

Health Consultation

Additional Off-Site Surface Soil

KOPPERS HAZARDOUS WASTE SITE

GAINESVILLE, ALACHUA, FLORIDA

EPA FACILITY ID: FLD980709356

**Prepared by the
Florida Department of Health**

JUNE 17, 2010

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

Health Consultation: A Note of Explanation

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

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

You May Contact ATSDR Toll Free at
1-800-CDC-INFO

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

Additional Off-Site Surface Soil

KOPPERS HAZARDOUS WASTE SITE

GAINESVILLE, ALACHUA, FLORIDA

EPA FACILITY ID: FLD980709356

Prepared By:

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

Table of Contents

Foreword	iii
Summary	1
Background and Statement of Issues	2
Community Health Concerns	4
Discussion	4
Environmental Data	4
Pathways Analysis	4
Public Health Implications	5
Health Outcome Data	7
Child Health Considerations	8
Community Health Concerns Evaluation	8
Conclusions	9
Recommendations	9
Public Health Action Plan	10
Authors and Technical Advisors	10
References	11
Appendices	12
Tables	12
Figures	13
Certification	15

Foreword

The Florida Department of Health (DOH) evaluates the public health threat of hazardous waste sites through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia. This health consultation is part of an ongoing effort to evaluate health effects associated with off-site surface soil from the Koppers hazardous waste site. The Florida DOH evaluates site-related public health issues through the following processes:

- **Evaluating exposure:** Florida DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is on the site, and how human exposures might occur. Consultants for the responsible party provided the information for this assessment.
- **Evaluating health effects:** If we find evidence that exposures to hazardous substances are occurring or might occur, Florida DOH scientists will determine whether that exposure could be harmful to human health. We focus this report on public health; that is, the health impact on the community as a whole, and base it on existing scientific information.
- **Developing recommendations:** In this report, the Florida DOH outlines, in plain language, its conclusions regarding any potential health threat posed by [media], and offers recommendations for reducing or eliminating human exposure to contaminants. The role of the Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions for other agencies, including the US Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (DEP). If, however, an immediate health threat exists or is imminent, Florida DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.
- **Soliciting community input:** The evaluation process is interactive. The Florida DOH starts by soliciting and evaluating information from various government agencies, individuals or organizations responsible for cleaning up the site, and those living in communities near the site. We share any conclusions about the site with the groups and organizations providing the information. Once we prepare an evaluation report, the Florida DOH seeks feedback from the public.

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

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

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

Summary

INTRODUCTION

At the Koppers hazardous waste site, the Florida Department of Health (DOH) serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent people from coming into contact with harmful toxic substances.

In this report, the Florida DOH reviews dioxin levels in surface soil collected June and December 2009 along the roads in the Stephen Foster neighborhood west of Koppers.

In a previous report, the Florida DOH reviewed February 2009 surface soil test results and recommended that parents keep children from playing in the City of Gainesville easement bordering the Koppers site. The responsible party erected a temporary fence but has not yet cleaned the soil. Until they do, parents should continue to keep their children out of the easement.

Since 1916, Koppers preserved wood utility poles and timber using creosote, pentachlorophenol (PCP) and chromated copper arsenate (CCA). Past waste disposal caused soil and groundwater contamination. Contaminants from Koppers have impacted soil west of the site.

CONCLUSION

The Florida DOH concludes that incidental ingestion (swallowing) of very small amounts of dioxin-contaminated surface soil tested along Stephen Foster roadsides in June and December 2009 is not expected to harm people's health.

However, surface soil testing has been inadequate to determine the full extent of contamination from the Koppers site.

BASIS FOR DECISION

Surface soil in the Stephen Foster neighborhood west of the Koppers site is contaminated with dioxins. Children who play outside are likely to ingest (swallow) very small amounts of soil. Adults who work outside and eat or smoke before washing their hands may also ingest (swallow) a very small amount of soil.

Based on June and December 2009 tests, the highest amount of dioxin that children or adults are likely to ingest is below the ATSDR health guideline and is not expected to cause harm. There is, however, a "very low" increased theoretical risk of cancer.

The responsible party has only tested soil along the roads and not in residential yards. The responsible party has not determined how far contamination extends from the site.

NEXT STEPS

EPA should require the responsible party to determine the full extent of surface soil contamination in Stephen Foster neighborhood, including residential yards.

