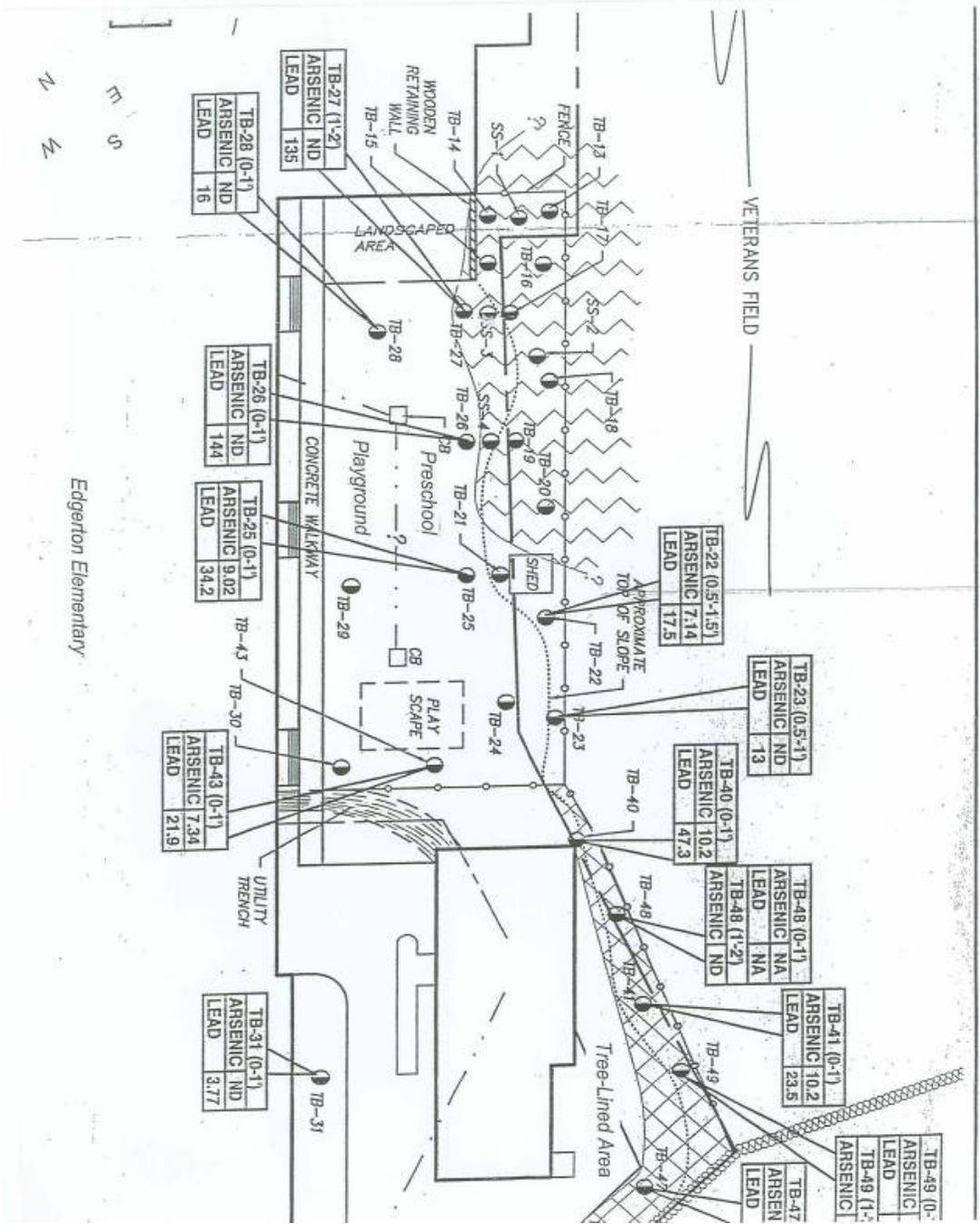
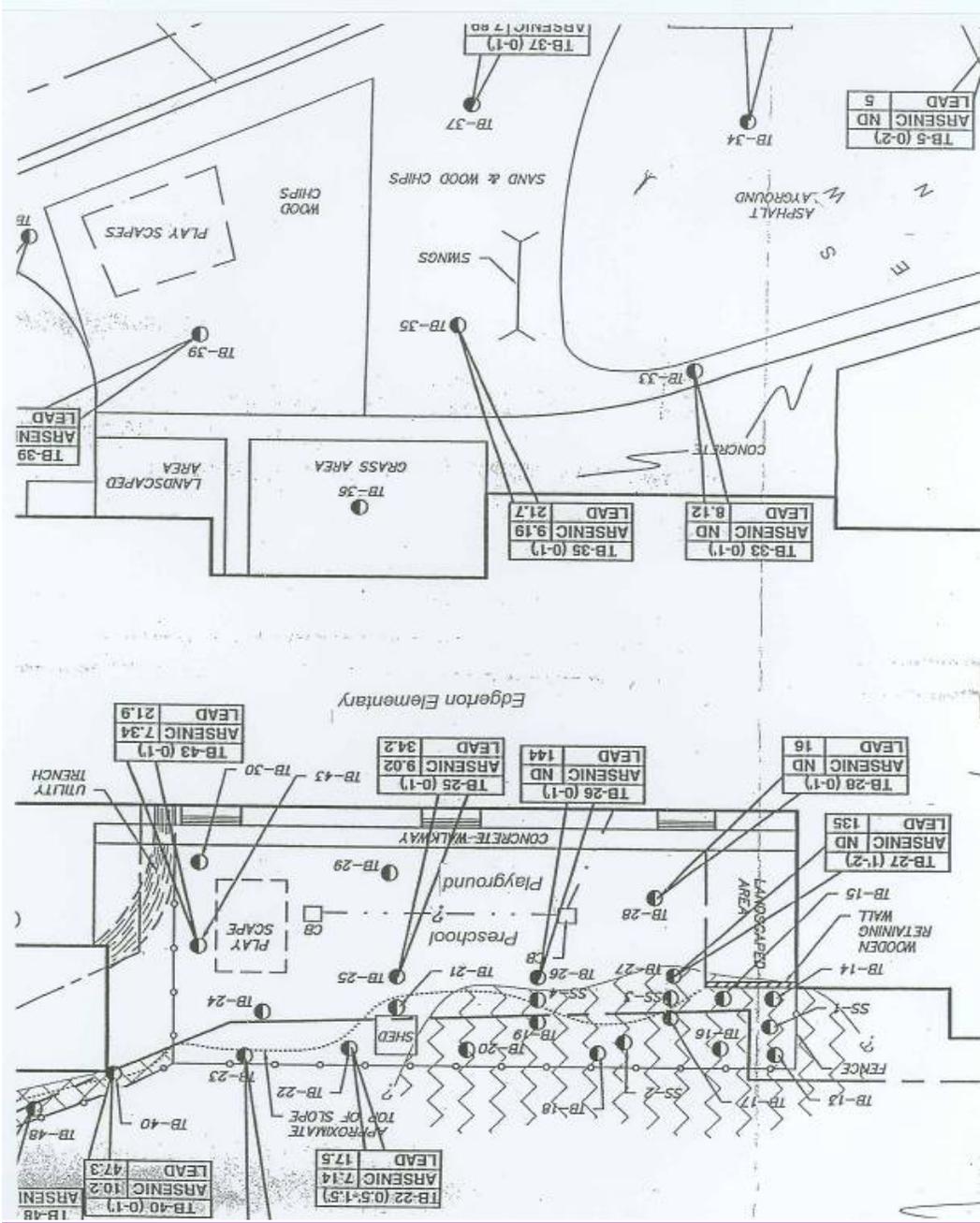


