# Health Consultation

MIAMI CIVIC CENTER PROPERTY

MIAMI, MIAMI-DADE COUNTY, FLORIDA

NOVEMBER 8, 2001

**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

## MIAMI CIVIC CENTER PROPERTY

## MIAMI, MIAMI-DADE COUNTY, FLORIDA

Prepared by:

Florida Department of Health
Bureau of Environmental Epidemiology
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

## Background and Statement of Issues

In March 2000, the Miami-Dade County Department of Environmental Resources Management (DERM) asked the Florida Department of Health (DOH) if heavy metals in the soil and non-native ash at the Miami Civic Center property are hazardous to human health. The Florida DOH, through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia, evaluates the public health significance of hazardous waste sites in Florida. This is the first review of the Miami Civic Center property by either the Florida DOH or the ATSDR.

The Miami Civic Center property is an approximately 3 acre parcel of undeveloped land located at 1700 N.W. 14 Avenue in Miami, Miami-Dade County, Florida (Figure 1). The property contained residences in the 1930s and supported a plant nursery on the northwest portion from approximately 1949 until the mid-1980s. By 1986, the residences and nursery had been cleared from the property. The property has been undeveloped land for the last sixteen years. The property is currently surrounded by a small residential housing community to the southeast, a high-rise residential building to the north, a canal to the northeast, and major roads to the south, east and west.

In 1989 and 1990, an environmental assessment found debris (glass, charcoal, metal, concrete) on the property. This assessment found elevated concentrations of lead and cadmium in the subsurface soil. Subsequent environmental assessment in 1998 and 1999 found elevated concentrations of total lead, arsenic and barium in a non-native layer of ash. This ash was approximately 1.0 to 4.5 feet below land surface on the eastern portion of the property. According to the Florida Department of Environmental Protection (DEP), this non-native ash may be from an incinerator previously located a few blocks away.

Because previous investigations collected soil samples in the subsurface, the Florida DOH requested additional surface soil ($\leq$ 3 inches) tests to more accurately estimate potential exposures. People do not frequently come into contact with soil deeper than three inches. This health consultation is limited to a review of the August 23, 2001 soil sampling and analyses conducted by the DERM.

On August 23, 2001, the DERM collected surface soil ($\leq$ 3 inches) samples from eight (8) locations on the eastern portion of the property (Figure 2). These samples were primarily between the small residential housing community to the south and the high-rise residential building to the north, west of N.W. 14 Avenue. The DERM collected the samples along a non-random, walking transect that extended north along the east side of the small residential housing community, west along the north side of the housing community, north toward the high-rise apartment building, then southeast along the canal. The DERM collected these surface soil samples approximately three to four feet from the fences surrounding the residential properties, in areas where children had been documented playing.

According to the DERM, the property consists of an open field with rolling topography, tall grass and few trees. Access is limited by chain-link fence, but is not completely restricted On the day of the sample collection, the DERM observed a worn vehicle path on the property and bare patches

of soil containing metal and small glass fragments, as well as residential-type refuse. The DERM also observed domestic chickens and banana trees on residential property to the south along N.W. 14 Avenue. The DERM used Quality Assurance procedures to prevent cross-contamination of the samples. The DERM laboratory analyzed the samples on August 28, 2001, for arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver and zinc.

The Florida DOH calculated ingestion exposure rates for children (the most sensitive population) assuming a "worst-case" scenario of 3 hour exposures per day, 365 days per year, for 30 years. Generally, an exposure rate (also called a daily dose) is given in milligrams of chemical per kilogram of body weight per day (mg/kg/day). A milligram is one-thousandth of a gram (a raisin or paperclip weighs about one gram). A kilogram is about two pounds. The Florida DOH assumed that children accidentally ingest 200 milligrams of soil per day, as they are more likely than adults to put their hands and other objects into their mouth on a frequent basis.

Currently the property is covered by a thick layer of grass and weeds, and there is little or no dust being generated. In the event that site conditions change in the future, where vegetation is removed, soil is disturbed and contaminated soil becomes airborne as dust, the Florida DOH calculated possible future air contaminant concentrations (Risk*Assistant, 1996).

## Discussion

The DOH compared the soil/metal analytical results with health-based screening values. The screening values or comparison values serve to narrow the focus of the health consultation to those contaminants most important to public health. Screening values are very conservative numbers, but do not necessarily mean that contamination in excess of these values will cause illness.