Florida DOH will evaluate additional surface soil test results.

FOR MORE INFORMATION

If you have concerns about your health or the health of your children, you should contact your health care provider. You may also call the Florida DOH toll-free at 877 798-2772 and ask for information about the Koppers hazardous waste site.

Background and Statement of Issues

The purpose of this health consultation report is to assess the public health threat from toxic chemicals found June and December 2009 in surface soil of the Stephen Foster neighborhood west of the Koppers hazardous waste site. The Alachua County Health Department (CHD) requested this assessment. The Florida Department of Health (DOH) evaluates the public health threat of hazardous waste sites through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia.

In 1989, the Florida DOH reviewed the environmental data, found the Koppers site a potential health risk, recommended warning signs, and recommended additional environmental testing [ATSDR 1989]. In 1993, the Florida DOH found most of its 1989 recommendations had been followed but recommended a more complete public health assessment and again recommended warning signs [ATSDR 1993]. In 1995, the Florida DOH reviewed new environmental data and recommended restricted site access, additional environmental testing, and warning signs [ATSDR 1995].

The Florida DOH reviewed February 2009 soil test results from the Stephen Foster neighborhood west of the Koppers site. In a July 2009 report on the February 2009 soil testing, we found dioxin contamination in the 30-foot wide City of Gainesville easement between NW 26th and NW 30th Avenues just west of Koppers could possibly harm children's health. We recommended parents keep children from playing in this easement. We also recommended more soil testing in the Stephen Foster neighborhood [ATSDR 2009].

In the summer of 2009, the responsible party erected a temporary fence restricting access to the City easement. They did this to prevent children from playing in this area. The

responsible party has not, however, cleaned up the soil in this easement (Figure 1). In June and December 2009, consultants for the responsible party tested more surface soil samples along the roads in the Stephen Foster neighborhood. This report reviews those test results.

Site Description

The Koppers hazardous waste site is at 200 N.W. 23rd Blvd. northwest of the intersection of NW 23rd Avenue and North Main Street in Gainesville, Alachua County, Florida 32609 (Figure 2). The 90-acre Koppers site occupies the western part of the larger 140-acre Cabot-Koppers hazardous waste site.

The Koppers site has been used for wood treatment since 1916. Historically, Koppers preserved wood utility poles and timber using three different chemicals: creosote, pentachlorophenol (PCP) and chromated copper arsenate (CCA). Past waste disposal caused soil and groundwater contamination. Contaminants from Koppers have impacted soil west of the site.

On 50 acres east of Koppers, Cabot Carbon made chemicals and charcoal from pine trees starting in 1945. Like the Koppers site, past waste disposal at Cabot Carbon caused soil and groundwater contamination. Cabot Carbon closed in 1966. In 1976, a developer released pine tar waste into a ditch leading to Springstead Creek which flowed into Hogtown Creek. Subsequent investigations confirmed citizens' complaints of tarry wastes in these two creeks. A commercial shopping mall, a car dealership, and a series of smaller stores and businesses now occupy the Cabot Carbon site.

The US Environmental Protection Agency (EPA) detected various organic chemicals, including aromatic and polycyclic aromatic hydrocarbons (PAHs) in soil and groundwater on both the Koppers and Cabot Carbon sites. In 1983, EPA added the Cabot-Koppers site to their Superfund National Priorities List (NPL). Nearby homes and businesses receive municipal water from distant wells.

In 1985, Cabot Carbon installed a surface water interceptor system to prevent contamination from entering the ditch leading to Springstead Creek. In 1995, Cabot Carbon installed a trench to intercept contaminated shallow aquifer groundwater. Groundwater treatment under the Koppers site has been ongoing since 1995. In the near future, the responsible party plans to begin soil cleanup on the Koppers site.

Demographics

Approximately 7,170 people live within one mile of the site. Sixty-three percent (63%) are white, 31% are African-American, 4% are Hispanic origin, and 2% are other. Twenty-five percent (22%) are less than 18 years old and 78% are older than 18. Forty-four percent (44%) have a high school diploma or less and 56% have at least two years of college. Ninety-one percent (91%) speak only English and 82% make less than \$50,000 a year [EPA 2010].

Land Use

Land use south, west, and north of the Koppers site is residential. Land use east of Koppers (formerly Cabot Carbon) is commercial.