Appendix A
 Maps of Veteran's Field and Edgerton Elementary School





Appendix B
ATSDR Arsenic and Lead Fact Sheets

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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?

- 0 Arsenic cannot be destroyed in the environment. It can only change its form.
- 0 Arsenic in air will settle to the ground or is washed out of the air by rain.
- 0 Many arsenic compounds can dissolve in water.
- 0 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?

- 0 Eating food; drinking water, or breathing air containing arsenic;
- 0 Breathing contaminated workplace air.
- 0 Breathing sawdust or burning smoke from wood treated with arsenic.
- 0 Living near uncontrolled hazardous waste sites containing arsenic.
- 0 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

ToxFAQsThI 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 fl.g arsenic per cubic meter of workplace air (10 fl.g/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. ToxFAQsTM 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

Veteran's Field and Edgerton Elementary Preschool Playground
New London, Connecticut

Comment [T1]: Add date and info about who developed these risk calculations

A. Veteran's Field, Noncancer Risks, Child age 1-6 years

1a. Ingestion Dose-Arsenic

In this calculation, we are estimating the average daily dose of arsenic a child, aged 1-6 years, would receive from via ingestion of soil.

$$\begin{aligned} ADD_i &= I_r \cdot [Soil] \cdot EF_1 \cdot ED \cdot C1 \cdot C2 \cdot 1/BW_c \cdot 1/AT_{nc} \\ ADD_i &= 100 \text{ mg/d} \cdot 15 \text{ mg/kg} \cdot 196 \text{ d/y} \cdot 6 \text{ yr} \cdot 10^{-6} \text{ kg/mg} \cdot \text{y}/365 \text{ d} \cdot 1/16 \text{ kg} \cdot 1/6 \text{ yr} \\ &= 5.05 \text{ E-5 mg/kg/day} \end{aligned}$$

2a. Dermal Dose-Arsenic

In this calculation, we are estimating the average daily dose of arsenic a child, aged 1-6 years, would receive from dermal exposure to soil.