Analytical Results for Barium, Chromium, Mercury, Nickel, Silver and Zinc

The concentrations of barium, chromium, mercury, nickel and zinc in surface soil at the Miami Civic Center property were all below the ATSDR's health-based screening values and thus are unlikely to cause any illness. Silver was not detected in any of the surface soil samples and is therefore also unlikely to cause illness.

Analytical Results for Arsenic, Cadmium, Copper and Lead

The following table shows the screening values and maximum surface soil contamination concentrations:

| Screening Values and Maximum Contaminant Concentrations for Surface Soils (≤ 3 inches) in milligrams per kilogram (mg/kg) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Arsenic | | Cadmium | | Copper | | Lead | |
| *Screening Value † Adult: 200 Child: 20* | *Max. Cont. Conc. 40* | *Screening Value † Adult: 100 Child: 10* | *Max. Cont. Conc. 20* | *Screening Value ‡ Adult: 110 Child: 110* | *Max. Cont. Conc. 938* | *Screening Value § Adult: 400 Child: 400* | *Max. Cont. Conc. 3,671* |

† - Environmental Media Evaluation Guide - ATSDR comparison value for daily exposures to arsenic and cadmium for longer than one year (ATSDR, 2001).

‡ - DEP Soil Cleanup Target Level for copper is calculated for direct contact including ingestion of contaminated soil, dermal contact with the soil and inhalation of chemicals that might volatilize or adhere to dust. The combined impact of exposure to all three routes simultaneously is used to calculate the SCTL (DEP, 1999).

§ - DEP Soil Cleanup Target Level for lead is based on EPA's Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (#9355.4-12, 1994). This value was calculated with the EPA's Integrated Exposure Uptake Biokinetic Model which takes into account children's likely exposure from more than one source. Research indicates that young children are particularly sensitive to the effects of lead and require specific attention in the development of a SCTL for lead. "Thus, a SCTL that is protective for young children is expected to be protective for older persons as well" (DEP, 1999).

Arsenic

The arsenic concentrations in surface soil (≤ 3 inches) at four of the eight sample locations were above the ATSDR's Environmental Media Evaluation Guide (EMEG) screening value for children. Children playing in the surface soil at the Miami Civic Center property may have accidentally eaten small amounts of arsenic-contaminated surface soil. To estimate children's potential daily exposure rates, the Florida DOH assumed exposure to the maximum arsenic surface soil concentration the DERM reported, 39.53 mg/kg.

The Florida DOH calculated a dose and compared it to doses of arsenic known to cause illness in people. The Florida DOH found that accidentally ingesting arsenic-contaminated surface soil would not cause any non-cancer illness in children. The Florida DOH found that accidentally ingesting arsenic-contaminated surface soil would result in a "no apparent" to low increased risk of skin cancer for adults (ATSDR, 2000).

In the future, if the vegetative cover at the property is removed, soil is disturbed, and arsenic-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may increase the risk of stillbirths and cause a moderate to high increased risk of lung cancer.

Cadmium

The cadmium concentrations in surface soil (≤3 inches) at four of the eight sample locations were above the ATSDR's Environmental Media Evaluation Guide (EMEG) screening value for children. Children playing in the surface soil at the Miami Civic Center property may have accidentally eaten small amounts of cadmium-contaminated surface soil. To estimate children's potential daily exposure rates, the Florida DOH assumed exposure to the maximum cadmium surface soil concentration the DERM reported, 20.3 mg/kg.

The Florida DOH calculated a dose and compared it to doses of cadmium known to cause illness in people. The Florida DOH found that accidentally ingesting cadmium-contaminated surface soil (≤3 inches) would not cause any non-cancer illness. There is insufficient evidence to determine whether or not cadmium is a human carcinogen by the oral route of exposure (ATSDR, 1999).

In the future, if the vegetative cover at the property is removed, soil is disturbed, and cadmium-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may cause a moderate to high increased risk of lung or prostate cancer.

Copper

The copper concentrations in surface soil (≤3 inches) at all eight sample locations were above the Florida Department of Environmental Protection's (DEP) Soil Cleanup Target Level (SCTL) for residential properties, acute exposure levels. Children playing in the surface soil at the Miami Civic Center property may have accidentally eaten small amounts of copper-contaminated surface soil. To estimate children's potential daily exposure rates, the Florida DOH assumed exposure to the maximum copper surface soil concentration the DERM reported, 938 mg/kg.