Community Health Concerns

For many years nearby residents, especially those in the Stephen Foster neighborhood west of Koppers, have been concerned about the health threat from contact with contaminated soil in their neighborhood. Also, nearby residents have been concerned about contaminants in sediments of the creeks that drain the site.

Discussion

Environmental Data

In June and December 2009, consultants for Beazer East, Inc. (the party currently responsible for contamination from the Koppers site) collected 21 surface soil samples (0-6 inches deep) along roads in the Stephen Foster neighborhood west of the Koppers site (Figure 2). They analyzed the samples for dioxins [AMEC 2010]. In one sample, the concentration of dioxins (expressed as 2,3,7,8-tetrachloro-p-dioxin toxicity equivalent quotient or TCDD-TEQ) was above the ATSDR screening guideline of 50 nanograms per kilogram (ng/kg) (Table 1). Therefore, we selected TCDD-TEQ as a contaminant of concern.

For this health consultation, surface soil testing in the Stephen Foster neighborhood has been inadequate to determine the full extent of contamination from the Koppers site. Although dioxin levels in 16 of 21 surface soil samples along NW 26th Avenue to NW 30th Avenue were above the Florida DEP screening guideline of 7 ng/kg, no testing has been done in the residential yards between these streets. EPA should require the responsible party to determine the full extent of surface soil contamination including residential yards between NW 26th Avenue and NW 30th Avenue, east of NW 6th Street.

Pathway Analyses

Chemical contamination in the environment can harm your health but only if you have contact with those contaminants (exposure). Without contact or exposure, there is no harm to health. If there is contact or exposure, the amount of the contaminants you contact (concentration), how often you contact them (frequency), for how long you contact them (duration), and the danger of the contaminant (toxicity) all determine the risk of harm.

Knowing or estimating the frequency with which people could have contact with hazardous substances is essential to assessing the public health importance of these

contaminants. To decide if people can contact contaminants at or near a site, the Florida DOH looks at human exposure pathways. Exposure pathways have five parts. They are:

1. a source of contamination like a hazardous waste site,
2. an environmental medium like air, water, or soil that can hold or move the contamination,
3. a point where people come into contact with a contaminated medium like water at the tap or soil in the yard,
4. an exposure route like ingesting (contaminated soil or water) or breathing (contaminated air), and
5. a population who could be exposed to contamination like nearby residents.

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

Compared to ingestion (eating/drinking) and inhalation (breathing), the risk from dermal exposure (skin absorption) is usually insignificant. Therefore, human health risk assessments don't typically quantify the risk from skin absorption.

For this assessment we evaluate the long-term health threat from accidentally ingesting (swallowing) very small amounts of surface soil in the Stephen Foster neighborhood. Incidental soil ingestion is common in children less than 6 years old who put soiled fingers or toys in their mouth. Incidental soil ingestion occurs to a lesser degree with adults who smoke or eat without washing their hands after working outside.

1. For this completed pathway, the Koppers hazardous waste site is the source.
2. Small soil particles (dust) blown by the wind from the site into the nearby neighborhood is the environmental medium.
3. Soil in the Stephen Foster neighborhood just west of Koppers is the exposure point.
4. Ingestion, accidentally swallowing very small amounts of soil, is the exposure route.
5. Nearby resident children and adults are the exposed populations (Table 2).

Public Health Implications

Florida DOH evaluates exposures by estimating daily doses for children and adults. Karmin [1988] explains the concept of dose as follows:

“...all chemicals, no matter what their characteristics, are toxic in large enough quantities. Thus, the amount of a chemical a person is exposed to is crucial in

deciding the extent of toxicity that will occur. In attempting to place an exact number on the amount of a particular compound that is harmful, scientists recognize they must consider the size of an organism. It is unlikely, for example, that the same amount of a particular chemical that will cause toxic effects in a 1-pound rat will also cause toxicity in a 1-ton elephant.

Thus instead of using the amount that is administered or to which an organism is exposed, it is more realistic to use the amount per weight of the organism. Thus, 1 ounce administered to a 1-pound rat is equivalent to 2,000 ounces to a 2,000-pound (1-ton) elephant. In each case, the amount per weight is the same; 1 ounce for each pound of animal.”

This amount per weight is the *dose*. Toxicology uses dose to compare toxicity of different chemicals in different animals. We use the units of milligrams (mg) of contaminant per kilogram (kg) of body weight per day (mg/kg/day) to express doses in this assessment. A milligram is 1/1,000 of a gram; a kilogram is approximately 2 pounds.

