Health Consultation

Soil Gas and Indoor Air Investigations
Cabot Carbon

CABOT/KOPPERS SUPERFUND SITE
GAINESVILLE, ALACHUA COUNTY, FLORIDA

EPA FACILITY ID: FLD980709356

Prepared by
Florida Department of Health

JANUARY 12, 2016

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

Health Consultation: A Note of Explanation

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

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

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Foreword

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

■ Evaluating exposure: FDOH 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. The U.S. Environmental Protection Agency (EPA) provided the soil gas information collected by the Cabot's consultant, and Alachua County provided a limited indoor air quality evaluation done by their consultant.

■ Evaluating health effects: If we find evidence that exposures to hazardous substances are occurring or might occur, FDOH 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 FDOH outlines, in plain language, its conclusions regarding any potential health threat posed by air, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of the FDOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions for other agencies, including the EPA and the Florida DEP. If, however, an immediate health threat exists or is imminent, FDOH 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 FDOH 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 FDOH seeks feedback from the public.

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

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Summary

INTRODUCTION

At the Cabot/Koppers hazardous waste site, the Florida Department of Health (FDOH) and the U.S. Agency for Toxic Substances and Disease Registry's (ATSDR) top priority is to ensure workers and patrons in the Northside Shopping Center (mall) have the best information to safeguard their health. This health consultation evaluates 12 soil gas samples collected near mall buildings in September 2012 and 8 indoor air samples collected in the southern end of the mall in March 2013.

The Cabot portion of the Cabot/Koppers site is 49 acres in the northwestern quadrant of the intersection of North Main and NE 23rd Avenue in Gainesville, Alachua County, Florida. The Cabot Corporation and other companies processed pine stumps there from 1911 to 1965. In 1977 a developer built the Northside Shopping Center on the Cabot site.

CONCLUSION #1

The 2012 soil gas and 2013 indoor air data are inadequate to evaluate the potential for vapor intrusion to impact air quality in the Northside Shopping Center.

BASIS FOR CONCLUSION #1

Cabot's consultant tested soil gases around the perimeter of the mall once in 2012. They found elevated levels of chlorinated and petroleum-based organic compounds in soil gas beneath the northern part of the mall. They did not sample indoor air.

Alachua County's consultant tested indoor air in two stores in the southern part of the mall in 2013. While the highest acetone, isopropyl alcohol, and toluene concentrations measured were less than their health-based comparison values, Cabot's testing also found acetone, isopropyl alcohol, and toluene in soil gas in the southern part of the mall. Therefore, these chemicals may be moving into indoor air from a subsurface source over time.

Significant limitations exists with the available 2012 and 2013 data: (1) both consultants conducted only one sampling event, discounting seasonal variability considerations and (2) neither paired indoor air and soil gas sampling.

NEXT STEPS #1

FDOH and ATSDR recommend that at the 2016 5-year review, Cabot use current EPA and Interstate Technology and Regulatory

Council (ITRC) guidelines to reevaluate the potential for vapor intrusion at the Northside Shopping Center.

Current EPA and ITRC soil vapor intrusion guidance recommends definite measurement data or multiple lines of converging information.

We recommend that sampling reflects actual exposures as accurately as possible or that it reflects worst case conditions to be conservative. We also recommend multiple concurrent soil gas, indoor air, and outdoor air tests (preferably in the more extreme heating and cooling seasons).

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 FDOH at 850-245-4444×2316 and ask for information about the Cabot hazardous waste site.

Background

The 140-acre Cabot-Koppers site is located in Gainesville, Alachua County, Florida, approximately one mile east of U.S Highway 441. The remediation site includes two properties; the Koppers facility area, covering 90 western acres, and the Cabot area, covering 49 eastern acres (Figures 1 and 2).

Companies processed pine stumps with heat to extract pine sap and make charcoal on the Cabot property from 1911 to 1966 (Figure 2) [Gradient 2012]. These companies stored process wastewater in a concrete-lined pond and later in unlined ponds in the northeastern part of the Cabot property (lagoons, Figure 2). In 1966, Cabot Corporation sold the property to a developer. The developer drained the waste ponds and sold the property in 1977 to a second developer who built the Northside Shopping Center.

The wood-treating facility on the Koppers property operated from 1916 until December 2009 (Figure 3). Gainesville has zoned the Koppers property for heavy industrial use. Future reuse planning for the Koppers property is underway to identify appropriate use once the final cleanup remedy is in place.