$$\begin{aligned} ADD_d &= [Soil] \cdot AF \cdot ABS_d \cdot SA \cdot EF \cdot ED \cdot F \cdot C1 \cdot C2 \cdot 1/BW_c \cdot 1/AT_{nc} \\ ADD_d &= 15 \text{ mg/kg} \cdot 0.2 \text{ mg/cm}^2 \cdot \text{ev} \cdot 0.03 \cdot 3307 \text{ cm}^2 \cdot 196 \text{ d/y} \cdot 6 \text{ yr} \cdot 1 \text{ ev/d} \cdot 10^{-6} \text{ kg/mg} \cdot \text{y}/365 \text{ d} \cdot 1/16 \text{ kg} \cdot 1/6 \text{ yr} \\ &= 1.00 \text{ E-5 mg/kg/day} \end{aligned}$$

3a. Noncancer Hazard Index-Arsenic

$$\begin{aligned} HI &= (ADD_i + ADD_d)/RfD \\ HI &= (5.05 \text{ E-5 mg/kg/day} + 1.00 \text{ E-5 mg/kg/day})/0.0003 \text{ mg/kg/day} \\ HI &= 0.20 \end{aligned}$$

A Hazard Index of 1 means that the estimated dose is equal to the safe dose. A Hazard Index less than 1 indicated that the estimated dose is below the safe dose and noncancer health effects are unlikely. A Hazard Index (HI) greater than 1 indicates that the estimated dose is above the safe dose and noncancer health impacts cannot be ruled out. In this case, HI for arsenic is below 1. This indicates that noncancer health impacts from arsenic are unlikely.

B. Cancer Risks, child/adult age 1-30

1b. Ingestion Dose-Arsenic

In this calculation, we are estimating the average lifetime daily dose of arsenic a child/adult, age 1-30 years would receive during ingestion of soil.

$$\begin{aligned} LADD_c &= I_r \cdot [Soil] \cdot EF \cdot ED \cdot C1 \cdot C2 \cdot 1/BW_c \cdot 1/AT_c \\ LADD_c &= 100 \text{ mg/d} \cdot 15 \text{ mg/kg} \cdot 196 \text{ d/yr} \cdot 6 \text{ yr} \cdot 10^{-6} \text{ kg/mg} \cdot \text{yr}/365 \text{ d} \cdot 1/16 \text{ kg} \cdot 1/70 \text{ yr} \\ &= 4.32 \text{ E-6 mg/kg/day} \end{aligned}$$

$$LADD_a = IR_a * [Soil] * EF * ED * CI * C2 * 1 / BW_a * 1 / AT_c$$

$$LADD_a = 50 \text{ mg/d} * 15 \text{ mg/kg} * 196 \text{ d/yr} * 24 \text{ yr} * 10^{-6} \text{ kg/mg*yr/365d} * 1/70 \text{ kg} * 1/70 \text{ yr}$$

$$= 2.0E-6 \text{ mg/kg/day}$$

2b. Dermal Dose-Arsenic (Child/Adult 1-30 Years)

In this calculation, we are estimating the average lifetime daily dose of arsenic a child/adult, age 1-30 years would receive during dermal exposure of soil.

$$LADDD_c = [Soil] * AF * ABS_d * SA * EF * ED * F * CI * C2 * 1 / BW_c * 1 / AT_c$$

$$LADDD_c = 15 \text{ mg/kg} * 0.2 \text{ mg/cm}^2 \text{-ev} * 0.03 * 3307 \text{ cm}^2 * 275 \text{ d/y} * 6 \text{ yr} * 1 \text{ ev/d} * 10^{-6} \text{ kg/mg*y/365d} * 1/16 \text{ kg} * 1/70 \text{ yr}$$

$$= 8.58E-7 \text{ mg/kg/day}$$

$$LADDD_a = [Soil] * AF * ABS_d * SA * EF * ED * F * CI * C2 * 1 / BW_a * 1 / AT_c$$

$$LADDD_a = 15 \text{ mg/kg} * 0.07 \text{ mg/cm}^2 \text{-ev} * 0.03 * 10,695 \text{ cm}^2 * 275 \text{ d/y} * 24 \text{ yr} * 1 \text{ ev/d} * 10^{-6} \text{ kg/mg*y/365d} * 1/70 \text{ kg} * 1/70 \text{ yr}$$

$$= 8.88E-7 \text{ mg/kg/day}$$

3b. Cancer Risk-Arsenic

$$ELCR = (LADD_c + LADD_a + LADDD_c + LADDD_a) * CSF$$

$$ELCR = (4.32E-6 + 2.0E-6 + 8.58E-7 + 8.88E-7) * 1.5 \text{ (mg/kg/day)}^{-1}$$

$$ELCR = 1.2E-5$$

The Estimated Lifetime Risk for arsenic is 1 E-5 (1 in 100,000). This means that if 100,000 people were exposed to arsenic in soil at the concentration, frequency, and duration of exposure assumed in the calculation detailed above, there would be a theoretical increase of 1 cancers above the number of cancers that would normally be expected to occur in the population of 100,000. Background rates of cancer in the U.S. are one in 2 or 3 (NCI 2001). This means that in a population of 100,000 background numbers of cancer cases would be approximately 33,000 to 50,000. Arsenic exposure could result in a theoretical increase of 1 cancer case above the background number of 33,000 to 50,000 cancer cases. This represents minimal increased cancer risk.

