

Health Consultation

Assessment of Sampling Data
From the Dump Area of Operable Unit 03

RIVERFRONT
(a/k/a NEW HAVEN PUBLIC WATER SUPPLY LINE)

NEW HAVEN, FRANKLIN COUNTY, MISSOURI

EPA FACILITY ID: MOD981720246

SEPTEMBER 30, 2003

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

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Prepared by:

Missouri Department of Health and Senior Services
Division of Environmental Health and Communicable Disease Prevention
Section for Environmental Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Statement of Issues and Background

Statement of Issues

The Missouri Department of Health and Senior Services (DHSS), in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), has prepared this health consultation at the request of the US Environmental Protection Agency (EPA) Region VII. The purpose of this health consultation is to evaluate the public health implications of exposure to contaminants on site and possibly leaving Operable Unit 3 (OU3) of the Riverfront Superfund Site in New Haven, Missouri. DHSS and ATSDR staff reviewed analytical sample results of the soil, seeps, surface streams, and groundwater from the dump area of OU3 at the Riverfront site to determine if the volatile organic compounds (VOCs); tetrachloroethylene (PCE) and its degradation products (trichloroethene (TCE), cis-1, 2-dichloroethene (cis DCE) trans-dichloroethene (trans DCE), and vinyl chloride (VC)), as well as other possible contaminants, are present at levels that could pose a public health threat.

Background

The Riverfront OU3 site is the New Haven old city dump, located in the southeastern part of New Haven, Franklin County, Missouri, along the north side of State Highway 100 (See Figure 1). The dumpsite consists of a steep ravine where wastes were dumped, filling the upper end of the ravine. The surface of the dump covers about 1.5 acres, with an approximate width of 320 feet, extending approximately 200 feet along the ravine. The surface of the dump is level; it consists of gravel, dirt, and small amounts of weathered asphalt and concrete. The dump ranges from about 5 feet to 35 feet above the original land surface, with the open face of the dump sloping steeply to the ravine floor. The area surrounding the dump is wooded and undeveloped, except for an industry to the east (1). See Figure 2 for a site map of OU3.

From the mid 1950s until 1974, the dump was used to dispose of household, industrial, and demolition waste, although no official records exist to document the materials disposed of in the dump. However, local citizens and former employees of local industries have stated that hundreds of drums of industrial wastes, such as unused dyes, flammable solvents, waterproofing compounds, and waste fabrics from the manufacture of tents by a local industry, were disposed of at the dump. Community members stated that flammable materials were routinely burned in a pit at the site. After the city purchased the dump in approximately 1972, it has been used for disposal of demolition debris from utility excavations and road maintenance, such as concrete, asphalt rubble, dirt, gravel, and yard wastes (1).

Water sampling by the Missouri Department of Natural Resources (MDNR) in 1986 had detected tetrachloroethylene (PCE) above the EPA's Maximum Contaminant Level (MCL) in one of the city's two public wells (NO. 1 and 2). The MCL is the highest level of a contaminant the EPA allows in public drinking water. Uncontaminated water was provided to the New Haven public water system when the city drilled two new public wells (NO. 3 in 1988 and NO. 4 in 1994). The dump was considered a possible source of the PCE contamination that had affected the city of New Haven's old public wells (NO. 1 and 2) (1).

PCE is a volatile organic compound (VOC) that evaporates easily in air, but remains in soil and groundwater without much decomposition. Since it is heavier than water it can easily travel through soil and into the groundwater. PCE is a synthetic chemical that is widely used for drying cleaning, metal degreasing, starting material for making other chemicals, and in some consumer products (2). PCE was suspected of having been used by some industries in the New Haven area for degreasing purposes.

To determine if the dump was the source of the PCE contamination in the public wells, MDNR collected a composite soil sample immediately down-slope of the north side of the dumpsite in September 1989. MDNR staff collected a composite soil sample from the north side of the dumpsite at depths ranging from 0 to 7 feet in September 1989. The exact location of the sample site is unknown, but it has been described as being along a natural drainage on the north side of the dump. The surface soil at the sample location was discolored with a blue tint, and the soil had a chemical odor. The sample was analyzed for VOCs, metals, and flashpoint. Very low levels of PCE were found in the soil sample (1).