Previous investigations found chemicals used or produced on both the Koppers and former Cabot properties in soil, groundwater, sediment, and surface water on the former Cabot property and adjacent properties [E^2 2011]. Chemicals measured on the former Cabot property include; benzene, toluene, ethylbenzene, xylenes, other fuel components, refined light oils, tar, distilled pine sap products, wood preservative, and combustion products.

In 1994, Cabot's contractors dug up and removed contaminated soil and sediment to start the Cabot property remediation process. In June 1995 they constructed a trench that intercepts contaminated groundwater from the Cabot property and sends it to the local wastewater treatment plant. In the five-year monitoring review, additional groundwater testing found deeper contamination. Cabot Carbon submitted a work plan for delineation of possible Cabot property-related contaminants in groundwater of the Hawthorn Group in early 2011. EPA approved this work plan, which Cabot implemented in September 2011. Results showed contamination of Hawthorn Group groundwater with Cabot Property-related contaminants in excess of groundwater cleanup standards included in the 2011 Record of Decision.

Cabot is required to remediate the contaminated groundwater utilizing an in-situ treatment technology. Cabot has proposed, and EPA has accepted, utilizing in-situ chemical oxidation (ISCO) to address the groundwater contamination subject to a successful pilot study of ISCO demonstrating its effectiveness. Cabot is in the process of designing and executing a remedial action plan for remediation of this deeper groundwater.

Regular testing of municipal wells which provide drinking water to area residents and testing of private and monitoring wells between the Cabot-Koppers site and the city well field show these water sources are free from contamination. FDOH Alachua County and FDEP determine the frequency of subsequent private well testing based on the test results. Gainesville Regional Utilities tests municipal wells yearly for VOCs. Their past and most recent testing has not detected site-related contamination.

FDOH has had a long involvement with review of data for the Cabot-Koppers site. Documents we have authored with the oversight of ATSDR are available on our website and include the following:

1. Public Health Assessment - April 24, 1989 (3.66 megabyte pdf file) [ATSDR 1989]
2. Site Review and Update - September 24, 1993 (3.24 megabyte pdf file) [ATSDR 1993]
3. Health Consultation - November 15, 1995 (1.1 megabyte pdf file) Koppers Off-site Surface Soil Health Consultation - July 17, 2009 (3.43 megabyte pdf file) Koppers Additional Off-site Surface Soil Health Consultation - June 17, 2010 (< 1 megabyte zip file) [ATSDR 1995]
4. Koppers Letter Health Consultation - Stephen Foster Neighborhood Chicken Egg Dioxin Evaluation - April 14, 2011 (< megabyte pdf file) [ATSDR 2011a]
5. Koppers Creek Sediment Health Consultation - May 24, 2011 (1.7 MB PDF) Stephen Foster Neighborhood Cancer Review - June 2011 (< 1 megabyte pdf file) [ATSDR 2011b]
6. Koppers Off-site Surface Soil in Stephen Foster Neighborhood Yards Health Consultation - December 9, 2011 (< 1 megabyte pdf file) [ATSDR 2011c]
7. Stephen Foster Neighborhood Cancer Review - March 2012 (<1 megabyte pdf file) [ATSDR 2012]
8. Koppers Area Surface Soil Health Consultation - November 4, 2013 (< 1 megabyte pdf file)
9. Koppers Indoor Dust Health Consultation - July 24, 2014 (4.6 megabyte pdf file)

FDOH continues to be involved in the review of site-related data. We recommend the reader may want to refer periodically to our website for updates at http://doh.state.fl.us/Environment/medicine/SUPERFUND/pha.htm .

Statement of Issues

Health scientists look at what chemicals are present and in what amounts. They compare those amounts to national environmental guidelines. These guidelines are set far below known or suspected levels associated with health effects. Florida Department of Health (DOH) uses guidelines developed to protect children and workers.

FDOH initiated this assessment of the potential for vapor intrusion to impact air quality in the Northside Shopping Center. FDOH considers existing soil gas and indoor air test

results to evaluate potential for people to breathe harmful levels of chemicals in the shopping center.

Site Description

The Northside Shopping Center looking west from NE 23rd Street. Google Earth, Image date March 2011.

The 49-acre former Cabot property is on the northwest quadrant of the intersection of North Main Street and NE 23rd Avenue in Gainesville, Alachua County, Florida (Figure 1). Land use surrounding the Cabot site is commercial and residential.

In 1977, the current owner redeveloped the former Cabot site (Figure 1). Most of the redeveloped areas are covered by asphalt, concrete, buildings, and landscaping. The western edge of the property has a boat sales and service business (P&J Marine) on Northeast 1st Boulevard with two mini-malls north of the boat business. The mini-malls are Hamilton Park and Studio Percussion, each has several businesses with store-front parking.