The Florida DOH calculated a dose and compared it to doses of copper known to cause illness in people. The Florida DOH found that accidentally ingesting copper-contaminated surface soil would not cause any non-cancer illness. There is insufficient evidence to determine whether or not copper is a human carcinogen by the oral or inhalation routes of exposure (ATSDR, 1990).

Lead

The lead concentrations in surface soil (≤3 inches) at all eight sample locations were above the Florida Department of Environmental Protection's (DEP) Soil Cleanup Target Level (SCTL) for residential properties, acute exposure levels. Children playing in the surface soil at the Miami Civic Center property may have accidentally eaten small amounts of lead-contaminated surface soil. To estimate children's potential daily exposure rates, the Florida DOH assumed exposure to the maximum lead surface soil concentration the DERM reported, 3,671 mg/kg.

The Florida DOH calculated a dose and compared it to doses of lead known to cause illness in people. The Florida DOH found that accidentally ingesting lead-contaminated surface soil could cause a decrease in aminolevulinic acid dehydratase (ALAD) activity in humans. The enzyme ALAD

is important to the production of hemoglobin in red blood cells. There is insufficient evidence to determine whether or not lead is a human carcinogen by the oral route of exposure (ATSDR, 1999).

In the future, if the vegetative cover at the property is removed, soil is disturbed, and lead-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may significantly decrease ALAD activity in humans. It is unclear if a decrease in ALAD activity is directly related to illness (Environmental Health Perspectives, 1998, 2001).

Additional Data Needs

Because testing of this property found elevated concentrations of arsenic, cadmium and lead, the Florida DOH recommends additional sampling to delineate the extent of contamination of surface soil. Additional analyses of surface soil from the Miami Civic Center property should include other contaminants known to be associated with incinerator ash waste, especially dibenzodioxins and dibenzofurans. The Florida DOH suggests that 8 to 10 more surface soil (≤3 inches) samples be tested to delineate the extent of contamination.

Children's Health Section

The ATSDR and the Florida DOH, through the ATSDR's Child Health Initiative, 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 are adults for certain kinds of exposure to hazardous substances emitted from waste sites. Because they play outdoors and because they often carry food into contaminated areas, children are more likely to be exposed to contaminants in the environment. Children are shorter than adults, which means they breathe dust, soil, and heavy vapors close to the ground. They are also smaller, resulting in higher doses of chemical exposure per body weight. If toxic exposures occur during critical growth stages, the developing body systems of children can sustain permanent damage. Probably most important, however, is that children depend on adults for risk identification and risk management, housing, and access to medical care. Thus, adults should be aware of public health risks in their community, so they can accordingly guide their children.

The Florida DOH compared the average blood lead level for children living in the immediate vicinity of the Miami Civic Center property to the average blood lead levels for all children in Miami-Dade County. This "target neighborhood" was defined as an area between N.W. 12 Avenue and N.W. 17 Avenue and N.W. 14 Street and N.W. 20 Street. In 2000, seventeen children living in this neighborhood had an average blood lead level of 3.05 micrograms per deciliter (ug/dL), compared to an average of 4.34 ug/dL for all children in Miami-Dade County. In 2001, twenty-seven children living in this neighborhood had an average blood lead level of 2.19 ug/dL, compared to an average of 3.62 ug/dL for all children in Miami-Dade County. Based on these results, children living in the vicinity of the Miami Civic Center property do not have an above-average level of lead in their blood.

Additionally, the Florida DOH used an ATSDR model to predict blood lead levels in children based on multiple potential lead exposures. This model predicts that blood lead levels of children continuously exposed to lead in the surface soil at the Miami Civic Center property are not likely to exceed the action level of 10 ug/dL (ATSDR, 1999, Appendix D).

Sensitive Populations

Sensitive populations exhibit a different or enhanced response to contaminants than most persons exposed to the same level of a contaminant in their environment. Reasons may include genetic makeup, age, health and nutritional status, and exposure to other toxic substances. Children were used to calculate exposure rates for this health consultation because they are smaller, are more likely to ingest larger amounts of soil, are more susceptible to contaminants in the environment and were documented as users of the property being assessed.