C. Preschool Playground Area, Noncancer risks, child aged 2-5 years

1c. Ingestion Dose-Arsenic

In this calculation, we are estimating the average daily dose of arsenic a preschool child, aged 2-5 years, would receive from via ingestion of soil.

$$ADD_{ip} = Ir_c * [Soil] * EF * ED * CI * C2 * 1 / BW_{cp} * 1 / AT_{ncp}$$

$$ADD_{ip} = 100 \text{ mg/d} * 25.4 \text{ mg/kg} * 196 \text{ d/y} * 3 \text{ yr} * 10^{-6} \text{ kg/mg*y/365d} * 1/15.3 \text{ kg} * 1/3 \text{ yr}$$

$$= 8.93 E-5 \text{ mg/kg/day}$$

2c. Dermal Dose-Arsenic

In this calculation, we are estimating the average daily dose of arsenic a preschool child, aged 2-5 years, would receive from dermal exposure to soil.

$$\begin{aligned}
ADD_d &= [Soil] * AF * ABS_d * SA * EF * ED * F * C1 * C2 * 1 / BW_c * 1 / AT_{nc} \\
ADD_d &= 25.4 \text{ mg/kg} * 0.2 \text{ mg/cm}^2 / \text{-ev} * 0.03 * 3307 \text{ cm}^2 * 196 \text{ d/y} * \\
&\quad 3 \text{ yr} * 1 \text{ ev/d} * 10^{-6} \text{ kg/mg} * \text{yr} / 365 \text{ d} * 1 / 15.3 \text{ kg} * 1 / 3 \text{ yr} \\
&= 1.77 \text{ E-5 mg/kg/day}
\end{aligned}$$

3c. Noncancer Hazard Index-Arsenic

$$HI = (ADD_i + ADD_d) / RfD$$

$$HI = (8.93 \text{ E-5 mg/kg/day} + 1.77 \text{ E-5 mg/kg/day}) / 0.0003 \text{ mg/kg/day}$$

$$HI = 0.36$$

A Hazard Index of 1 means that the estimated dose is equal to the safe dose. A Hazard Index less than 1 indicated that the estimated dose is below the safe dose and noncancer health effects are unlikely. A Hazard Index (HI) greater than 1 indicates that the estimated dose is above the safe dose and noncancer health impacts cannot be ruled out. In this case, HI for arsenic is below 1. This indicates that noncancer health impacts from arsenic are unlikely.

D. Preschool Playground Area, Cancer Risks, Preschool Child, Age 2-5 Years

1d. Ingestion Dose-Arsenic

In this calculation, we are estimating the average lifetime daily dose of arsenic a preschool child, age 2-5 years would receive during ingestion of soil.

$$LADD_{pc} = IR_c * [Soil] * EF * ED * C1 * C * 1 / BW_c * 1 / AT_c$$

$$\begin{aligned}
LADD_{pc} &= 100 \text{ mg/d} * 25.4 \text{ mg/kg} * 196 \text{ d/yr} * 3 \text{ yr} * 10^{-6} \text{ kg/mg} * \text{yr} / 365 \text{ d} * 1 / 15.3 \text{ kg} * 1 / 70 \text{ yr} \\
&= 3.83 \text{ E-6 mg/kg/day}
\end{aligned}$$

2d. Dermal Dose-Arsenic, Preschool Child, Age 2-5 Years

In this calculation, we are estimating the average lifetime daily dose of arsenic a preschool child, age 2-5 years would receive during dermal exposure of soil.

$$LADDD_{pc} = [Soil] * AF * ABS_d * SA * EF * ED * F * C1 * C2 * 1 / BW_c * 1 / AT_c$$

$$\begin{aligned}
LADDD_{pc} &= 25.4 \text{ mg/kg} * 0.2 \text{ mg/cm}^2 / \text{-ev} * 0.03 * 3307 \text{ cm}^2 * 196 \text{ d/y} * 3 \text{ yr} * 1 \text{ ev/d} * \\
&\quad 10^{-6} \text{ kg/mg} * \text{yr} / 365 \text{ d} * 1 / 15.3 \text{ kg} * 1 / 70 \text{ yr} \\
&= 7.6 \text{ E-7 mg/kg/day}
\end{aligned}$$

3d. Cancer Risk-Arsenic

$$ELCR = (LADD_{pc} + LADDD_{pc}) * CSF$$

$$ELCR = (3.83 \text{ E-6} + 7.6 \text{ E-7}) * 1.5 \text{ (mg/kg/day)}^{-1}$$

$$ELCR = 6.89 \text{ E-6}$$

The Estimated Lifetime Risk for arsenic is 7E-6 (7 in 1,000,000). This means that if 1,000,000 people were exposed to arsenic in soil at the concentration, frequency, and duration of exposure assumed in the calculation detailed above, there would be a theoretical increase of 7 cancers above the number of cancers that would normally be expected to occur in the population of 1,000,000. Background rates of cancer in the U.S. are one in 2 or 3 (NCI 2001). This means that in a population of 1,000,000 background

numbers of cancer cases would be approximately 330,000 to 500,000. Arsenic exposure could result in a theoretical increase of 4 cancer cases above the background number of 330,000 to 500,000 cancer cases. This represents minimal increased cancer risk.

