

Health Consultation

1 SINCO PLACE
(A/K/A MY SCHOOL LEARNING CENTER)

EAST HAMPTON, MIDDLESEX COUNTY, CONNECTICUT

SEPTEMBER 30, 2008

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

1 SINCO PLACE
(A/K/A MY SCHOOL LEARNING CENTER)

EAST HAMPTON, MIDDLESEX COUNTY, CONNECTICUT

Prepared By:

Connecticut Department of Public Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

The conclusions and recommendations in this health consultation are based on the data and information made available to the Connecticut Department of Public Health (CT DPH), Environmental and Occupational Health Assessment Program (EOHA) and the Agency for Toxic Substances and Disease Registry (ATSDR). EOHA and ATSDR will review additional information when received. The review of additional data could change the conclusions and recommendations listed in this document.

BACKGROUND AND STATEMENT OF ISSUE

The Connecticut Department of Public Health (CT DPH) Daycare Licensing Section (DLS) requested that CT DPH Environmental and Occupational Health Assessment Program (EOHA) evaluate environmental data from the former Sinco, Inc, located at 1 Sinco Place in East Hampton, Connecticut. My School Daycare Learning Center is currently located at the 1 Sinco Place site and has been in operation since September 2007. At the time of the DLS request, My School Learning Center was under review to receive a permanent license. As part of its daycare licensing process, the DLP crosschecks addresses of new daycares with a database of hazardous waste sites maintained by Connecticut Department of Environmental Protection (CT DEP).

The former 1 Sinco Place site now occupied by My School Learning Center is approximately 1 acre in size and is bordered by Middletown Avenue (CT Route 16) to the south, Sinco Place to the west, woods and wetlands to the east, and industrial property to the north. Please refer to Appendix A for a map of the site. The now defunct Sinco, Inc., manufactured safety nets and operated on the site until approximately 1996. An assessment of this property in the 1990s indicated numerous areas of contamination in the surface and subsurface soil of the property, which were partially remediated around 1996 [AEI 1992,1996]. Soil gas and groundwater samples were also taken during this time, but were shown not to be contaminated. A subsurface investigation performed in 2000 revealed elevated levels of arsenic in soil that exceed state remediation standards, but the investigation concluded that this was due to naturally occurring arsenic [AEI 2000]. In January 2008, EOHA, working with CT DEP, requested that the property owner perform soil sampling and analysis of the playground area of the My School Learning Center because the site had a history of elevated arsenic levels in its soil and the playground area had not been included in previous investigations,

In February 2008, in response to EOHA's request, the owner of the site sampled the soil from the playground. Because soil results showed elevated arsenic levels, EOHA worked with the property owner and CT DEP to develop a remediation program which consisted of limited excavation of arsenic hotspots and placement of 3 layers of cover to prevent exposure to the contaminated soil in the playground (a fabric liner, a layer of crushed stone, and several inches of wood chips). This remedial work was completed in February 2008, while the playground was not in use. The goal of this health consultation is to evaluate exposure and risks from arsenic in playground soil and whether remedial actions at the My School Learning Center playground are protective of public health.

Site Visit

EOHA did a site visit on January 25, 2008 along with staff from CT DEP, DLP, the My School Learning Center operator, and the Chatham Health Department (CHD). The weather was overcast and cold. Representatives from these agencies discussed the usage of the playground by daycare children. Because of the cold and snowy weather, the daycare operator stated that the playground had not been used in the last few months. EOHA also observed that the mulch cover underneath the swings was worn away. Daycare staff also stated that the playground would probably not be used again until March.

Demographics

The site is in the town of East Hampton, Middlesex County, Connecticut whose population is 13,352 [US Census Bureau 2000]. My School Learning Center has approximately 80 children in the school with a capacity of 100.

Environmental Contamination and Health Comparison Values

In February 2008, soil sampling was conducted in the playground in a random pattern at various depths (0-3, 3-6, 6-9, and 9-12 inches below ground surface (bgs)) (Table 1) [SECOR 2008]. Previous sampling reports from the 1990's indicate arsenic concentrations of up to 190 parts per million (ppm) in subsurface soil on other areas of the site that did not include the playground. Twenty-one soil samples were collected and analyzed for arsenic. The average concentration for arsenic in soil was 46 ppm, approximately four and a half times above Connecticut Remedial Standard Regulations (CT RSR) for arsenic. The maximum concentration for arsenic in soil was 260 ppm, found at 0-3 inches bgs, which is 26 times above the CT RSR for arsenic in soil. Two soil samples with the highest arsenic concentrations were also analyzed for heavy metals, polycyclic aromatic hydrocarbons (PAHs), and pesticides. Pesticides were not detected in the samples. Two PAHs (fluoranthene and pyrene) were detected in one soil sample at concentrations that were below the CT RSRs for soil. Lead, barium, and chromium were the only metals detected in the soil and their concentrations were also below the CT RSRs.

One additional soil sample was collected from the small grassy area near the exit door of the My School Learning Center and analyzed for arsenic (see map in Appendix A). That sample was below the CT RSRs and is not included in Table 1.

The CT RSRs [CT RSR 1996] were developed to protect children and adults who have contact with soils on daily basis for many years (30 years).