To calculate the daily doses of each contaminant, the Florida DOH uses standard and other factors needed for dose calculation [ATSDR 2005; EPA 1997]. We assume that people are exposed daily to the maximum concentration measured. We also make the health protective assumption that 100% of the ingested chemical is absorbed into the body. The percent actually absorbed into the body is likely less. The general formula for estimating a dose is:

$$\text{Dose} = (\text{soil concentration} \times \text{soil ingestion rate}) / \text{body weight}$$

ATSDR groups health effects by duration (length) of exposure. Acute exposures are those with duration of 14 days or less; intermediate exposures are those with duration of 15 – 364 days; and chronic exposures are those that occur for 365 days or more (or an equivalent period for animal exposures). ATSDR Toxicological Profiles also provide information on the environmental transport and regulatory status of contaminants.

To estimate exposure from the incidental ingestion (swallowing) of contaminated soil, the Florida DOH uses the following assumptions:

- 1) Children ingest (swallow) an average of 200 milligrams (mg) of soil per day (about the weight of a postage stamp),
- 2) Adults ingest an average of 100 mg of soil per day,
- 3) Children weigh an average of 10 kilograms (kg) or about 22 pounds,
- 4) Adults weigh an average of 70 kg, or about 155 pounds,
- 5) Children and adults ingest (swallow) contaminated surface soil at the maximum concentration measured for each contaminant.

For non-cancer illnesses, we first estimate the health risk for children. Because children are smaller and are assumed to swallow more soil than adults, their exposure dose is

higher. Therefore, if children are not at risk, then non-worker adults are not either. For cancer, we estimate the risk for adults from lifetime exposure.

Too little is known about the combined toxic effect of multiple contaminants to assess the health risk from exposure to mixtures. The science of toxicology is only now addressing this issue. Therefore this report assesses the health threat based on exposure to individual contaminants.

Dioxins: 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxicity Equivalence (TCDD-TEQ)

Dioxins are a family of chlorinated compounds with similar structures but varying toxicities. They have very low solubility in water and tend to stick to ash, soil, or any surface with a high organic content such as plant leaves. Forest fires, manufacture of pentachlorophenol wood preservative, manufacture of bleached paper, and burning municipal garbage containing plastic all produce small amounts of dioxins.

One of the most toxic and well studied dioxins is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). TCDD-TEQ (2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalent quotient) estimates the toxicity of a group of closely related dioxins [ATSDR 1998].

Non-cancer risk – Children incidentally ingesting (swallowing) very small amounts of surface soil with the highest TCDD-TEQ levels in the Stephen Foster neighborhood west of the Koppers site are not likely to suffer any non-cancer illnesses (Table 3). The maximum TCDD-TEQ dose for children playing in this soil (0.000001 micrograms per kilogram per day or $\mu\text{g}/\text{kg}/\text{day}$) is the same as the ATSDR chronic oral minimal risk level [ATSDR 1998]. Doses at or below the ATSDR chronic oral minimal risk level are not likely to cause any non-cancer illnesses.

Cancer risk – People incidentally ingesting (swallowing) very small amounts of surface soil with the highest TCDD-TEQ levels in the Stephen Foster neighborhood over an entire lifetime (70 years) are at a “very low” increased theoretical risk of cancer (Table 3). Multiplying the maximum TCDD-TEQ dose (0.0000001 $\mu\text{g}/\text{kg}/\text{day}$) by the EPA cancer slope factor (150 $\mu\text{g}/\text{kg}/\text{day}^{-1}$) results in a “very low” additional increased theoretical cancer risk of 0.000002 or 2×10^{-5} . This estimate uses the highest soil concentration measured, higher end estimated of incidental soil ingestion, and the upper range of the cancer potency. Thus this is the highest estimated increased cancer risk for exposure to TCDD-TEQ in soil. The actual increased cancer risk is likely lower and may be as low as zero.

Health Outcome Data

Florida DOH epidemiologists are reviewing a request to analyze the Florida Cancer Data System for the area around the Koppers site.

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than 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 system 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.

This assessment takes into account the special vulnerabilities of children. It specifically assesses the health risk for children playing in the soil of the Stephen Foster neighborhood near the Koppers hazardous waste site. The Florida DOH found that children incidentally ingesting (swallowing) very small amounts of surface soil in the Stephen Foster neighborhood west of the Koppers site are not likely to suffer any illnesses.