WHERE:

ADD _i	= average daily dose from ingestion
ADD _d	= average daily dose from dermal contact
LADD _c	= lifetime average daily dose from ingestion for child, aged 1-6 years
LADD _{pc}	= lifetime average daily dose from ingestion for a preschool child, aged 2-5 years
LADD _a	= lifetime average daily dose from ingestion for adult, aged 7-30 years
LADDD _a	= lifetime average dermal daily dose for child, aged 1-6 years
LADDD _{pc}	= lifetime average dermal daily dose for a preschool child, aged 2-5 years
LADDD _a	= lifetime average dermal daily dose for adult, aged 7-30 years
IR _c	= soil ingestion rate for a child; 100 mg/day (EPA 1997)*
IR _a	= soil ingestion rate for an adult; 50 mg/day (EPA 1997)*
AF	= skin-soil adherence factor for default residential child; 0.2 mg/cm ² -ev; default residential adult; 0.07 mg/cm ² -ev (EPA 2001b)
ABS _d	= Soil dermal absorption fraction Arsenic: 0.03 (EPA 2001b),
SA	= Skin surface area, 50 th %ile legs, feet, hands, and arms, child aged 1-6; 3307 cm ² (EPA 1997), legs, arms, hands, and feet, adult; 10,695 cm ² (EPA 2001b)
[Soil]	= soil concentration; Veteran's Field: arsenic : 15 mg/kg (95% UCL). Preschool Playground at Edgerton Elementary: arsenic: 25.4 mg/kg (maximum concentration)
EF	= exposure frequency; 196 days/year (5 days/wk, 9 months/year)
F	= event frequency, 1 ev/day
ED	= exposure duration; 6 years for child, 3 years for preschool child, 24 years for adult
C1	= conversion factor; 10 ⁻⁶ kg/mg
C2	= conversion factor; 1 year/365 days
Bw _c	= child 50 th %tile body weight for age 1-6 yrs (EPA 1997); 16 kg
Bw _{pc}	= child 50 th %tile body weight for age 2-5 yrs (EPA 1997); 15.3 kg
Bw _a	= adult 50 th %tile body weight (EPA 1997); 70 kg
AT _{nc}	= averaging time for noncancer risk; 6 years
AT _c	= averaging time for cancer risk; 70 years
AT _{ac}	= average time for noncancer risk for Veteran's Field: 6 years Preschool Playground for Edgerton Elementary School: 3 years.
RfD	= EPA Reference Dose Arsenic; 3E-4 mg/kg/day (IRIS)
CSF	= Cancer Slope Factor Arsenic: 1.5 (mg/kg/day) ⁻¹ (IRIS)
HI	= Hazard Index
CSF	= Cancer Slope Factor

** EPA (1997) recommends using soil ingestion rates of 100 mg/day for child < 6 years and 50 mg/day a child/adult over 6 years old. The U.S. EPA states that these values represent best estimates of average soil ingestion rates. U.S. EPA programs have used 200 mg/day and 100 mg/day as conservative estimates of average soil intake rates. CTDPH opted to use the best estimate average values of 100 mg/day and 50 mg/day rather than the more conservative estimates for the sake of consistency.*

ATSDR (2002) advises using the 95% upper confidence limit of the arithmetic mean. This was performed using Pro UCL (EPA 2001a). A 95% UCL accounts for the variability in the data and ensures that the mean is not underestimated.

Appendix D
Arsenic Fact Sheet for Teachers
Questions and Answers About Arsenic at Veteran's Field, New London

What is Arsenic?

Arsenic is an element that can be found naturally in soil and rock. Arsenic is also used to preserve wood to make it resistant to rotting and decay. Arsenic was also used in the past as a pesticide, primarily on cotton fields and in orchards.

Are there different forms of Arsenic?

Yes, there are two forms of arsenic, inorganic and organic arsenic. The form of arsenic being cleaned up at Veteran's Field next to Edgerton School is **inorganic arsenic**.

Because arsenic is always present in soil, it can get into lakes, rivers or groundwater. When arsenic gets into fish and shellfish, they change it to a harmless form called **organic arsenic** (fish arsenic).

Why Is The Difference Between Organic And Inorganic Arsenic Important?

Organic arsenic can be present in your body in large amounts if you eat fish or seafood, but this form of arsenic is NOT harmful. In contrast, inorganic arsenic can be harmful if you get enough of it in your body.

Is There A Medical Test To Show If I Have 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 for arsenic exposure within the last few days. 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.