Table 1 gives a summary of soil sampling results collected in February 2008 from the playground of the My School Learning Center.

Table 1. Summary of Surface and Depth Soil Samples Results from the playground of My School Learning Center , 1 Sinco Place, February 2008.

Contaminant	Sampling Depth (Inches)	Concentration Range (ppm [#])	Number of Exceedances of Comparison Value/Number of Samples Taken	Average Concentration (ppm)	Comparison Value (ppm)
Arsenic	0-3	7.18-260	13/15	47.1	10 [^]
	3-6	31.3-79.3	2/2	40.0	
	6-9	54.8	1/1	----	
	9-12	43.1-65.5	3/3	55.8	

[#] Parts per Million

[^]Connecticut Remedial Standard Regulations

DISCUSSION

Exposure Pathway Analysis

To evaluate potential exposures to arsenic in soil at the playground, EOHA evaluated the environmental data and considered how people might come into contact with this contaminant in soil. The possible pathways of exposure are dermal, inhalation, and incidental ingestion. In other words, in order to be exposed to this contaminant in soil at the playground of My School Learning Center, one must come into contact with the soil by touching the soil, breathing airborne soil particles, or eating soil adhered to fingers or food items. Inhalation is not considered a complete pathway at this site because the presence of mulch minimizes the creation of soil dust. Completed past and current dermal and ingestion exposures to soil in the playground are evaluated in detail in this health consultation.

In the past, daycare children could have been exposed to the contaminated soil in the playground a couple of times a day during the weekdays on warm dry days when they were allowed to play on the playground. However, the daycare center has only been open since September 2007 and the children did not play outside in the winter months. Because of this, exposure to the contaminated soil was limited to only 4 months duration, with a frequency of 5 days/week for a child, aged 1-6 years old. This assumption is realistic, but conservative because the soil is covered mostly with mulch thus minimizing direct contact with the contaminated soil. Because past exposure pathways are complete, they will be evaluated in further detail in the next section.

Since a remedial program was implemented in February 2008 (as stated in the Background Section of this document), there is no current direct contact with the contaminated soil and thus, no current complete pathway of exposure provided that the 3 layers of protection are maintained. Because of this, current or future exposures will not be evaluated further.

Public Health Implications for Adults and Children

When determining the public health implications of exposure to hazardous contaminants, EOHA considers how people might come into contact with contaminants and compares contaminant concentrations with health protective comparison values. When contaminant levels are below health-based comparison values, health impacts from exposure to those levels are unlikely. Contaminant levels exceeding comparison values do not necessarily indicate that health impacts are likely but instead warrant further evaluation. In this health consultation, EOHA used CT RSRs as health protective screening values. As stated previously, these values are health-based levels developed to be protective of children and adults with frequent, long-term exposure to contaminants in soil. EOHA only evaluated completed exposure pathways where soil contamination exceeded CT RSRs. The only completed exposure pathways are past dermal and ingestion exposure to the contaminated soil in the playground.

Exposure to soil under these past conditions is a complete pathway for the playground of the My School Learning Center and is evaluated quantitatively in this health consultation. General toxicology information for arsenic is included in Appendix B.

In February 2008, contractors for the property owners sampled the soil throughout the playground and the DLP requested EOHA's evaluation of past exposures and risks and the protectiveness of the remedy. This section will evaluate public health implications from past exposure to arsenic in the soil of the playground of the My School Learning Center.

It is important to note that CT RSRs were developed to be protective of young children and adults exposed to soil everyday over a long term, i.e., a residential backyard scenario. It is unlikely that such frequent soil exposure would occur at the playground of the My School Learning Center because the children are at the daycare only 5 days per week. In addition, during winter months, the ground would be frozen or snow-covered, and soil contact would be minimal. Therefore, EOHA evaluated health risks based on realistic, but conservative exposure assumptions.

EOHA used the average arsenic concentration of 46 ppm in soil and calculated an average daily dose of 0.00005 mg/kg/day using the child (aged, 1-6 years) exposure assumptions described previously. This average daily dose represents a conservative estimate of dose to a child using the playground before it was remediated. This dose from the site is much lower than ATSDR's Minimum Risk Level (MRL) [ATSDR 2000] for chronic oral exposure of 0.0003 mg/kg/day and the United States Environmental Protection Agency's (US EPA's) reference dose which is also 0.0003 mg/kg/day. Dose and risk calculations are provided in Appendix C. Because the estimated average daily dose is less than ATSDR's MRL and EPA's reference dose, the exposure to arsenic is unlikely to result in any adverse health effects under the given conditions. In addition, the length of possible past exposure (4 months) is much less than the time period used to set ATSDR MRLs and US EPA's reference dose, further minimizing the potential for health risk.