Northeast 1st Boulevard is a Cabot site access road that begins on NE 23rd Street between P&J Marine and the rear of the Northside Shopping Mall. This access road follows the rear of the mall and exits on North Main Street between the mall and the GM/Chevrolet dealership. Six undeveloped parcels in the northwestern portion of the property—which were for sale in 2013—and the areas of the former lagoons and acid water pond—which were not for sale in 2013, border the north side of Northeast 1st Boulevard.

Much of the GM/Chevrolet dealership property, except its northwestern corner, is on former Cabot property. A Mazda dealership borders the GM/Chevrolet dealership on the north, approximately one-third of it is also on the former Cabot site.

The Northside Shopping Center is the main shopping center on the Cabot site, located in the center and southeast portions of the site. Stores and businesses include a pawn store, Harbor Freight Tools, Big Lots, Advance (cash) America, COX Communications (cable service provider), Lee Nails (nail salon), Gatorland Laundromat, FDLS Inc. Dentist, Boost Mobile Cell Phone Retail, Jackson Hewitt (tax preparer), and Winn Dixie Grocery Store [Gradient 2012]. Ashley Furniture recently occupied a vacant store adjacent to Big Lots.

The Cabot site and surrounding properties are mostly flat, with shallow swales in the grassy area north and northwest of the commercial buildings on the site.

Demographics

FDOH examines demographic and land use data to identify sensitive populations, such as young children, the elderly, and women of childbearing age to determine whether potential health risks from the Cabot site might affect these sensitive populations. Demographics also provide details on population mobility and residential history in a particular area.

In 2010, approximately 7,170 people lived within 1 mile of the Cabot site. Sixty three percent (63%) were white, 31% were African-American, 4% were of Hispanic origin, and 2% were other. Twenty-five percent (25%) were less than 18 years old. Fifty-five percent (55%) had a high school diploma or less and 56% had 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

The Cabot site is in an urban area of northeastern Gainesville. Surrounding areas include zones of residential, commercial, and mixed uses. The areas to the west (west of Koppers) and north are residential and commercial. A Gainesville Public Works facility and several small businesses are north of the Cabot site. An abandoned railway lies between the former Cabot and Koppers properties. The Site Description section of this report provides detailed information on the current use of the Cabot and Koppers properties.

Community Health Concerns

We have not received any health concerns related to mall indoor air from the community.

Discussion

Environmental Data

Cabot's consultant conducted soil gas testing from September 24th to 26th, in 2012 [Gradient 2012]. They collected samples along the perimeter of the shopping center buildings, following a work plan approved by the EPA, the Alachua County Environmental Protection Department (ACEPD) and the Florida Department of Environmental Protection (FDEP). The objective of this investigation was to assess human health risks associated with the vapor intrusion exposure pathway [E^2 2011]. Figure 2 shows the 12 soil gas sample locations.

Alachua County's consultant conducted limited indoor-air testing March 27, 2013 in two stores in the southern portion of the shopping center. The objective of this investigation was to assess potential human health risks associated with mold and the vapor intrusion exposure pathways as part of the County's due diligence prior to a potential real estate transaction (lease) [ECT 2013]. Figure 4 shows the 8 indoor-air sample locations. The Alachua County Supervisor of Elections decided against pursuing a lease of this property, therefore the Alachua County Environmental Protection Department will not be taking additional indoor air samples in the mall.

Soil Gas Testing

Cabot's consultant installed 12 temporary soil vapor implants using direct push technology along the Northside Shopping Mall building perimeters, 4.5 feet below the ground surface. They tested these implants for surface leakage with helium. They then collected 1-hour, time-averaged, soil gas samples into 1-liter, stainless-steel canisters. They also collected outdoor air samples from two locations on the shopping mall. They shipped the soil gas and exterior air samples to Eurofins Air Toxics Inc. and had them analyzed for VOCs based on the EPA Method TO-15 scan.

Both outdoor air samples and the equipment blank had non-detectable levels of VOCs except for acetone: ambient air SG-14A had 5.4 $\mu g/m^3$; SG-14A had 3.8 $\mu g/m^3$, and the equipment blank SG-13B had 28 $\mu g/m^3$ acetone. We list the VOCs detected in soil gas above their comparison values in Table 2.

Indoor Air Testing

Alachua County's consultant used one-half liter, stainless-steel canisters and flow regulators calibrated to approximate a total sample time of 4 hours. They also took an outdoor air sample behind the former Ashley Furniture store. They shipped the samples to Galson Laboratories, East Syracuse, New York and had them analyzed for VOCs based on a modified EPA Method TO-15 scan. The chemicals analyzed for were the same as those analyzed for in soil gas except for naphthalene, which is a semi-volatile and which laboratories may sometimes exclude from the TO-15 scan. The heating, ventilation, and air-conditioning system was on in the Big Lots store and off in the former Ashley furniture store. We summarize the indoor air sample results in Table 3.