It is important to understand that a urine test measures the total amount of arsenic (that is, arsenic from fish plus inorganic arsenic). The arsenic that we are concerned about is inorganic arsenic. Special laboratory procedures are required to separate the inorganic from the organic forms.

If I Eat Fish Or Shellfish Before I Have A Urine Test, Can It Cause My Urine Arsenic Levels To Be High?

Yes! Eating fish or shellfish within a few days before a urine test can cause elevated arsenic levels. Usually the physician who orders the test will tell you not to eat seafood for 3 days prior to the test.

What Is A Normal Urine Arsenic Level?

The Agency for Toxic Substances and Disease Registry (ATSDR) says that urine arsenic levels are normally below 50 µg/L when the child or adult has not eaten seafood within the last 2 or 3 days. Levels can be much higher if seafood was eaten recently. For example, volunteers in a recent study had urine arsenic levels of 30 µg/L before eating a

lunch of lobster tail. Four hours after the lobster lunch, they had an average urine arsenic level of 1,300 ug/L. These high values went back to the 'before lunch' levels within two days.

Because arsenic exposure is so common in food, we would generally expect everyone to have some measurable amount of arsenic in his or her urine.

How High Do Urine Arsenic Levels Have To Be Before I Can Get Sick?

ATSDR believes that levels above 200 µg/L can result in adverse health effects. They do not expect to see any health effects in children or adults with arsenic levels below 50 ug/L. However, there is uncertainty about whether health effects are expected when urine arsenic levels are between 50 and 200 µg/L.

How Do I Get Exposed To Arsenic?

For most people, diet is the largest source of arsenic exposure. As previously mentioned, seafood contains arsenic so diet is usually the primary source of arsenic exposure. There are also trace levels of arsenic in other foods such as rice, mushrooms and poultry. The arsenic you get in your food is the nontoxic, organic form of arsenic.

You can also be exposed to inorganic arsenic from soil, drinking water, cigarette smoke, pressure treated wood, some pesticides and some herbal remedies.

My Child's Urine Test Came Back Elevated And He Doesn't Eat Fish. What Other Sources Of Arsenic Could Cause This?

Eating a lot of seafood is not the only source of arsenic. As mentioned above, there are other foods that can contain arsenic, such as rice, mushrooms and poultry. A child could have elevated arsenic levels from exposure to secondhand cigarette smoke or playing on pressure treated wood decks, docks or playscapes. Well water and some herbal remedies can also be a source of arsenic.

Could The Arsenic Present In Soil In Veteran's Field Give Me A Rash?

It is very unlikely that arsenic in soil from the field could cause a rash because the levels of arsenic in the soil are not very high and people are not exposed for a long enough period of time. In addition, tests inside Edgerton School indicate that arsenic is not present at detectable levels. Rashes have been reported among workers (mostly in metal smelters) who were exposed to very high levels of arsenic dusts for many years. In order for arsenic to cause skin effects such as rashes or skin pigment changes, you need to be exposed to very high levels of arsenic (much higher than those present at Veteran's Field) for many years.

Who Should I Contact If I Have Questions?

For general questions about health concerns, you can call Sharee Rusnak at the Department of Public Health, 860-509-7742.

For questions about the cleanup of Veteran's Field, you can call Eileen Barnes at the Department of Environmental Protection, 860-424-3090.
If you have questions about specific medical tests or symptoms you are having, you should always speak with your own physician first.

Appendix E
Veteran's Field and Edgerton Elementary School
Fact Sheets from Open House

June 2005 CT Department of Public Health

Q & A about Contamination at Veteran's Field and Edgerton Elementary School

BACKGROUND

Veteran's Field, on Cedar Grove Avenue in New London was once used as a landfill. Industrial waste was placed there sometime before the early 1930s. During the late 1950s, the City of New London built Edgerton Elementary School next to Veteran's Field. Samples taken in 2003 at Veteran's Field showed elevated levels of contaminants, primarily arsenic, lead, and a small amount of polycyclic aromatic hydrocarbons (PAHs) in surface soil and soil beneath the surface.



In the spring of 2005, the City of New London received money from the state to pay for further testing of the Field and to clean up the soil. The city hired a contractor to do the work. Soil testing is complete and cleanup of Veteran's Field is nearly complete.



DID ANY CONTAMINATION FROM THE SOIL IN VETERAN'S FIELD GET INSIDE EDGERTON SCHOOL?

No, indoor dust and air sampling shows that there is no contamination inside of the school.



WAS ANY CONTAMINATION FOUND IN SOIL ON THE EDGERTON SCHOOL PROPERTY?

There is a tree-lined area near the southeastern boundary of the school property with a slightly elevated level of arsenic. This area is currently covered with gravel. We do not expect anyone to be exposed to the soil because of the cover. The gravel will be maintained by the city.



WHAT ACTIONS ARE BEING TAKEN DURING CLEANUP OF VETERAN'S FIELD TO MAKE SURE THAT CONTAMINATED DUST AND SOIL DOES NOT SPREAD OFF THE FIELD?