In addition, EOHA used the average arsenic concentration of 46 ppm in soil and calculated an average daily dose of 0.002 mg/kg/day using the child (aged, 1-6 years) exposure assumptions described previously and the higher end of the ingestion rate of a child exhibiting pica behavior (5 grams/day or g/day). The ATSDR Guidance Manual recommends evaluation of a pica child whose age is less than 6 years old. Pica behavior is the recurrent ingestion of unusually high amounts of soil (i.e., on the order of 1-5 g/day [ATSDR 2005]). Groups at risk of soil-pica behavior include children, aged 6 years and younger and individuals who are developmentally delayed. We do not, however, believe children attending the daycare ever exhibited this type of behavior. This average daily dose represents a very conservative estimate of dose of a child using the playground before it was remediated. This dose from the site is slightly less than 10 times the ATSDR's MRL for chronic oral exposure of 0.0003 mg/kg/day and the US EPA's reference dose which is also 0.0003 mg/kg/day. Dose and risk calculations are provided in Appendix C. However, because we assumed an ingestion rate which is on the higher end of the recommended ingestion rate for a pica child, this dose represents a largely conservative estimate of what a young child could be exposed to if they consume a large amount of contaminated soil over 4 months time. In addition, because the children at My School Learning Center are aged 3 years and older, we do not expect them to ingest a large amount of soil like a younger child (less than 2 years). Furthermore, as stated earlier, the soil is covered mostly with mulch thus minimizing direct contact with the contaminated soil. Because of this, we do not expect that exposure to arsenic is unlikely to result in any adverse health effects under the given conditions. Lastly, the length of possible past exposure (4 months) is much less than the time period used to set ATSDR MRLs and US EPA's reference dose, further minimizing the potential for health risk.

Because arsenic is also a short-term (acute) toxin, EOHA also used an acute ingestion exposure scenario where a child would consume a large quantity of contaminated soil (400 mg/day) with the maximum concentration of arsenic (260 ppm) over a short time (5 days). This calculation resulted in an acute ingestion dose of 0.0055 mg/kg/day which slightly exceeds ATSDR's Acute Oral Maximum Risk Level for arsenic of 0.005 mg/kg/day. Although this acute dose slightly exceeds the ATSDR MRL, this dose is only a high end estimate of the dose a child could be exposed to in a very short period of time. In addition, 46 ppm, which is the average arsenic concentration in surface soil in the playground is a more realistic exposure concentration than the maximum concentration. We believe that such an acute scenario is very unlikely to have occurred in the past. However, if it did occur, the estimated dose exceeds the ATSDR MRL by only a very small amount. Doses above the ATSDR MRL do not necessarily indicate that health effects will occur. ATSDR MRLs include health protective safety factors. Therefore, an exposure dose from a site slightly above an ATSDR MRL will be still be well below a dose that could cause an adverse health effect.

It is important to note that although arsenic is a carcinogen, cancer risks were not calculated here because the exposure period is too short.

CONCLUSIONS

As part of the Daycare Licensing process and because of known historical soil contamination, EOHA requested that the property owner of the 1 Sinco Place Site perform soil sampling and analysis of the playground of the My School Learning Center playground which currently operates on the site. Because the soil in the playground contained elevated levels of arsenic, EOHA requested that the property owner perform remedial work on the playground which consisted of excavation of hotspots and placement of 3 layers of material to protect children from exposure to the contaminated soil. This remedial work is health protective because it prevents contact with contaminated soil remaining on the playground. The remedy will continue to be protective provided that the layers of cover are maintained.

Because direct contact with the soil is prevented by these layers of cover, children's health will not be harmed when they use the playground¹. In addition, under past site conditions (before the 3 layers of cover were placed on top of the contaminated soil), children's health would not have been harmed if they used the playground because it is unlikely that exposure to the contaminated soil was high enough to cause health effects. It is important to note, however, that although past exposures are unlikely to have posed a health threat, it was prudent to perform remedial work on the playground to ensure that potential exposures to the contaminated soil do not continue into the future.

RECOMMENDATIONS

1. EOHA recommends that the three layers of material be maintained in order to prevent exposure to the contaminated soil in the playground.
2. EOHA recommends that no digging take place on the playground without notifying CT DEP and EOHA so that contaminated soil beneath the protective layers can be managed properly.
3. EOHA recommends that CT DEP coordinate with EOHA on any further assessment or remedial plans that may be developed for this property.
4. EOHA recommends that the My School Learning Center operator, CT DEP, CHD, and the property owner notify EOHA if site conditions change (i.e., the playground is relocated, etc.). If site conditions change so that the potential

¹ ATSDR has a categorization scheme whereby the level of public health hazard at a site is assigned to one of five conclusion categories (Appendix B). CTDPH has concluded that the presence of contaminated soil under current and past conditions do not present a Public Health Hazard and that health effects are unlikely if a child were exposed to contaminated soil in the playground. This site is categorized as "posing no apparent public health hazard."

for exposure to the contaminated soil could change, then exposures and risks should be re-evaluated.

PUBLIC HEALTH PLAN

Actions Taken

1. On January 30, 2008, EOHA, along with CHD, CT DEP, DLP, the property owner, and the My School Learning Center operator held a meeting to discuss contamination and sampling issues regarding the playground of My School Learning Center. In addition, attendees did a site visit of the playground and discussed possible sampling and remedial issues regarding the site.
2. On February 25, 2008, EOHA held an availability session for parents of My School Learning Center along with DLP, CT DEP, CHD, and the daycare operator to inform parents of the remedial plans for the playgrounds as well as to answer any health related questions. EOHA also provided a fact sheet on the site which gave health related information concerning soil contamination in the playground (See Appendix E).
3. On January 29, 2008, EOHA wrote a letter to the property owner requesting sampling and analysis of soil in the playground.
4. On February 15, 2008, EOHA assisted the daycare operator in writing a letter to the parents of children attending the daycare informing them of the plans for the playground as well as related health issues.
5. On February 29, 2008, EOHA wrote a letter to the DLP informing them of EOHA's conclusion that remedial measures regarding the playground are sufficient in ensuring that the children frequenting the playground will not be exposed to contaminated soil.