The dump received little attention in the Expanded Site Investigation (1993), because most of the investigation focused on the Front Street area (OU1), where PCE was found in high concentrations. In 1998, EPA requested assistance from the United States Geological Survey (USGS) to further evaluate groundwater flow and possible source areas of contamination. As part of the Expanded Site Investigation/Remedial Investigation (ESI/RI) and later the Focused Remedial Investigation of Operable Units OU1 and OU3 (RI), USGS collected stream, soil, private well, and tree core samples at the dumpsite to determine if chemicals were leaching from the landfill at unsafe levels from 1999 through 2002 (1). During that time period and in April 2003, samples were also collected from dumpsite seeps and nearby private wells. The private wells are addressed in a different health consultation.

During follow-up sampling as part of the RI, USGS drilled a borehole in 2000. The well was located about 300 feet northwest of the dump, between the dumpsite and city well NO 2. The well was drilled in this location in order to collect groundwater samples to determine if PCE was migrating from the dump and affecting city well NO 2. Soil drill-cutting samples were taken during the development of the borehole into a groundwater monitoring well in March and April 2002. The subsurface soil samples were analyzed for PCE, TCE, cis-DCE, benzene, and toluene by use of a field instrument called a portable gas chromatograph. Samples were collected at depths ranging from 20 feet to 215 feet. This was the only analysis performed on these samples (1).

Surface water samples were taken from seeps at the dump and from a small tributary stream during the RI to determine if contaminants were leaching from the dump and getting into surface water. The seeps can be characterized as low-volume water discharges from the dumpsite. The flow rate from the seeps was estimated to be about 50 ml/minute. Surface water samples were taken from a small tributary leaving the dump at two locations to determine if contaminants had moved downstream. Samples were analyzed for VOCs, inorganic constituents (mineral-based compounds such as metals, nitrates, etc.), and physical properties (1).

Discussion

Surface and Subsurface Soil

The soil sample collected by MDNR in 1989 below the dump contained PCE, 2-butanone, and methyl ethyl ketone (MEK) at concentrations much lower than health screening values (1). Mercury was also detected in the sample at a level of 4 parts per billion (ppb) (3). Although there is no health screening value for mercury in soil, no health effects have been reported in humans at this level (4). Therefore, exposure to this soil is not expected to cause a public health threat.

Analysis of the soil samples taken in 2002 of the soil cuttings during the development of the monitoring well found that all VOCs detected were at concentrations that were much lower than health screening values. Because soil levels were below health screening values and there is no completed subsurface soil exposure pathway (no drilling or digging is taking place), the subsurface soil does not pose a public health hazard at this time.

Surface Water

USGS staff collected surface water samples from seeps and a small tributary stream that drains from the dump to determine the extent of surface water chemical contamination at the site. Surface water samples were collected from four seeps located at the bottom of the ravine at the toe of the dump. Figure 2 is a site map of OU3; it shows the seep sampling point locations. The samples collected from May 1999 through April 2001 were analyzed for PCE, TCE, cis-DCE, trans-DCE, benzene, toluene, and inorganic constituents (1). Samples were also collected from Seeps E and M (see figure 2) on April 16, 2003, and the samples were tested for VOCs, inorganic constituents, and physical properties (5). The test results from all sampling events were compared to EPA's maximum contaminant levels (MCLs). MCLs, which are enforceable standards for public drinking water supplies, are used in this health consultation only for comparison purposes (5). For contaminants detected that do not have MCLs, the levels of contaminants were compared to other established EPA drinking water standards, such as EPA's Lifetime Health Advisory or EPA's Secondary Drinking Water Regulation standards. The Lifetime Health Advisory is the concentration of a chemical in drinking water that is not expected to cause any non-carcinogenic effects for a lifetime of exposure, while the Secondary Drinking Water Regulations establish standards for the taste and appearance of water (6). Water that exceeds secondary standards will not normally cause adverse health effects in people.