Community Health Concerns Evaluation

1. Nearby residents, especially those in the Stephen Foster neighborhood west of Koppers are concerned about the health threat from contact with contaminated soil in their neighborhood.

Incidental ingestion (swallowing) for more than a year very small amounts of dioxin-contaminated surface soil from the 30-foot wide City easement between NW 26th Avenue and NW 30th Avenue just west of Koppers could possibly harm children's health. Therefore, parents should keep their children from playing in this easement. A fence has been erected to prevent children from playing in the easement.

Although levels of dioxin in surface soil along the roads in other parts of the neighborhood are slightly above state cleanup guidelines and must be remediated, they are not likely to harm people's health. This is because state cleanup guidelines are set with large safety factors to ensure a large margin for public health and safety. Additional testing is necessary, however, to determine the full extent of surface soil contamination.

2. Nearby residents are concerned about contaminants in sediments of the creeks that drain the Koppers site.

In a separate report, the Florida DOH will assess the public health threat from sediments in the creeks that drain the Koppers site.

Conclusions

1. Based on June and December 2009 tests, incidental ingestion (swallowing) very small amounts of dioxin-contaminated surface soil along Stephen Foster roadsides is not expected to harm children or adults. Adults accidentally swallowing very small amounts of this soil over a lifetime are at a “very low” increased theoretical risk of cancer.

Surface soil testing in the Stephen Foster neighborhood, however, has been inadequate to determine the full extent of contamination from the Koppers site. Although tests have found dioxins in roadside surface soil from NW 26th Avenue to NW 30th Avenue, no testing has been done in the residential yards between these streets.

2. In the summer of 2009, the responsible party erected a temporary fence restricting access to the 30-foot wide City of Gainesville easement between NW 26th and NW 30th Avenues just west of the 6-foot chain link fence marking the Koppers boundary. They did this to prevent children from playing in this area. The responsible party has not, however, cleaned up the soil in this easement.

Recommendations

1. Determine the full extent of soil contamination in the Stephen Foster neighborhood.

EPA should require the responsible party to determine the full extent of surface soil contamination in Stephen Foster neighborhood residential yards between NW 26th Avenue and NW 30th Avenue, east of NW 6th Street.

2. Continue to keep children from playing in the City easement west of Koppers.

Until the responsible party cleans up the soil, parents should continue to keep their children from playing in the 30-foot wide City easement just west of the 6-foot chain link fence marking the Koppers boundary.

Public Health Action Plan

Actions Undertaken

1. In May 2009, the Alachua CHD hand delivered letters to 20 nearby residences advising them to keep their children from playing in the City easement just west of Koppers. The City of Gainesville posted “keep out” and “no trespassing” signs along this easement. Contractors for the responsible party erected a temporary fence to discourage trespassing on this easement.
2. In June 2009, the Florida DOH, Alachua CHD, EPA, and Florida DEP held an open house meeting attended by about 120 nearby residents.
3. In July 2009, the Florida DOH distributed a health consultation report and summary fact sheet on off-site surface soil.

Actions Underway

1. Florida DOH epidemiologists are reviewing a request to analyze the Florida Cancer Data System for the area around the Koppers site.
2. The Florida DOH is assessing the public health threat from contaminated sediments in the creeks draining the Koppers and Cabot Carbon sites.

Actions Planned

The responsible party is planning to test surface soil in Stephen Foster neighborhood yards between NW 26th and NW 30th Avenues for dioxins. Florida DOH will review these test results.

Authors and Technical Advisors

Florida Department of Health Author and Designated Reviewer

Randy Merchant
Bureau of Environmental Public Health Medicine
Division of Environmental Health
850 245-4299

US Agency for Toxic Substances and Disease Registry Reviewer

Jennifer Freed
Technical Project Office
Division of Health Assessment and Consultation