Actions Planned

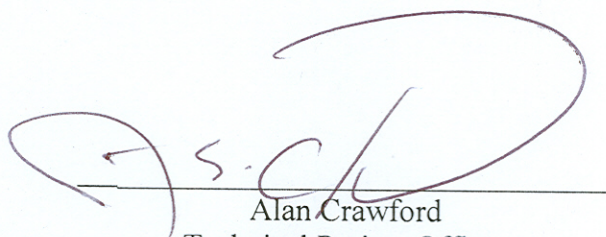
1. EOHA will continue to work with DLP, CT DEP, CHD, and the My School Learning Center to respond to health questions and concerns involving the cleanup and use of this site as well as any future assessment or cleanup work that may occur.
2. EOHA will continue to evaluate environmental data from the site if it is generated in the future.

REFERENCES

- [AEI 1992] Advanced Environmental Interface, Inc. Report on Soil and Ground Water Testing of Sinco, Inc. One Sinco Place, East Hampton, CT.
- [AEI 1996] Advanced Environmental Interface, Inc. Report on Results of Soil Removal and Confirmatory Testing of Sinco, Inc. One Sinco Place, East Hampton, CT.
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- [ATSDR 2000] Toxicological Profile for Arsenic, US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, September, 2000.
- [ATSDR 2005] Public Health Assessment Guidance Manual (Update), US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, January, 2005.
- [CT RSR 1996] Connecticut Remediation Standard Regulations, Sections 22a-133k(1) through (3) of the Regulations of Connecticut State Agencies, January 30, 1996. Available at <http://www.dep.state.ct.us/wtr/regs/remediation/rsr.pdf>. Accessed on 24 February 2006.
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- [EPA 2004] Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), EPA/540/R/99/005 OSWER 9285.7-02EP PB99-963312, Final. July 2004.
- [Secor 2008] Secor, International. Soil Sampling Results of the Playground of 1 Sinco Place. East Hampton, CT.
- [United States Census Bureau. 2000] American Fact Finder. Census 2000 Summary. Available at http://factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=04000US09&-_box_head_nbr=GCT-PH1&-ds_name=DEC_2000_SF1_U&-format=ST-7. Accessed on 24 February 2006.

CERTIFICATION

The Health Consultation for the Public Health Evaluation of 1 Sinco Place property (AKA My School Learning Center, East Hampton, Connecticut) was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the ATSDR Cooperative Agreement Program.

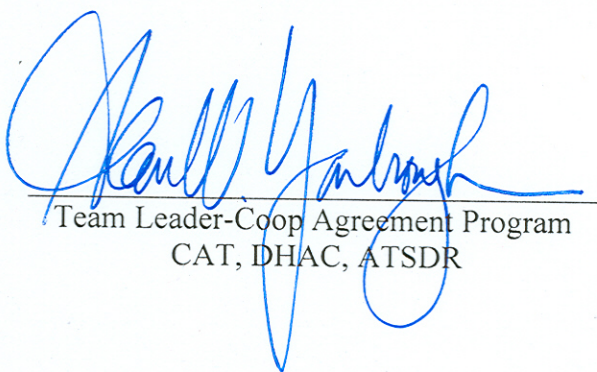


Alan Crawford

Technical Project Officer

Division of Health Assessment and Consultation (DHAC)
Agency for Toxic Substances and Disease Registry (ATSDR)

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



Team Leader-Coop Agreement Program
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Appendix A
Maps of the 1 Sinco Place Property and the Playground of the My School Learning
Center