PCE was detected in one sample collected at Seep M at a concentration lower than its MCL of 5 ppb. PCE and its degradation products were not detected in any of the other seep samples. Antimony, manganese, boron, and nitrate were detected in Seep M at levels that exceeded or approached the limits of the health comparison values. The highest concentrations of these contaminants were detected in Seep M during the different sampling events. See Table 1 for a

list of the chemicals, their maximum detected values, and their health comparison values (1, 5). No other contaminants were present at levels that exceeded health-screening values. Considering the low flow rate of the seeps, the fact that the water is not used for drinking, and the fact that the seeps are located in a relatively isolated area, no exposure is expected from these seeps.

USGS also tested water samples collected from a small tributary that drains the dump for PCE, TCE, cis-DCE, benzene and toluene, using a portable gas chromatograph. This was the only analysis performed on these samples. PCE was not detected; but Cis-DCE was detected in one sample (1). All contaminants were at levels much lower than health screening values.

Ground Water

USGS staff collected groundwater samples from the borehole located at the dump on June 8, 2000. The sample was analyzed in the laboratory for the presence of PCE, TCE, cis-DCE, trans-DCE, VC, toluene, and benzene. PCE was detected at 0.80 ppb, a level lower than the MCL of 5.0 ppb. No adverse health effects are expected in humans at this level. No other VOCs were detected in this borehole groundwater sample. The borehole was developed into a monitoring well and sampled on four occasions between July 2000 and August 2001. No detectable levels of PCE were found (1).

Private wells to the east, south, and west sides of the dump were sampled to see if they have been affected by contaminants from the dump. The results of that sampling will be evaluated in a different health consultation. Because no wells are located north of the dump in the expected direction of groundwater flow, USGS recently drilled a down-gradient monitoring well at the base of the northeast face of the dump. This well will help scientists to better characterize the general direction of groundwater flow and to evaluate whether the dump is contaminating groundwater. EPA will establish a groundwater well monitoring schedule to further characterize the extent of groundwater contamination in the vicinity of the dump.

Child Health Considerations

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination in their environment. Children are at greater risk than adults from certain kinds of exposures to hazardous substances because they drink more water, eat more food, and breathe more air than adults per kilogram of body weight, and they have a larger skin surface in proportion to their body volume. Children also play outdoors and are more likely to come in contact with soil than adults. They may get contaminated dirt on their hands and may ingest some of the dirt if they do not properly wash their hands before eating. Children are shorter than adults; consequently, they are more likely to be exposed to dust, soil, and vapors because they are closer to the ground. In addition, the developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical

care.

DHSS and ATSDR evaluated the likelihood for children to be exposed to contaminants detected at the Riverfront OU3 Superfund Site. A gate restricts access to the site, and the terrain is rugged, further limiting access. Chemical contaminants are not present in surface samples at levels that could cause a public health hazard. The conclusion drawn is that children are not at risk from contaminants at the Riverfront OU3 Superfund Site.

Conclusions

On the basis of current site conditions, DHSS and ATSDR have determined that Operable Unit 3 of the Riverfront Superfund Site should be characterized as No Public Health Hazard. The category of No Public Health Hazard is used for sites for which data indicate no current or past exposure or no potential for exposure exists and therefore no health hazard exists. This classification is based on the following conclusions:

1. No human exposure pathways are expected to exist in the slightly contaminated soil and the surface water north of the dump. The seeps are not used for potable water sources, and the area is relatively inaccessible, limiting human contact.
2. Contaminants do not appear to be leaving the site and affecting groundwater, but groundwater has not been fully characterized over the long term.

Recommendations

1. A long-term monitoring plan (down-gradient of the dump) should be implemented to determine if the dump is affecting groundwater.
2. Institutional controls should be implemented to restrict well drilling down-gradient of the dump until down-gradient groundwater has been more completely characterized to determine if contaminants are present at levels that could pose a public health hazard.