Identifying Contaminants of Concern

FDOH compared the maximum concentrations of contaminants found at a site to ATSDR's and other agencies' comparison values [ATSDR 2013]. Comparison values are specific for the medium tested. We found the levels of acetone, isopropyl alcohol, and toluene in the 8 indoor air samples from two buildings in the southern part of the mall are below ATSDR air comparison values and are not a health risk (Table 2).

Although we are unable to use the soil gas measurements for assessment of either cancer or non-cancer health effects potential, we did compare these measurements with screening values that anticipate a soil gas to indoor air attenuation factor of 0.03 [EPA 2015a,b] and so we adjust the air screening value by that amount. The ATSDR method

uses only one set of screening values (regardless of the type of building), but then considers site-specific exposure factors in more detail for chemicals exceeding screening values.

Soil gas chemicals exceeding air screening values adjusted by the attenuation factors include chlorinated and petroleum-based organic compounds. EPA's Vapor Intrusion Guidance indicates that biodegradation is not expected to occur indoors in the absence of an air treatment system. The soil gas attenuation factor we used is expected to apply equally to vapor-forming chemicals that biodegrade in the vadose zone and those that do not [EPA 2015a, b].

We found that levels of benzene, ethylbenzene, total xylenes, toluene, 1,2,4-trimethyl benzene, 1,3,5-trimethylbenzene, cumene, naphthalene, 2-propanol, trichloroethene, and 1,3-butadiene indicate a need for SVI evaluation (Table 3). Soil gas tests found these chemicals greater than their screening values at sample locations 1, 2, 3, and 5 on Figure 2. This is around the northern perimeter of the Winn Dixie store at the northern part of the mall. Sample locations 7 and 8 near the middle of the mall also had elevated levels of 2-propanol (isopropyl alcohol).

The available data do not allow us to assess the pathway, temporal variability, or the spatial variability of the chemicals identified in the soil gas above ATSDR screening values. To assess the pathway, researchers need to concurrently sample indoor air, ambient air and sub-slab soil gas. To assess temporal variability, they would need to sample these three pathway components in conditions that use the heating system and again the cooling systems in the appropriate weather. Researchers would also need to sample the different areas of the mall for pathways and temporal variability as preliminary soil gas testing showed variability in the spatial location of the chemicals measured and variability in the levels of individual chemicals.

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, how much 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, FDOH 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),
5. a population who could be exposed to contamination like nearby residents.

FDOH rejects 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.

Potential Exposure Pathways:

For this assessment, the FDOH found the available data insufficient to evaluate the exposure pathway involving the long-term health threat from breathing vapors from contaminated soil/groundwater via vapor intrusion into the overlying commercial buildings and indoor air (Table 1). For the potential vapor intrusion pathway, spills and wastes on the former Cabot site and wastes from the Koppers property caused soil and shallow groundwater contamination.

Figure 3 shows the locations of former wastewater lagoons on both properties. Unlined waste ponds can recharge the shallow aquifer through a process called mounding. With mounding, the constant presence of wastes in the pond allows liquid to flow in all directions into the underlying soil away from the pond, rather than only in the direction of groundwater flow. Once waste liquids move vertically down to the groundwater table, groundwater transports them. The groundwater table varies from 5 to 8 feet below the ground surface on both the Cabot and Koppers properties. Regional groundwater flow is northeasterly.

Contaminants in shallow groundwater and in surface/near-surface soil may evaporate as vapors (the environmental medium) and travel up underneath and possibly into buildings, making on-site indoor air the point of exposure. Depending on the exposure levels, breathing the air inside these buildings could be an exposure route. Site workers and shoppers could be exposed populations (Table 1).