0 50 100
Approximate Scale (ft.)
All locations approximate

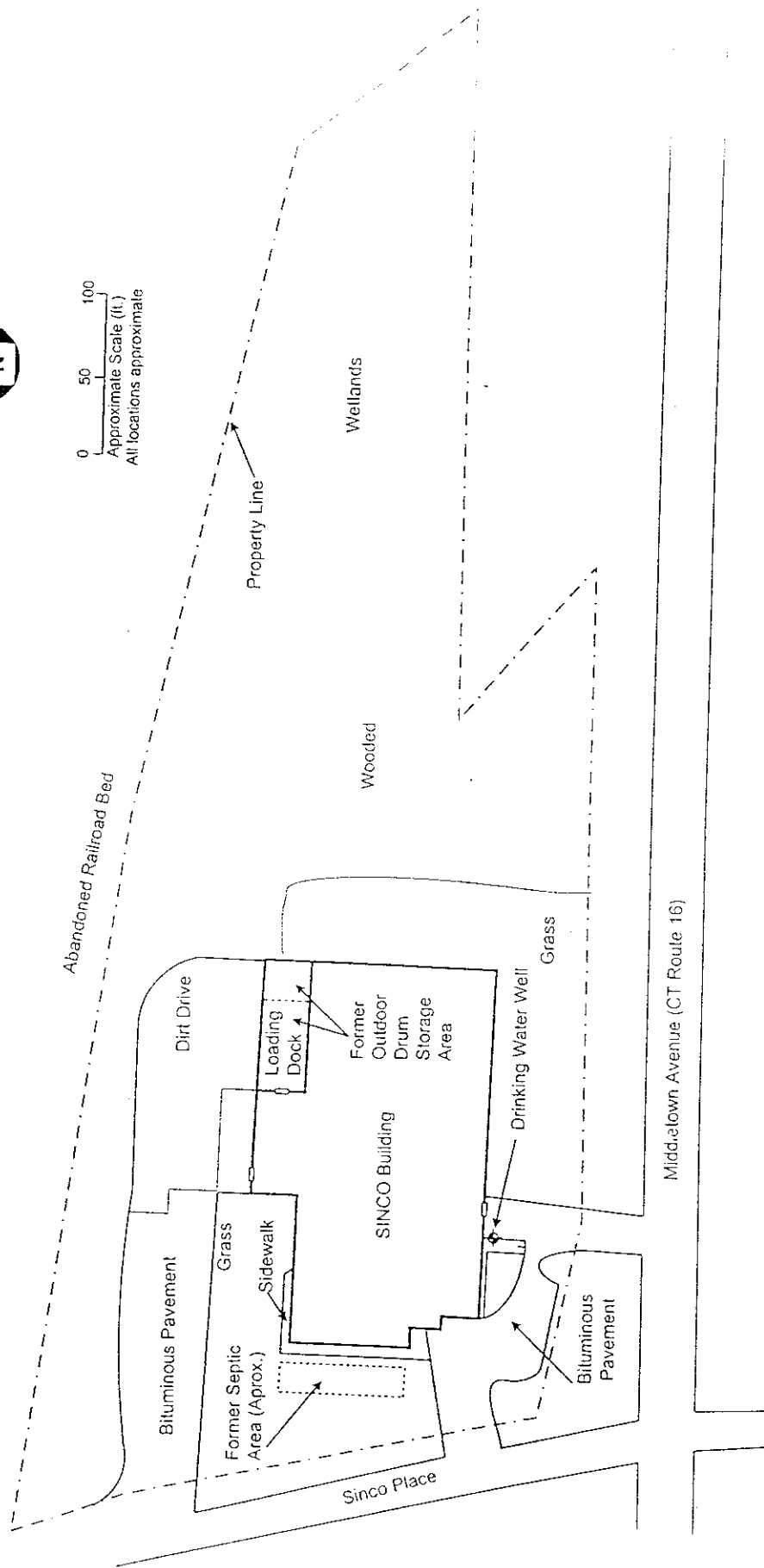
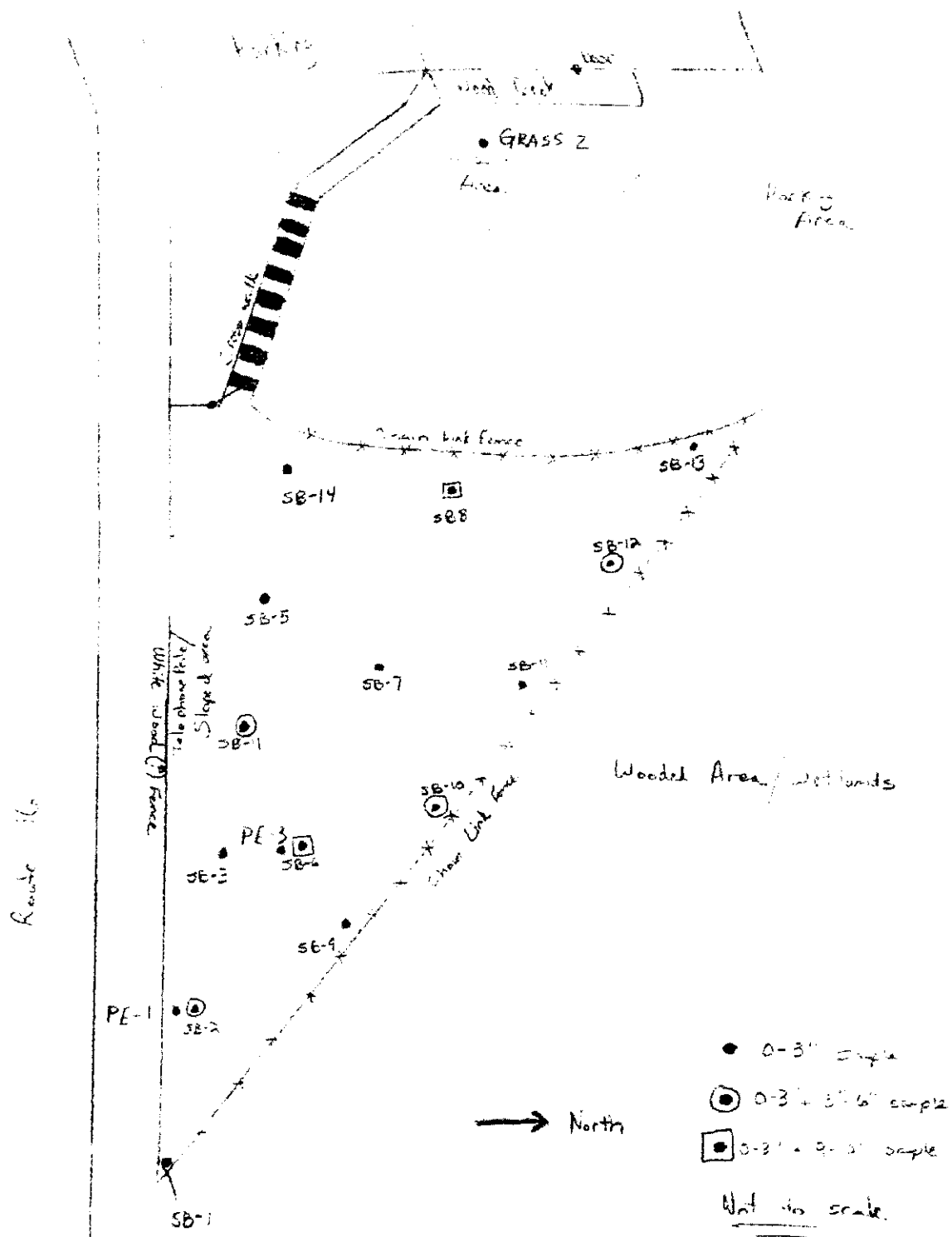