References

- [AMEC 2010] AMEC Earth and Environmental. Letter from Joseph Robb, P.G. with AMEC to Scott Miller with the US Environmental Protection Agency regarding additional off-site soil sampling. February 19, 2010.
- [ATSDR 1989] Agency for Toxic Substances and Disease Registry. Health Assessment for Cabot Carbon/Koppers Site. U.S. Department of Health and Human Services. Atlanta, GA. April 24, 1989.
- [ATSDR 1993] Agency for Toxic Substances and Disease Registry. Site Review and Update for Cabot Carbon/Koppers Site. U.S. Department of Health and Human Services. Atlanta, GA. September 24, 1993.
- [ATSDR 1995] Agency for Toxic Substances and Disease Registry. Health Consultation for Cabot Carbon/Koppers Superfund Site. U.S. Department of Health and Human Services. Atlanta, GA. November 15, 1995.
- [ATSDR 1998] Agency for Toxic Substances and Disease Registry. Toxicological Profile for Chlorinated dibenzo-p-dioxins (Update). Atlanta: US Department of Health and Human Services; December 1998.
- [ATSDR 2005] Agency for Toxic Substance and Disease Registry. Public Health Assessment Guidance Manual (Update). U.S. Department of Health and Human Services, Atlanta, GA. January 2005.
- [ATSDR 2009] Agency for Toxic Substances and Disease Registry. Health Consultation Off-Site Surface Soil, Koppers Hazardous Waste Site. Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA. July 17, 2009.
- [EPA 1997] US Environmental Protection Agency, Office of Research and Development. Exposure Factors Handbook. Volumes I, II, and III. EPA/600/ P-95/002F (a, b, and c).
- [EPA 2010] US Environmental Protection Agency. EnviroFacts. Demographics around Koppers, 200 N.W. 23rd Blvd. Gainesville, FL, 32609. Washington, DC (updated March 18, 2010; accessed March 18, 2010). Available at <http://www.epa.gov/enviro>.
- [Karmin 1988] Toxicology – A Primer on Toxicology Principles and Applications. Lewis Publications. Chelsea MI. 1988.

Appendices

Table 1. June/December 2009 Surface Soil Dioxin Concentrations (0-6 inches deep) in the Stephen Foster Neighborhood West of the Koppers Hazardous Waste Site

Contaminant	Concentration Range (ng/kg)	Screening Guideline* (ng/kg)	Source of Screening Guideline	# Above Screening Guideline/Total #
TCDD – TEQ	1 – 70	50	ATSDR chronic child EMEG	1/21

TCDD – TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalence EMEG = ATSDR environmental media evaluation guide
 ng/kg = nanograms per kilogram * Screening guidelines are used to select chemicals for further scrutiny, not to determine the risk of illness.
 Source of data: AMEC 2010

Table 2. Completed Human Exposure Pathway in the Stephen Foster Neighborhood West of the Koppers Hazardous Waste Site

COMPLETED PATHWAY NAME	COMPLETED EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Residential soil ingestion (swallowing)	Contaminated dust from Koppers site	Dust/Soil	Off-site residential yards	Ingestion	Nearby residents	1916 to present

Table 3. Estimated Maximum Dose and Increased Lifetime Cancer Risk from Incidental Ingestion of Surface Soil in the Stephen Foster Neighborhood West of the Koppers Hazardous Waste Site