## Conclusions

The Miami Civic Center property is an "Indeterminate Public Health Hazard". The Florida DOH cannot rule out possible exposure to elevated concentrations of incinerator wastes other than heavy metals. The extent of contamination of surface soil at the property has not been adequately characterized. Future testing of surface soil at the Miami Civic Center property should include not only more surface soil samples to delineate the extent of contamination, but also additional analytical contaminants associated with incinerator ash such as dibenzodioxins and dibenzofurans.

The concentrations of barium, chromium, iron, mercury, nickel, silver and zinc in the Miami Civic Center property surface soil (≤3 inches) were all below health-based screening values and thus are unlikely to cause any illness.

Ingesting arsenic-contaminated surface soil is unlikely to cause any non-cancer illness in children. Ingesting arsenic-contaminated surface soil would result in a "no apparent" to low increased risk of cancer for adults. If arsenic-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may cause a moderate to high increased risk of lung cancer.

Ingesting cadmium-contaminated surface soil is unlikely to cause any non-cancer illness in children. There is insufficient evidence to determine whether or not cadmium is a human carcinogen by the oral route of exposure. If cadmium-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may cause a moderate to high increased risk of lung and/or prostate cancer.

Ingesting copper-contaminated surface soil or inhaling copper-contaminated dust are unlikely to cause any non-cancer illness in children. There is insufficient evidence to determine whether or not copper is a human carcinogen by the oral or inhalation routes of exposure.

Ingesting lead-contaminated surface soil has the potential to decrease ALAD enzyme activity. If lead-contaminated soil becomes airborne as dust, long term (30 year) inhalation of the contaminated dust from this property may cause a decrease in ALAD activity. It is unclear if this decrease in ALAD activity is directly related to illness. There is insufficient evidence to determine whether or not lead is a human carcinogen by the oral and inhalation routes of exposure.

Children living in the vicinity of the Miami Civic Center property do not have an above-average level of lead in their blood when compared to children living in Miami-Dade County. Also, an ATSDR model predicts that children continuously exposed to concentrations of lead in surface soil at the Miami Civic Center property are not likely to have blood lead levels in excess of 10 ug/dL.

## Recommendations

Collect and analyze 8 to 10 additional surface soil (≤ 3 inches) samples to further characterize the extent of incinerator ash contamination at the target property. Analyze samples for arsenic, barium, cadmium, chromium, lead, mercury, dibenzodioxins (PCDD) and dibenzofurans (PCDF).

Ensure restricted access to the Miami Civic Center property by unauthorized personnel.

Suppress dust formation and monitor the air for arsenic, cadmium and lead during any activity that removes the vegetative cover or disturbs the soil.

## Public Health Action Plan

The Florida DOH will continue to assist the Miami-Dade County DERM and the Miami-Dade County Health Department by reviewing additional environmental data as it becomes available.

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## References

ATSDR, 1992. Public Health Assessment Guidance Manual (March). Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services, Atlanta, GA.

ATSDR.1998. Guidance on Including Child Health Issues in Division of Health Assessment and Consultation Documents. Agency for Toxic Substances and Disease Registry, Atlanta, GA. July 2, 1998.

ATSDR, 2000. Draft Toxicological Profile for Arsenic (Update). Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services.

ATSDR, 1999. Draft Toxicological Profile for Cadmium (Update). Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services.

ATSDR, 1990. Draft Toxicological Profile for Copper. Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services.

ATSDR, 1999. Draft Toxicological Profile for Lead (Update). "A Framework to Guide Public Health Assessment Decisions at Lead Sites"; Appendix D. Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services.

ATSDR, 1999. Draft Toxicological Profile for Lead (Update). Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services.

Risk*Assistant for Windows, Software Version 1.1, Hampshire Research Institute, 1996.

Environmental Protection Agency, 1997. U.S. Environmental Protection Agency. Exposure Factors Handbook, Volumes I, II, and III. EPA/600/P-95/002F a, b, c.