Figure 2: Site Schematic

Job No: AEI-99J-060
Location: Former SINCO, Inc.
One Sinco Place
East Hampton, CT
Date: April 2000

Advanced Environmental Interface, Inc.





One Since Place

Appendix B
ATSDR Arsenic Fact Sheet

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occurs mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found at 1,014 of the 1,598 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

- ☐ Arsenic cannot be destroyed in the environment. It can only change its form.
- ☐ Arsenic in air will settle to the ground or is washed out of the air by rain.
- ☐ Many arsenic compounds can dissolve in water.
- ☐ Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful.

How might I be exposed to arsenic?

- ☐ Eating food, drinking water, or breathing air containing arsenic.
- ☐ Breathing contaminated workplace air.
- ☐ Breathing sawdust or burning smoke from wood treated with arsenic.
- ☐ Living near uncontrolled hazardous waste sites containing arsenic.
- ☐ Living in areas with unusually high natural levels of arsenic in rock.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

appearance of small “corns” or “warts” on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

How can arsenic affect children?

We do not know if exposure to arsenic will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to inorganic arsenic.

It is likely that health effects seen in children exposed to high amounts of arsenic will be similar to the effects seen in adults.

How can families reduce the risk of exposure to arsenic?

☐ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.

☐ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

Is there a medical test to show whether I've been exposed to arsenic?

There are tests to measure the level of arsenic in blood, urine, hair, or fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or canceled many uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration has set limits of 10 µg arsenic per cubic meter of workplace air (10 µg/m³) for 8 hour shifts and 40 hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

EPA. 2001. Drinking water standard for arsenic. Office of Water. EPA 815-F-00-015.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



Appendix C Risk Calculations

Ingestion Dose- Average Concentration Arsenic, Noncancer Risk Pica 1-6 Years Old

Ing Rate (mg/d)	Ave Conc (mg/kg)	EF (d/y)	ED (yr)	C1 (10 ⁻⁶ kg/mg)	C2 (y/365d)	1/BW _c (1/kg)	1/At _{nc}				ADD _i	HI
100	46	80	0.33	0.000001	0.002739726	0.06	2				0.002079 452	7

Dermal Dose-Ave Concentration Arsenic, Noncancer Risk Child 1-6 Years Old

Ave Conc (mg/kg)	AF (mg/cm ² /-ev)	Absorption Factor (ABS _d)	Surface Area (cm ²)	EF (d/y)	ED (yr)	F (ev/day)	C1 (kg/mg)	C2 (y/365d)	1/BW _c	1/AT _{nc}	ADD _d	
46	0.2	0.03	3307	80	0.33	1	0.000001	0.0027397	0.06	2	7.92201E -6	

Ingestion Dose- Ave Concentration Arsenic, Noncancer Risk Child 1-6 Years Old

Ing Rate (mg/d)	Ave Conc (mg/kg)	EF (d/y)	ED (yr)	C1 (10 ⁻⁶ kg/mg)	C2 (y/365d)	1/BW _c (1/kg)	1/At _{nc}				ADD _i	HI
100	46	80	0.33	0.000001	0.002739726	0.06	2				0.000041 589	0.165

Dermal Dose-Ave Concentration Arsenic, Noncancer Risk Child 1-6 Years Old

Ave Conc (mg/kg)	AF (mg/cm ² /-ev)	Absorption Factor (ABS _d)	Surface Area (cm ²)	EF (d/y)	ED (yr)	F (ev/day)	C1 (kg/mg)	C2 (y/365d)	1/BW _c	1/AT _{nc}	ADD _d	
46	0.2	0.03	3307	80	0.33	1	0.000001	0.0027397	0.06	2	7.92201E -6	