Institutional controls should be implemented to prevent drilling and digging in the dump, because the type and amount of materials disposed in the dump is unknown.

Public Health Action Plan

The Public Health Action Plan (PHAP) for the Riverfront OU3 portion of the Riverfront Superfund site contains a description of actions to be taken by DHSS, ATSDR, and other shareholders. The purpose of the PHAP is to ensure that this health consultation not only identifies public health hazards, but that it also provides an action plan to mitigate and prevent adverse human health hazards from present and/or future exposure to hazardous substances at or near the site. Below is a list of actions to be implemented by DHSS, ATSDR, and/or stakeholders at the site:

1. USGS/EPA will continue to monitor the groundwater to determine if contaminants may be leaving the site.
2. EPA/MDNR intends to implement and monitor institutional controls as part of the site remediation plan.
3. DHSS and ATSDR will assist EPA/MDNR, if requested, in evaluating all proposed land use changes for the purpose of determining whether a potential health threat might exist if changes are implemented.
3. DHSS and ATSDR will continue to address any community health concerns and questions as they arise and provide necessary community and health professional education.
4. DHSS and ATSDR will continue to evaluate additional environmental data to determine if people are being exposed to unsafe levels of contaminants at the site.

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Attachments: Figure 1	Riverfront Site Location Map
Figure 2	Riverfront Site Map of OU3
Table 1	Surface Water Sample Contaminants Exceeding Health Comparison Values

References

1. US Geological Survey and Black and Veatch Special Project Corp. Focused Remedial Investigation of Operable Units OU1 and OU3, Riverfront Superfund Site, Franklin County, Missouri. 2003 Jan.
2. Agency for Toxic Substances and Disease Registry. Toxicological profile for tetrachloroethylene – Update. Atlanta: US Department of Health and Human Services; 1999 Sep.
3. Missouri Department of Natural Resources. Data sheets concerning contamination at Riverfront Site, OU3 property. Jefferson City, Missouri. 1989.
4. Agency for Toxic Substances and Disease Registry. Toxicological profile for mercury. Atlanta: US Department of Health and Human Services; 1999 Mar.
5. US Geological Survey. Data sheets concerning contamination at Riverfront Superfund Site, OU3. New Haven, Missouri. 2003 May.
6. Environmental Protection Agency. 2002 Edition, drinking water standards and health advisories. 2002.

CERTIFICATION

The Missouri Department of Health and Senior Services prepared this Assessment of Sampling Data from the Dump Area of Operable Unit OU3, Riverfront Site Health Consultation under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