Public Health Implications

FDOH provides site-specific public health recommendations on the basis of toxicological literature, levels of environmental contaminants, evaluation of potential exposure pathways, duration of exposure, and characteristics of the exposed population. Whether a person will be harmed depends on the type/amount of contaminant, how they are

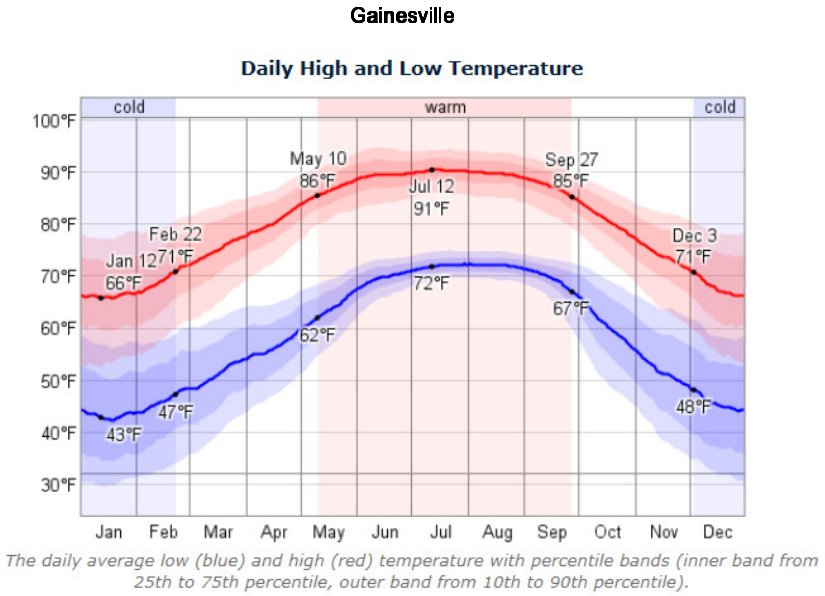
exposed, how long they are exposed, how much contaminant is absorbed, genetics, and individual lifestyle practices.

Measured Indoor Air Values

Levels of chemicals from the 2013 indoor air tests in the southern portion of the shopping center are not a health risk. However, because this was one round of data we do not know if there could be seasonal variations or other factors which might influence vapor intrusion.

SVI guidance recommends testing a building's heating and cooling systems' effects and other seasonal factors on indoor air quality, with at least two sets of appropriate seasonal tests [ITRC 2007]. They also recommend samplers should test soil gas and indoor air at the same time. Then, if tests find chemicals in indoor air, a concurrent soil gas test is available for comparison [ITRC 2007].

Consultants for Alachua County measured the indoor air quality of the southern part of the mall as part of a limited assessment for a potential real estate transaction, and did not collect simultaneous soil gas samples. The 2012 soil gas tests showed acetone and isopropyl alcohol are elevated beneath this part of the mall. The indoor air testing likely did not capture the full effects of either the heating or cooling systems on vapor intrusion potential as the testing was done in late March (mild weather), and only one of these properties had an operating business. Therefore, the heating, ventilation, and air conditioning system was not in use in one property and it may not have been necessary to use heating or cooling extensively in the other building. See the following graph for supporting temperature data.



Source:[Weatherspark 2015, based on historical records from 1974 to 2012]

Measured Soil Gas Values

Cabot's consultant tested soil gas chemicals as a part of their 2012, 5-year assessment, a required part of the site remediation process [Gradient 2012]. They found elevated levels of different types of VOCs beneath the northern and southern parts of the mall. Although Gradient modeled the data and found it not likely to cause vapor intrusion at levels of health concern, Soil Vapor Intrusion (SVI) guidance recommends decisions to screen out sites from further analysis—should be based on definite measurement data—or on multiple lines of converging information [EPA 2002, 2012]. Gradient did not sample indoor air in the mall. In addition, the attenuation factors Gradient used to evaluate this data predict greater attenuation than what past and current guidance recommends for screening [EPA 2002, 2008, 2012, 2015a; Interstate Technology and Regulatory Council [ITRC 2007].

FDOH used a recommended soil gas attenuation factor (0.03 [EPA 2015a]) to screen the 22 VOCs detected in soil gas (Table 3). We found that benzene, ethylbenzene, total xylenes, toluene, 1,2,4-trimethyl benzene, 1,3,5-trimethylbenzene, cumene, naphthalene, 2-propanol, trichloroethene, and 1,3-butadiene levels indicate a need for further SVI investigation.

Child Health Considerations

Children are likely to be present in the Northside Shopping Center buildings for a fraction of the time workers would be. However, at most locations faced with air, water, or soil contamination, the many physical differences between children and adults demand special attention. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometime 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 and medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health.

Community Health Concerns Evaluation

We have not received any health concerns related to mall indoor air from the community. This report evaluates the 2012 and 2013 soil gas and indoor air test results.

Conclusions

The 2012 soil gas and 2013 indoor air data are inadequate to evaluate the potential for vapor intrusion to impact air quality in the Northside Shopping Center.

Cabot's consultant tested soil gases around the perimeter of the mall once in 2012. They found elevated levels of chlorinated and petroleum-based organic compounds in soil gas beneath the northern part of the mall. They did not sample indoor air.