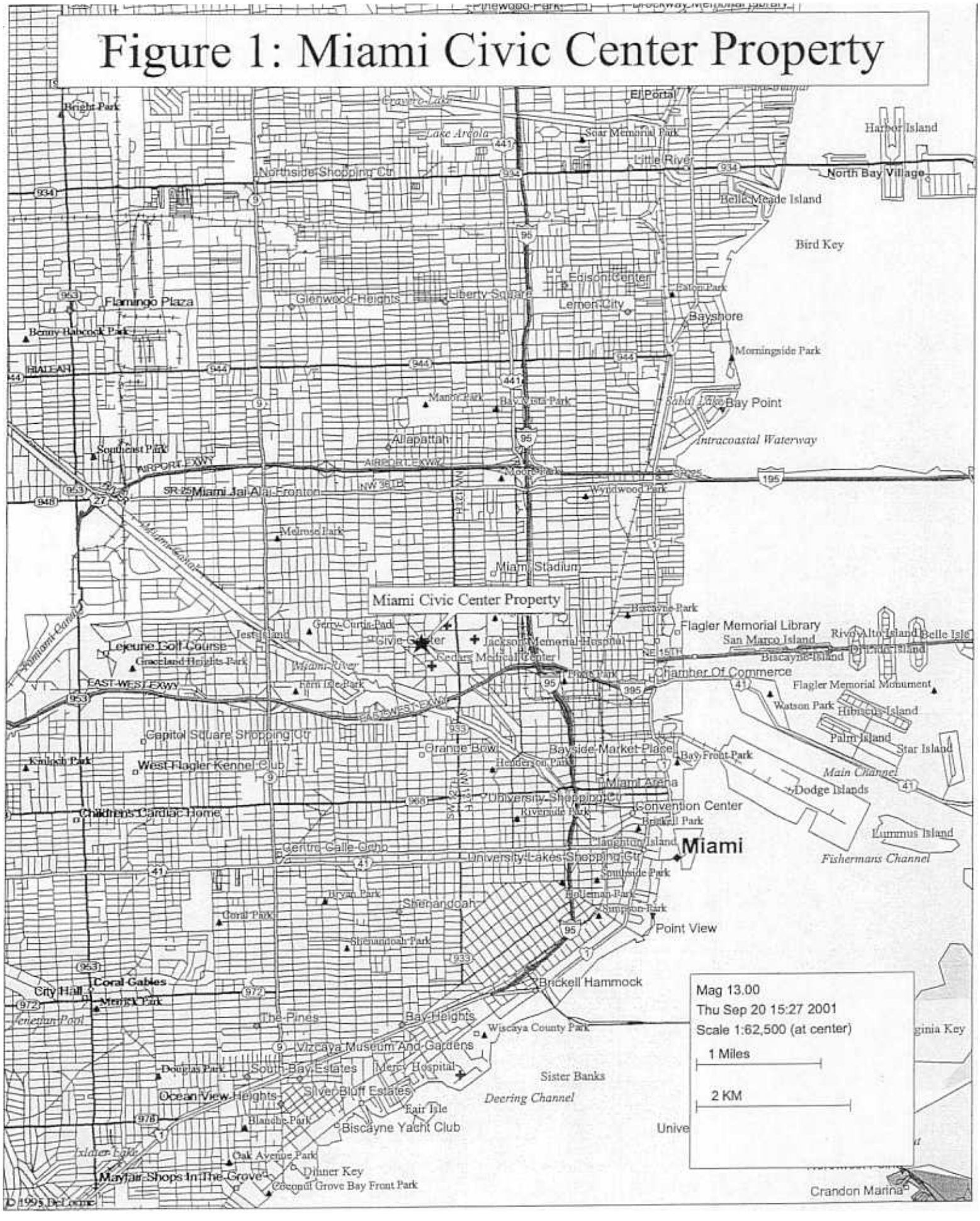
Florida Department of Environmental Protection, 1999. Development of Soil Target Cleanup Levels, for Chapter 62-777, F.A.C. Prepared for the Division of Waste Management, Florida DEP.

Florida Department of Health, Childhood Lead Poisoning Prevention Program, 2000-2001.

Chen, et al, 1999. "Background Concentrations of Trace Metals in Florida Surface Soils: Taxonomic and Geographic Distributions of Total-total and Total-recoverable Concentrations of Selected Trace Metals".

Environmental Health Perspectives: Volume 106, Number 4, April 1998, Alexander, Bruce H. et al; Volume 109, Number 8, August 2001, Hu, Howard et al.