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

Section Chief, SPS, SSAB, DHAC, ATSDR

Figure 1

Riverfront Site Location Map

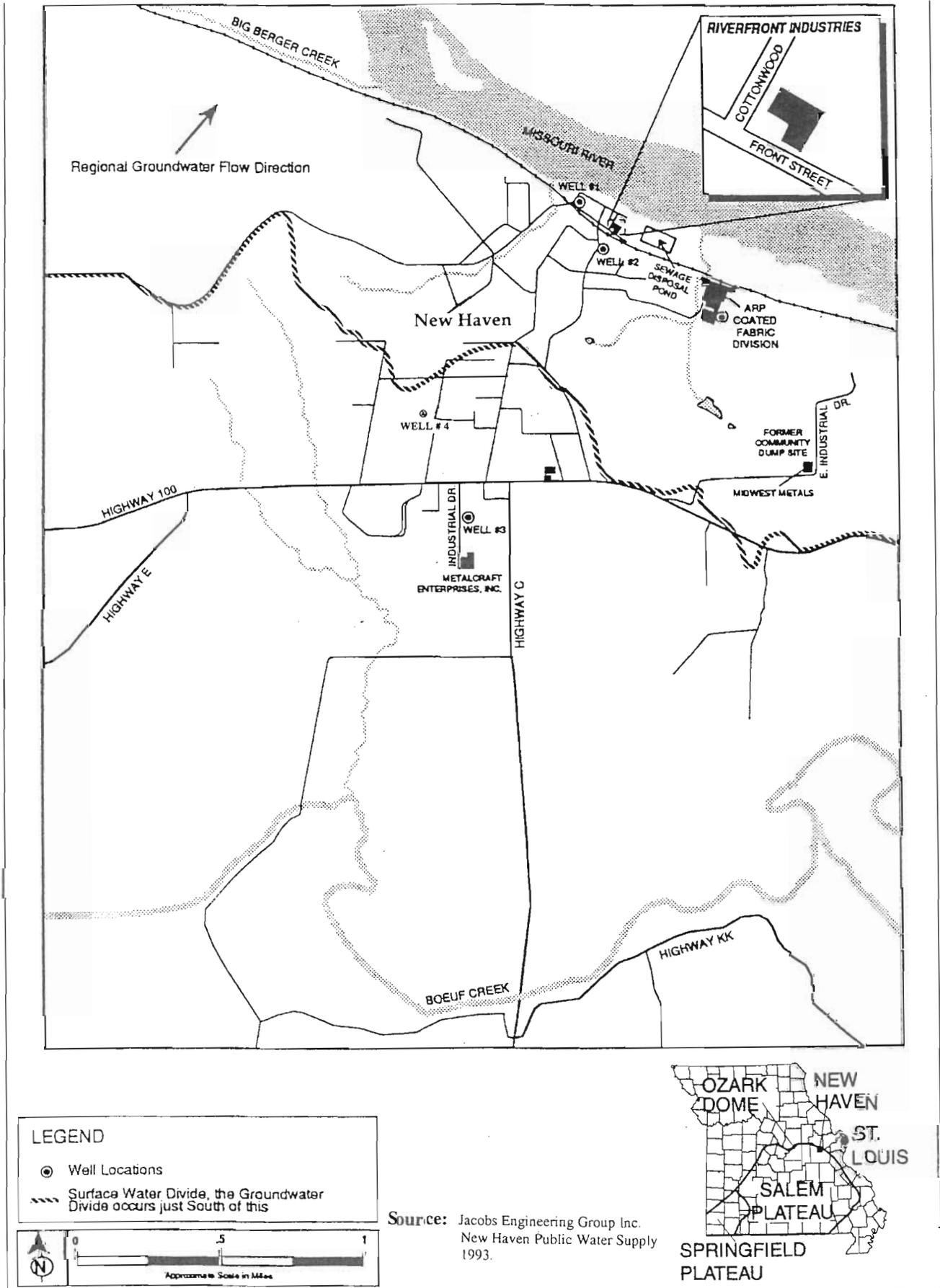
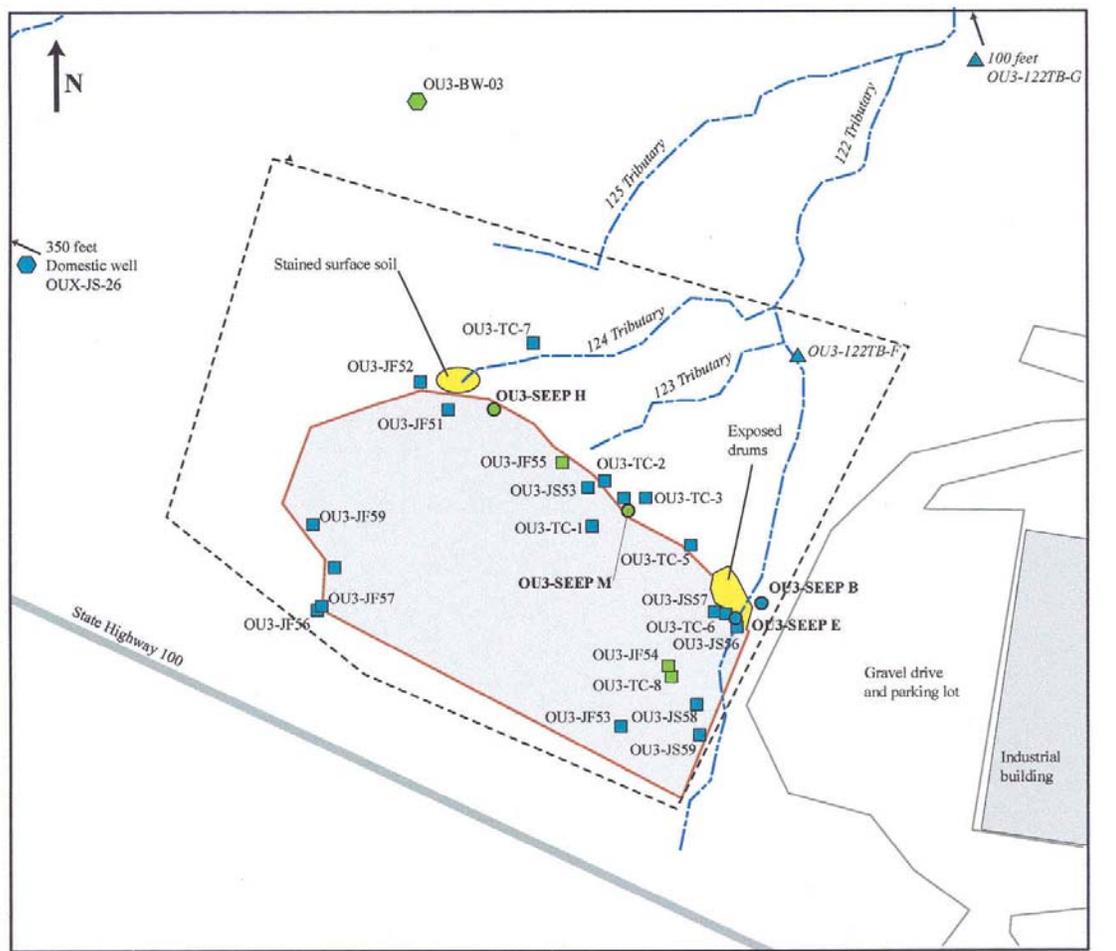
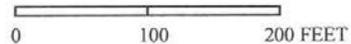