Alachua County's consultant tested indoor air in two stores in the southern part of the mall in 2013. While the highest acetone, isopropyl alcohol, and toluene concentrations measured were less than their health-based comparison values, Cabot's testing also found acetone, isopropyl alcohol, and toluene in soil gas in the southern part of the mall. Therefore, these chemicals may be moving into indoor air from a subsurface source over time.

Significant limitations exists with the available 2012 and 2013 data: (1) both consultants conducted only one sampling event, discounting seasonal variability considerations and (2) neither paired indoor air and soil gas sampling.

Recommendations

FDOH and ATSDR recommend that at the 2016 5-year review, Cabot use current EPA and ITRC guidelines to reevaluate the potential for vapor intrusion at the Northside Shopping Center.

Current EPA and Interstate Technology and Regulatory Council (ITRC) soil vapor intrusion guidance recommends measurement data or multiple lines of converging information.

We recommend that sampling reflects actual exposures as accurately as possible or that it reflects worst case conditions to be conservative. We also recommend multiple concurrent soil gas, indoor air, and outdoor air tests (preferably in the more extreme heating and cooling seasons).

Public Health Action Plan

The FDOH of Alachua County will distribute a community update to nearby residents, the property owners, store managers, and other interested parties.

FDOH will review additional environmental data as warranted.

Report Preparation

The Florida Department of Health prepared this health consultation for the former Cabot site under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). We wrote it in accordance with the approved agency methods, policies, and procedures existing at the date of publication.

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Appendices

Tables and Figures

Table 1. Potential Human Exposure Pathways at the Northside Shopping Center (former Cabot site)

Completed Pathway Name	Completed Exposure Pathway Elements					Time
	Source	Environmental Media	Point of Exposure	Route of Exposure	Exposed Population	
Indoor Air	Pine stump processing wastes, wood preserving chemicals from Cabot and Koppers	Air	Inside site businesses	Inhalation	Workers and shoppers	Past, present, and future

Table 2. Northside Shopping Center (former Cabot site) On-site Indoor Air VOC Concentrations, Indoor Air Sampled on March 27, 2013

Detected Volatile Organic Chemicals	Concentration Range (ppb)	CV – basis (ppb)	# Above CV/Total #
Acetone	18–95	13,000 – cEMEG 26,000 - aEMEG	0/8
Isopropyl Alcohol	15–26	297 – EPA RSL*	0/8
Toluene	< 5.0–8.7	80 – cEMEG 2,000 – aEMEG	0/8

ppb – parts per billion-volume
CV – ATSDR Comparison Value
cEMEG – chronic Environmental Media Evaluation Guide
aEMEG - acute Environmental Media Evaluation Guide
EPA RSL – EPA Regional Screening Level [EPA 2013]

* No CVs exist for isopropyl alcohol. The EPA RSL, 730 µg/m^3 [EPA 2013] was used and converted as follows:

$$\text{ppb} = \frac{24.45 \times \text{concentration}}{\text{molecular weight}} = \frac{24.45 \times 730}{60.1} = 297 \text{ ppb}$$

concentration = maximum level measured in µg/m^3
24.45 = volume of a mole of gas

VOC – Volatile Organic Chemical

Table 3. Northside Shopping Center (former Cabot site) Soil gas VOC Concentrations, Above Screening Levels for All Building Exposures (0.03 attenuation value), Sampled September 24-26, 2012

Detected Volatile Organic Chemicals	Soil Gas Level Range ($\mu g/m^3$)†	Soil Gas Screening Level ($\mu g/m^3$)	Air Screening Level Used as Basis for Soil Gas Screening Level ($\mu g/m^3$)	# Above Soil Gas Screening Level/Total #
Benzene	3.8 U – 9,000	3.9	0.13 – CREG	4/12
Ethylbenzene	5.2 U – 640,000	7,800	260 – cEMEG	2/12
Total Xylenes	5.2 U – 405,000	6,600	220 – cEMEG	2/12
Toluene	4.5U – 57,000	9,000	300 – cEMEG	3/12
1,2,4-Trimethylbenzene	5.8 U – 62,000	219	7.3 – EPA RSL	3/12
1,3,5-Trimethylbenzene	5.8 U – 100,000	219	7.3 – EPA RSL	2/12
Cumene (Isopropyl benzene)	5.8 U – 89,000	12,000	400 – RfC	1/12
Naphthalene	25 UJ – 2,500	111	3.7 – cEMEG	3/12
2-Propanol (Isopropyl alcohol)	12 U – 410,000	21,900	730 – EPA RSL	3/12
Trichloroethene	6.6 U – 24	7.2	0.24 CREG	1/12
1,3-Butadiene	2.6 U – 480	0.99	0.033 – RfC	2/12