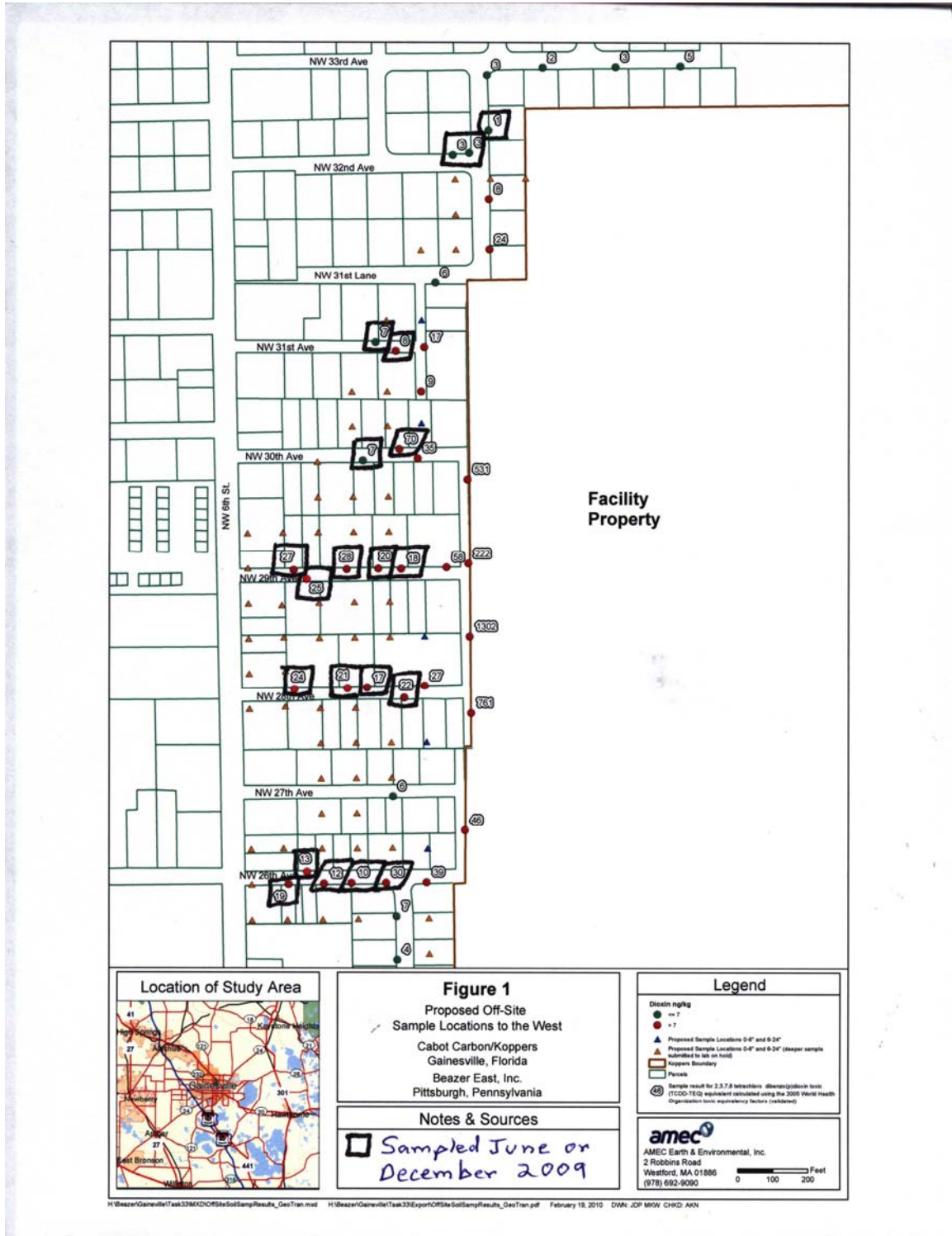
Contaminant	Maximum Soil Concentration (ng/kg)	Estimated Maximum Child Dose (µg/kg/day)	Estimated Maximum Adult Dose (µg/kg/day)	ATSDR MRL (µg/kg/day)	EPA Oral Cancer Slope Factor (µg/kg-day)	Theoretical Increased Lifetime Cancer Risk
TCDD-TEQ	70	0.000001	0.0000001	0.000001	150	0.00002

TCDD-TEQ = 2,3,7,8-tetrachloro-p-dioxin toxicity equivalent quotient
 ng/kg = nanograms per kilogram µg/kg/day = micrograms per kilogram per day MRL = ATSDR minimal risk level

Figure 1. Restricted Access to the City Easement along the West Boundary of the Koppers Hazardous Waste Site

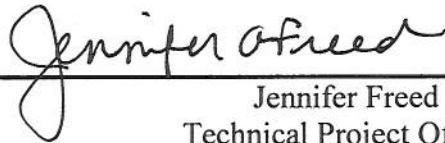


Figure 2. June/December 2009 Surface Soil Dioxin Concentrations (0-6 inches deep) in the Stephen Foster Neighborhood West of the Koppers Hazardous Waste Site



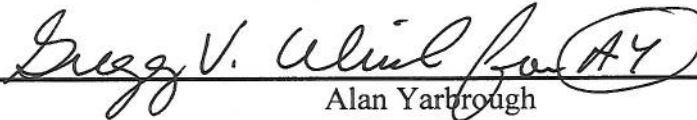
Certification

The Florida Department of Health, Bureau of Environmental Public Health Medicine prepared this health consultation report under a cooperative agreement with the US Agency for Toxic Substances and Disease Registry. The Florida DOH followed approved methodologies and procedures existing at the time it began its assessment. The Florida DOH completed an editorial review of this document.



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

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



Alan Yarbrough
Team Lead
CAT, CAPEB, DHAC, ATSDR