# Figure 1: Miami Civic Center Property



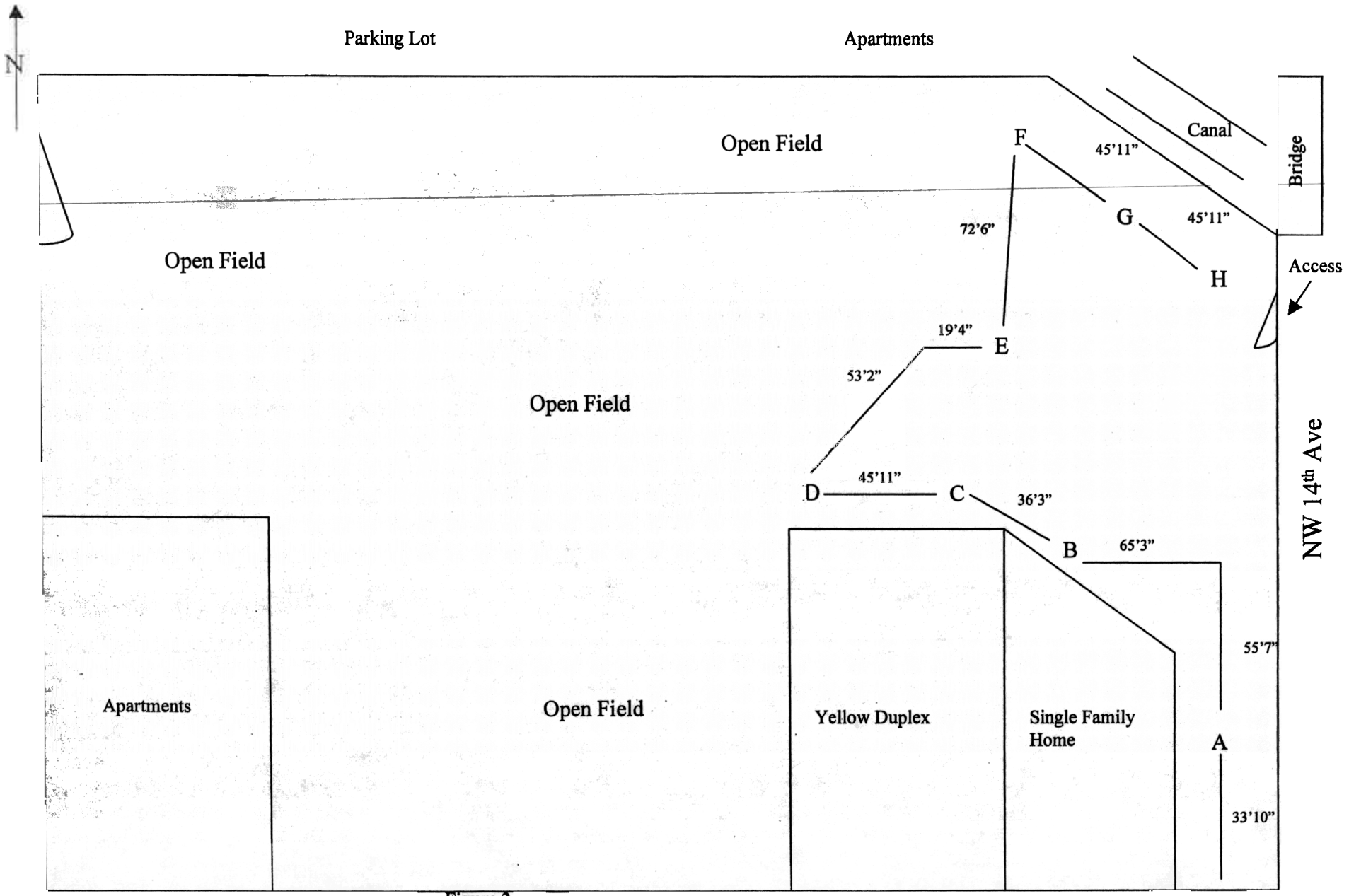



**Figure 2**

**Miami Civic Center Property**

**1700 NW 14th Avenue**

**Miami, Miami-Dade County, Florida**

## Certification

The Miami Civic Center Property Health Consultation was prepared by the Florida Department of Health, Bureau of Environmental Epidemiology, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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

for Richard Gillig
Branch Chief,
SSAB, DHAC
ATSDR