Acute Ingestion for a Child, Aged 2 years, Using Max Concentration

Ing Rate (mg/d)	Max Conc (mg/kg)	C1 (10 ⁻⁶ kg/mg)	C3 (d/wk)	1/BW _c (1/kg)	1/At _{nc}	C4 (1 wk)			ADD _i
400	260	0.000001	5	0.08	0.14	1			0.0055328

WHERE:

ABS _d	= Soil dermal absorption fraction Arsenic: 0.03 [EPA 2004]
ADD _d	= Average daily dose from dermal contact
ADD _i	= Average daily dose from ingestion
AF	= Recommended skin-soil adherence factor for a child aged 1-6 years; (moist conditions) 0.2 mg/cm ² -ev [EPA 2004]
AT _{nc}	= Averaging time for noncancer risk; 6 months, acute ingestion; 7dy
Bw _c	= child, aged 1-6 yr, 50 th percentile body weight [EPA 1997]; 16 kg
C1	= Conversion factor; 10 ⁻⁶ kg/mg
C2	= Conversion factor; 1 year/365 days
C3	= Conversion factor; 7d/week
C4	= Conversion factor; 1 week
ED	= Exposure duration; 4 months for a child
EF	= Exposure frequency; 80 days/year (5 days/wk, 4 months/yr)
F	= Event frequency, 1 event/day (1ev/day)
HI	= Hazard Index
Ing Rate	= Soil ingestion rate for a child, aged 1-6 yrs; 100 mg/day [EPA 1997]; pica Child, aged 1-6 years; 5g/day [ATSDR 2005] Acute Ingestion Rate for a child, aged 1-6 years; 400 mg/day
MRL	= ATSDR minimal risk level (MRL); Arsenic: 0.0003 mg/kg/day
SA	= Skin surface area, 50 th percentile child, aged 1-6 years: legs, feet, hands, and arms; 3307 cm ² [EPA 1997]
[Soil]	= Maximum Soil concentration, Arsenic : 260 mg/kg

Appendix D. ATSDR Public Health Categories

Category/Definition	Criteria	ATSDR Actions
<p>1. Urgent Public Health Hazard</p> <p>This category is used for sites where short-term exposures (< 1 year) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.</p> <p>This determination represents a professional judgment based on critical data which ATSDR has judged sufficient to support a decision.</p> <p>This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information indicates that the site-specific conditions or likely exposures have had, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards.</p>	<p>ATSDR will expeditiously issue a health advisory that includes strong recommendations to immediately stop or reduce exposure to mitigate the health risks posed by the site.</p>
<p>2. Public Health Hazard</p> <p>This category is used for sites that pose a public health hazard due to the existence of long-term exposures (> 1 year) to hazardous substance or conditions that could result in adverse health effects.</p> <p>This determination represents a professional judgment based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.</p>	<p>ATSDR will make recommendations to stop or reduce exposure in a timely manner to mitigate the health risks posed by the site.</p>

Appendix D. ATSDR Public Health Categories (Continued)

Category/Definition	Criteria	ASTDR Actions
<p>3. Indeterminate Public Health Hazard</p> <p>This category is used for sites in which “critical” data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.</p> <p>This determination represents a professional judgment that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.</p>	<p>This category is used for sites in which “critical” data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels. The health assessor must determine, using professional judgement, the “criticality” of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible, to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.</p>	<p>ATSDR will make recommendations in the public health assessment to identify the data or information needed to adequately assess the public health risks posed by the site.</p>
<p>4. No Apparent Public Health Hazard</p> <p>This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.</p> <p>This determination represents a professional judgment based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.</p>	<p>Recommendations made to reduce exposure are not needed to reduce risk but may be considered prudent public health practice.</p>
<p>5. No Public Health Hazard</p> <p>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.</p>	<p>Sufficient evidence indicates that no human exposures to contaminated media may have occurred, no exposures are currently occurring, and exposures are not likely to occur in the future.</p>	<p>ATSDR may make no recommendations or may recommend community health education.</p>

Appendix E
1 Sinco Place (My School Learning Center)
Fact Sheet

Questions and Answers about Soil Testing at "My School" Daycare

One Sinco Place, East Hampton, CT

BACKGROUND

This fact sheet was written to give you information about soil testing that was done recently in the playground at the 'My School' daycare center.

The 'My School' daycare is located on a parcel of land that was once used for manufacturing. The Sinco Inc. company made plastic safety nets and used various chemicals in their manufacturing process. After they stopped manufacturing about 10 years ago, the company did soil cleanup on the property in areas where their chemicals had contaminated the soil. However, at that time, the company discovered that some areas of soil on the property contained arsenic at levels above Connecticut's soil cleanup standards. The company did not do any soil cleanup for arsenic because, according to the company:

- they did not use arsenic as part of their manufacturing process; and
- they thought that any arsenic was naturally-occurring.

The areas of the property where high arsenic was originally found are now covered with buildings or pavement.

In January 2008, during the CT Department of Public Health's (DPH's) daycare licensing process, DPH worked with the CT Department of Environmental Protection (DEP) to review past reports of testing and cleanup of the property. Because the soil in the playground area had never been tested, DEP and DPH asked the property owner (Global Storage LLC) to test the playground soil. That testing was completed on February 7, 2008.