$\mu g/m^3$ – micrograms per cubic meter
CREG – Cancer Risk Evaluation Guide
cEMEG – chronic Environmental Media Evaluation Guide
VOC – Volatile Organic Chemical
RfC – Reference Concentration, an estimate of a continuous exposure levels likely to be without risk of noncancer health effects for a lifetime exposure.
RSL – EPA's regional screening levels for contaminants at Superfund Sites. It allows the user to screen tests results for additional evaluation.
† Highlighted value is greater than 1,000 times the air screening level

Figure 1. 2012 Aerial View of the Former Cabot Site

Figure 2: Former Cabot Site: 2012 Soil gas Sample Locations and Footprints of Former Operations and Current Buildings

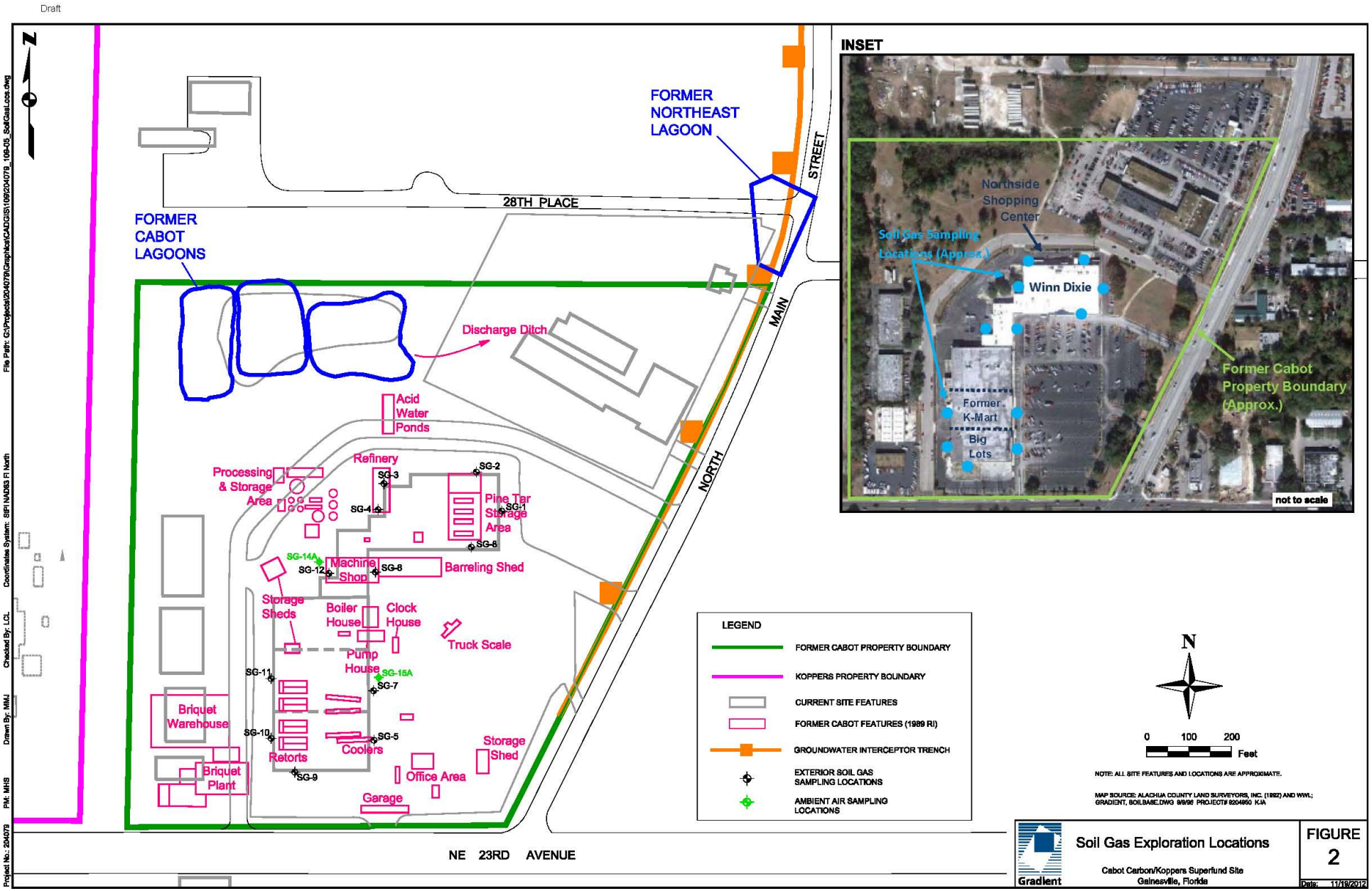

Figure 3. Locations of Former Waste Lagoons on the Cabot/Koppers Site

Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is informational purposes only regarding EPA's response actions at the Site, and is not intended for any other purpose.

