 0.01 mg copper/kg/day
Therefore, since the calculated dose of copper in the mangos ($6.6 \times 10^{-7}$ mg/kg/day) is 17,000 times less than the MRL of 0.01 mg copper/kg/day, the amount of copper detected in the mangos is not likely to cause illness from oral ingestion.

Note: µg/g = mg/kg
MRL = minimal detection limit
bw = body weight
mg = milligrams
µg = micrograms

*Reference: EPA 1997

## 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.

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CAT, CAPEB, DHAC

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

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CAT, CAPEB, DHAC, ATSDR