WHAT WAS FOUND IN SOIL IN THE PLAYGROUND?

Soil beneath the layer of woodchips was collected from 14 different locations across the playground. At all locations, the top 3 inches of soil was tested. At some locations, slightly deeper soil was also tested (3 to 6 inches and 9 to 12 inches below ground surface).

At almost all the places tested in the playground, arsenic is present at levels higher than Connecticut's soil cleanup standard. The highest level of arsenic found is about twenty-six times greater than the cleanup standard. Most of the samples are 3 to 5 times higher than the cleanup standard.

The 3 soil samples with the highest amounts of arsenic were also tested for other contaminants such as pesticides and lead. Results from those tests are not yet available.

WHAT IS ARSENIC? WHERE DID IT COME FROM?

Arsenic is found naturally in soil and rock at low levels. The major uses of arsenic are as wood preservatives and agricultural pesticides.

We don't know for sure where the arsenic found in the playground soil came from. The company that made safety nets says they did not use any arsenic in their manufacturing. Natural (background) levels of arsenic in soil vary across CT, depending on the local geology. However, some of the levels of arsenic found in the playground soil at My School are higher than we typically see naturally. It is possible that arsenic-contaminated soil was brought in from another location as fill.

UNDERSTANDING EXPOSURES TO CHEMICALS

Any chemical that enters your body can be harmful if you take in too much. Whether your health will be affected by a chemical that gets into your body depends on several factors.

- How much of the substance you take in.
- How long you are exposed to it.
- How it enters the body (for example, through eating, drinking, breathing, or touching).
- Your age, general health and other individual traits that determine how susceptible you are to health effects.
- Other exposures you have to the same or similar substances.
- How toxic the substance is.

You cannot be harmed by chemicals in the soil unless you are **exposed** to the chemical, in large enough amounts. **Exposed** means that you have come into contact with the chemical and it has gotten into your body. The three ways soil can get into the body are:

- ✓ **Eating** (for example, putting dirty fingers or toys in the mouth)
- ✓ **Touching** (some chemicals can be absorbed into the body through the skin; arsenic is not easily absorbed through the skin.)
- ✓ **Breathing** soil dust particles in the air.

DID THE ARSENIC IN THE PLAYGROUND SOIL HARM THE CHILDREN?

Not likely.

The only way for a child to be exposed to enough arsenic to cause harm is if the child plays directly in the soil on a daily basis, such as for many years. Children at My School have not had much chance to come into contact with playground soil for the following reasons:

- The playground at My School has a layer of woodchips covering the soil. This helps minimize the amount of contact children have with the soil.
- Children have not used the playground for very long because My School opened less than one year ago. In addition, the playground has not been used very much during the cold winter weather.

SHOULD I HAVE MY CHILD TESTED FOR ARSENIC EXPOSURE?

We do not recommend that children be tested. There are two reasons why we do not recommend medical testing.

First, we believe that children were not exposed to enough arsenic, for long enough periods of time for medical testing to be useful. Second, while medical tests for arsenic exist, they cannot easily determine whether a child has been exposed to above-average arsenic levels. More importantly, tests can not tell you whether arsenic in your child's body will harm his/her health.

It is important to know that all of us have measurable amounts of arsenic in our bodies. Arsenic is present in large amounts in fish and shellfish. The type of arsenic in fish and shellfish is not harmful. However, standard medical tests cannot distinguish between the type of arsenic in soil (which can be harmful) from the type of arsenic in fish and shellfish (which is not harmful).

WHAT WILL BE DONE WITH THE PLAYGROUND TO ADDRESS THE ARSENIC IN THE SOIL?

DPH and DEP are working with the property owner (Global Storage LLC.) on a cleanup plan for the playground. This plan will likely involve limited soil removal in areas of the playground with the highest arsenic levels. The cleanup plan is also likely to include placing additional layers of covering across the entire playground (such as heavy landscaping fabric, crushed stone, and wood chips). When these actions are complete, children will not be able to come into contact with playground soil containing arsenic. The property owner would like to begin the cleanup process on the playground during the week of February 18th, provided that cover materials are available.

**SOME ADDITIONAL INFORMATION ABOUT ARSENIC**

We know a lot about health effects from exposure to arsenic by studying people who were exposed to very high levels of arsenic for a long time. Eating or breathing arsenic for a long time can cause a darkening of the skin, redness or swelling of the skin, and the appearance of "corns" or "warts" on the skin. In addition, studies have shown that exposure to arsenic every day for many years can increase the risk of several types of cancer (skin, liver, bladder lung).

Important: We do not expect to see any of these health effects in children at My School daycare because exposure to soil is not high enough.

WHAT IF I HAVE MORE QUESTIONS?

My School will be hosting an informational meeting for parents in late February. Health and environmental experts will be available at the meeting to answer your questions and concerns. You can also contact the state or local health department, or the DEP directly using the following contact information. If your child's pediatrician has questions about health issues and arsenic, they may also call the DPH contact below.

CT Department of Public Health

Sharee Rusnak

860-509-7583

Sharee.Rusnak@ct.gov

Chatham Health District

Thad King, Director of Health

860-267-9601

healthdirector@easthamptonct.org

Gil Richards

CT Department of Environmental Protection

860-424-3523

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