City contractors have used water trucks to wet the soil to prevent dusty conditions. In addition, city contractors have done dust monitoring around the work area, and used monitors placed on the clean-up workers to make sure that the dust has not spread off the field. The monitors did not show any elevated dust levels leaving the work area. There is also a weather station installed on the school roof to further assist in the air monitoring process.



WHAT WAS FOUND IN SOIL AT VETERAN'S FIELD?

→ Elevated levels of contaminants, primarily arsenic, lead, and a small amount of polycyclic aromatic hydrocarbons (PAHs) in surface soil and soil beneath the surface in various areas of the field. This contamination is being cleaned up.

→ The grassy slope just outside the pre-school playground fence has elevated arsenic in surface and sub-surface soil. This area will be cleaned up this summer. The pre-school playground fence has been temporarily moved closer to the school to provide the contractor with more space for clean up work and to restrict access to the slope.



BACKGROUND ON ARSENIC AND LEAD

Arsenic:

Arsenic is found in nature at low levels. The major uses of arsenic are as wood preservatives and agricultural pesticides. Arsenic is very widely distributed in the environment and everyone is exposed to low levels. Long-term exposure to arsenic can increase the risk of skin, bladder, kidney, liver, and lung cancer. Exposure to arsenic can also lead to skin effects such as irritation and skin darkening.

Lead

Lead is a naturally occurring bluish gray metal found in small amounts in the earth's crust. Lead has many uses, most importantly, in the use of batteries. Lead is also used in ammunition, metal products like pipes and solder, roofing, and devices to shield X-rays. Lead exposure can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead exposure in children and the fetus can lead to pre-term births, decreased mental ability, learning difficulties and decreased growth in children. Lead also damages the kidneys and immune system. It is uncertain whether lead exposure causes cancer.

For more information on these chemicals, visit the website for the Agency for Toxic Substances and Disease Registry (ATSDR) website at <http://atsdr.cdc.gov>



HOW DO WE EVALUATE HEALTH RISKS?

CT DPH is in the process of evaluating risks from potential exposure to contaminated soil from Veteran's Field. This evaluation is not yet complete. However, it is very unlikely that exposures that may have occurred would lead to any illness. It is important to understand how CTDPH evaluates exposures and how we make **decisions about health risks** for hazardous waste sites. The first step is to find out if there has been exposure to contaminants. Then we try to find out how long people were exposed and to how much contamination. Then we estimate cancer and other health risks. Finally, we come to a conclusion about whether the exposure is likely to cause illness. If we conclude that exposures may have caused disease, we may recommend further studies. Here are some concepts important in evaluating health risks to contaminants:

- **“Exposure”** means that you have come into contact with a chemical (breathing, eating, touching), and it has entered into your body.
- If you are **not exposed** to a chemical, **it won't make you sick**.
- CTDPH is required to use accepted science-based methods when we evaluate health risks. When CTDPH analyzes environmental data, we use conservative (most protective of health) health guidelines and approaches to reach our conclusions and make our recommendations.
- It is very difficult to determine if people have become sick from a site, even though it may be shown that people were likely exposed. This is because of many complicated factors:
 - ⇒ Were people exposed long enough and to enough of the contaminant?
 - ⇒ What are other exposures?
 - ⇒ What are some lifestyle issues such as diet, smoking, etc?

Just because we may not be able to say that people have become sick from contaminants, this does not mean the community should not be concerned or work to clean up the site. Preventing exposures is very important!



WHAT IS THE STATUS OF VETERAN'S FIELD?

Veteran's Field is currently being cleaned up so that the property can be used temporarily to house portable buildings for Jennings Elementary School. The city is hoping to complete the work this summer when school is out.

For Further Information, please contact:

Sharee Rusnak
CT Department of Public Health
(860) 509-7742

Eileen Barnes
CT Department of Environmental Protection
(860) 424-3090

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QUESTIONS AND ANSWERS ABOUT ARSENIC AT VETERAN'S FIELD AND EDGERTON ELEMENTARY SCHOOL

BACKGROUND

Veteran's Field is located on Cedar Grove Avenue in New London. The site was used as a landfill for industrial waste sometime in the early 1930s. During the late 1950s, the City of New London built Edgerton Elementary School next to the Veteran's Field site.

Samples taken in 2003 at Veteran's Field showed elevated levels of soil contaminants (primarily arsenic) in surface soil and soil beneath the surface. Recently, the City of New London began clean-up efforts to redevelop the site. The purpose of this fact sheet is to give you background information about arsenic and medical testing for arsenic. **We are not recommending medical testing for arsenic exposure.** However, since some people have gotten tested already, this fact sheet answers questions about what arsenic test results mean. If you have additional questions about arsenic and/or the Veteran's Field Site, please contact one of the agencies listed at the end of this document.



WHAT IS ARSENIC?

Arsenic is an element that can be found naturally in soil and rock. Arsenic is also used to preserve wood to make it resistant to rotting and decay. Arsenic is used as a pesticide, in paints and pigments, in electronic manufacturing, bronze plating, ceramics, and in some herbal remedies.