Figure 2
Riverfront Superfund Site Map, Operable Unit 3 (1)



Base from U.S. Geological Survey digital data, 1:100,000, 1927 Universal Transverse Mercator projection Zone 15

SCALE



- PCE CONCENTRATION IN ENVIRONMENTAL SAMPLES, IN MICROGRAM PER LITER
- TREE-CORE SAMPLE AND NUMBER

 - OU3-JF57 ■ NOT DETECTED
 - 0.23-1.01 ug/L (estimated)
 - SEEP SAMPLE AND NUMBER

 - OU3-SEEP H ● LESS THAN 0.05 ug/L
 - 0.05-0.18 ug/L
 - SURFACE-WATER SAMPLE AND NUMBER

 - OU3-122TB-F ▲ LESS THAN 0.05 ug/L
 - MONITORING OR DOMESTIC WELL AND NUMBER

 - OUX-JS-26 ● LESS THAN 0.1 ug/L
 - 0.1-0.8 ug/L
- OLD CITY DUMP PROPERTY LINE (APPROXIMATE)
 - STREAM
 - ROADS
 - FILL AREA BOUNDARY (APPROXIMATE)

Source: U.S. Geological Survey and Black and Veatch Special Project Corp. Focused Remedial Investigation of Operable Unit OU1 and OU3, Riverfront Superfund Site, Franklin County, Missouri, 2003 January.

Table 1
Surface Water Sample Contaminants Exceeding Health Comparison Values

Sample Location	Parameter	Maximum Concentration (ppb)	Health Comparison Value (ppb)	Type of Standard
Seep M	Antimony	82	6	MCL
Seep M	Boron	2,710	600	EPA's Lifetime Health Advisory
Seep M	Manganese	371	50	EPA's secondary (aesthetic) drinking water standard
Seep M	Nitrate	9,990*	10,000	MCL

*The nitrate standard was not exceeded, but it was included because Seep M was very close to exceeding the standard.