Figure 4: Cabot 2013 Indoor Air Sample Locations

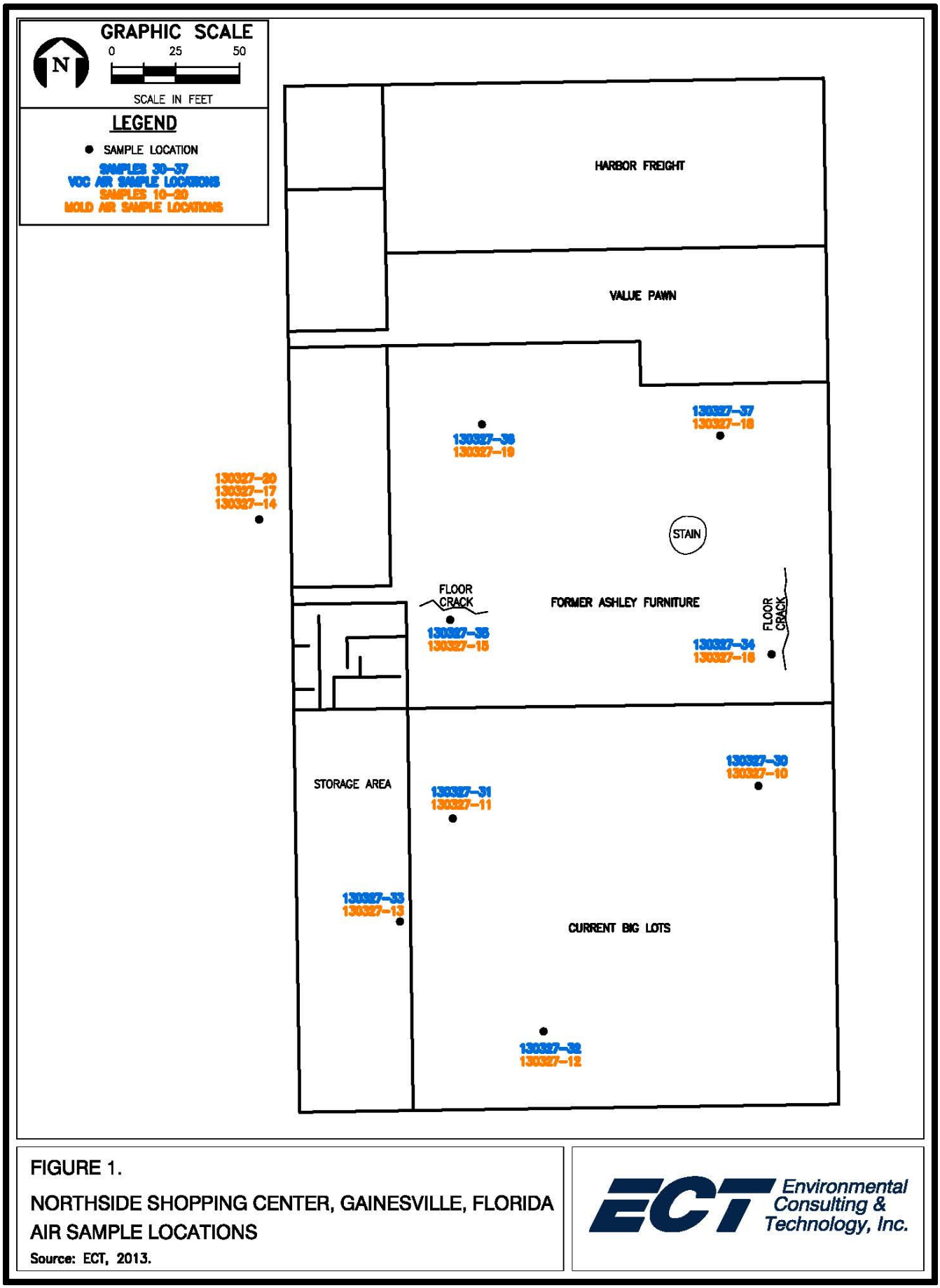

FIGURE 1.

NORTHSIDE SHOPPING CENTER, GAINESVILLE, FLORIDA
AIR SAMPLE LOCATIONS

Source: ECT, 2013.

ECT Environmental Consulting & Technology, Inc.

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