ARE THERE DIFFERENT FORMS OF ARSENIC?

Yes, there are two forms of arsenic, inorganic and organic arsenic. The form of arsenic being cleaned up at Veteran's Field next to Edgerton School is **inorganic arsenic**.

Because arsenic is always present in soil, it can get washed into lakes, rivers or groundwater. From there, arsenic gets into fish and shellfish. They change it to a harmless form called **organic arsenic** (fish arsenic).

WHY IS THE DIFFERENCE BETWEEN ORGANIC & INORGANIC ARSENIC IMPORTANT?

Organic arsenic can be present in your body in large amounts if you eat fish or seafood, but this form of arsenic is NOT harmful. In contrast, inorganic arsenic can be harmful if you get enough of it in your body.

IS THERE A MEDICAL TEST TO SHOW IF I HAVE 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 for arsenic exposure within the past few days. 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.

It is important to understand that a urine test measures the total amount of arsenic (that is, arsenic from fish plus inorganic arsenic). The arsenic that we are concerned about is inorganic arsenic. Special laboratory procedures are required to separate the inorganic from the organic forms. Again, we are not recommending medical testing because exposure to arsenic in the soil at Veteran's Field is so low.

IF I EAT FISH OR SHELLFISH BEFORE I HAVE A URINE TEST, CAN IT CAUSE MY URINE ARSENIC LEVELS TO BE HIGH?

Yes! Eating fish or shellfish within a few days before a urine test can cause elevated arsenic levels. Usually the physician who orders the test will tell you not to eat seafood for at least 3 days prior to the test.

WHAT IS A NORMAL URINE ARSENIC LEVEL?

The federal Agency for Toxic Substances and Disease Registry (ATSDR) says that urine arsenic levels are normally below 50 ug/L (micrograms per liter) when the child or adult has not eaten seafood within the last 2 or 3 days. Levels can be much higher if seafood was eaten recently. For example, volunteers in a recent study had urine arsenic levels of 30 ug/L before eating a lunch of lobster tail. Four hours after the lobster lunch, they had an average urine arsenic level of 1,300 ug/L. These high values went back to the 'before lunch' levels within two days. Because arsenic exposure is so common in food, we would generally expect everyone to have some measurable amount of arsenic in their urine.

HOW HIGH DO URINE ARSENIC LEVELS HAVE TO BE TO MAKE ME SICK?

ATSDR says that levels above 200 ug/L can cause adverse health effects. They do not expect to see any health effects in children or adults with arsenic levels below 50 ug/L. However, there is uncertainty about whether health effects are expected when urine arsenic levels are between 50 and 200 ug/L. Again, these levels reflect total (organic and inorganic) arsenic. Levels of organic arsenic greater than 200 ug/L would not be harmful.

HOW DO I GET EXPOSED TO ARSENIC?

For most people, diet is the largest source of arsenic exposure. Seafood contains arsenic, so diet is usually the primary source of arsenic exposure. There are also trace levels of arsenic in other foods such as rice, mushrooms and poultry. The arsenic you get in your food is the nontoxic, organic form of arsenic.

You can also be exposed to inorganic arsenic from soil, drinking water, cigarette smoke, pressure treated wood, some pesticides and some herbal remedies.

MY CHILD'S URINE TEST CAME BACK ELEVATED AND HE DOESN'T EAT FISH. WHAT OTHER SOURCES OF ARSENIC COULD CAUSE THIS?

Eating a lot of seafood is not the only source of arsenic. As mentioned above, there are other foods that can contain arsenic, such as rice, mushrooms and poultry. A child could have elevated arsenic levels from exposure to secondhand cigarette smoke or playing on pressure treated wood decks, docks or playscapes. Well water and some herbal remedies can also be a source of arsenic.

COULD THE ARSENIC PRESENT IN SOIL IN VETERAN'S FIELD GIVE ME A RASH?

It is very unlikely that arsenic in soil from the field could cause a rash because the levels of arsenic in the soil are not high enough, and people are not exposed for a long enough period of time. In addition, tests inside Edgerton School indicate that arsenic is not present at detectable levels. Rashes have been reported among workers (mostly in metal smelters) who were exposed to very high levels of arsenic dusts for many years. In order for arsenic to cause skin effects such as rashes or skin pigment changes, you need to be exposed to very high levels of arsenic (much higher than those present at Veteran's Field) for many years.

WHO CAN I CALL FOR MORE INFORMATION?

⇒ For general questions about health concerns, you can call Sharee Rusnak at the Department of Public Health, 860-509-7742.

<http://www.dph.ct.us>

⇒ If you have questions about specific medical tests or symptoms you are having, you should always speak with your own physician first.

⇒ For questions about the cleanup of Veteran's Field, you can call Eileen Barnes at the Department of Environmental Protection, 860-424-3090.

<http://www.dep.ct.us>



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Appendix F. ATSDR Interim Public Health Categories

Category/Definition	Criteria	ASTDR 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>

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>