

Health Consultation

H.O. FORGY

JACKSON, MADISON COUNTY, TENNESSEE

EPA FACILITY ID: TN0001923945

AUGUST 1, 2007

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:

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

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Preface

This document summarizes an environmental public health technical review performed by Environmental Epidemiology of the State of Tennessee Department of Health. Our work was performed under a Cooperative Agreement with the federal Agency for Toxic Substances and Disease Registry. In order for the Health Department to answer an environmental public health question, several actions are performed:

Evaluate Exposure: Tennessee health assessors begin by reviewing available information about environmental conditions at a site. We interpret environmental data, look for exposure pathways, calculate exposure amounts, review site reports, and talk with environmental officials. Usually, we do not collect our own environmental sampling data. We rely on information provided by the Tennessee Department of Environment and Conservation, U.S. Environmental Protection Agency, and other government agencies, businesses, or the general public. We work to understand how much contamination may be present, where it is located on a site, and how people might be exposed to it. We look for evidence that people may have been exposed to, are being exposed to, or in the future could be exposed to harmful substances.

Evaluate Health Effects: If people could be exposed to contamination, then health assessors take steps to determine if the exposure could be harmful to human health. We base our health conclusions on exposure pathways, risk assessment, toxicology, cleanup actions, and the scientific literature.

Make Recommendations: Based on our conclusions, we will recommend that any potential health hazard posed by a site be reduced or eliminated. These actions will prevent possible harmful health effects. The role of Environmental Epidemiology in dealing with hazardous waste sites is to be an advisor. Often, our recommendations will be actions items for other agencies. However, if there is an urgent public health hazard, the Tennessee Department of Health can issue a public health advisory warning people of the danger, and will work with other agencies to resolve the problem.

Through these actions this technical health consultation will provide support to another agency. The information contained herein can be used to evaluate and improve environmental site reports submitted to the agency as an effort to promote and protect public health.

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

Please write to: Environmental Epidemiology
Tennessee Department of Health
1st Floor Cordell Hull Building
425 5th Avenue North
Nashville TN 37243

Or call us at: 615-741-7247 or toll-free 1-800-404-3006 during normal business hours

Statement of Issue

Staff from the Jackson Field Office of the Tennessee Department of Environment and Conservation (TDEC) Division of Remediation (DoR) noticed signs of trespassing at the H.O. Forgy State Superfund site. They requested that Environmental Epidemiology (EEP) of the Tennessee Department of Health (TDH) assist them with lead contamination issues at the site. DoR was concerned that industrial cleanup guidance might not be appropriate if vacant land near the site were redeveloped into a residential neighborhood.

Background

Site Description and History

Located in south Jackson, Madison County, H.O. Forgy was an aluminum smelting operation from 1951-1977. The property, owned by CSX Railroad, was leased to the H.O. Forgy company. The site is now abandoned, without buildings. The site is triangular in shape, bounded by two active and one abandoned railroad tracks. Figure 1 is a site map that illustrates the layout. The 1.6 acre fenced area is now mostly overgrown with vegetation. Figures 2 and 3 are photographs that showed what the site looked like during a November 28, 2006, site visit.

In 1998, a health consultation was performed by the Agency for Toxic Substances and Disease Registry (ATSDR) at the request of the US Environmental Protection Agency (EPA). A purpose of their investigation was to determine the public health impact from contaminated soil to area residents who may access the site. At that time, the site had open access and lead contamination in surface soil was considered to be an indeterminate health hazard.

The H.O. Forgy site was fenced to prevent area residents from being exposed to contaminated soils. This measure was mostly effective. Over time, however, the appeal of the using the H.O. Forgy site as a shortcut from one neighborhood to another became apparent. The photograph in Figure 3 shows that the fence was compromised, allowing access to the site.

As the H.O. Forgy site is in a residential area, the TDEC DoR noticed that short-term trespassing was common. They were worried that anyone accessing the site would be exposed to the contaminated soil. Data from previous investigations (EPA 1996) showed that lead concentrations in soil, 1,322 mg/kg on average, were above industrial cleanup guidance. Thus, trespassers could be exposed to surface soil containing lead levels above industrial cleanup guidance.

Discussion

Introduction to Chemical Exposure

To determine whether persons are, have been, or are likely to be exposed to chemicals, Environmental Epidemiology of the Tennessee Department of Health evaluates mechanisms that could cause human exposure. An exposure pathway contains five parts:

- a source of contamination,
- contaminant transport through an environmental medium,
- a point of exposure,
- a route of human exposure, and
- a receptor population.

An exposure pathway is considered complete if there is evidence that all five of these elements have been, are, or will be present at the site. An exposure pathway is considered potential if at least one of the five elements listed has been, is, or will be present at the site. An exposure pathway may also be considered potential if there is a low likelihood of exposure. An exposure pathway is considered incomplete if there is no evidence that none of the five elements listed was, is, or will be present.

For the purpose of evaluating exposure to lead in soil or sediment, it is common to only evaluate measurements collected from the upper, surface soil layer. At H.O. Forgy, the exposure pathway is considered complete for lead in surface soil from exposure through incidental ingestion of soil, inhalation of soil dust, or dermal contact with soil.

The presence of a potentially harmful chemical in the environment does not necessarily mean that a person will develop adverse health effects because of it. A chemical's ability to affect public health is controlled by a number of factors, including:

- the amount of the chemical that a person is exposed to (dose)
- the length of time that a person is exposed to the chemical (duration)
- the number of times a person is exposed to the chemical (frequency)
- the person's age and health status
- the person's diet and nutritional habits.

Exposed Populations

There are several smaller neighborhoods near the site. As there is no direct route from one group of houses to the other, the H.O. Forgy site has become a shortcut. The people of these neighborhoods are the potentially exposed populations. The open fields of the mostly fenced site seem to offer little value to additional trespassers. Although, use of the site as a resting place by the homeless or play area by local children could not be ruled out.

Figure 4 is photograph of a trespasser that just happened to be walking their bicycle across the site the morning of November 28, 2006. The trespassing was observed during the relatively few minutes that TDEC DoR and TDH EEP visited the site.

In the past, there were more homes close to the H.O. Forgy site. A few years ago, a tornado touched down in Jackson destroying most of the nearby homes. If these homes were ever rebuilt or the now vacant land redeveloped, then there would be more people in close proximity to the site. This circumstance worried TDEC DoR in regard to site surveillance and changing exposure scenarios. It raised the question, “At what point, should a former industrial site that is within a predominately residential area, be evaluated using residential exposure guidance rather than industrial guidance?”

Lead Levels

The common industrial action level to prevent human adverse health effects from exposure to lead contamination in surface soil is in the range of 800-1,000 milligrams of lead per kilogram of soil (mg/kg). Twelve of twenty surface soil samples collected at H.O. Forgy exceeded this level. The mean lead concentration was 1,322 mg/kg, also above the guidance level that suggests cleanup is needed at an industrial site. The site is abandoned. There are no workers present. As stated previously, an exposure pathway is incomplete if there is no receptor population, thus, cleanup is not needed to protect site workers.

However, there is a completed exposure pathway for trespassers to lead in surface soil. Residential guidance suggests lead cleanup around 400 mg/kg. As the site is located close to homes and there will likely be even more homes built around it in the future, there was discussion amongst the government agencies as to whether the site should simply be cleaned up to a residential safe level. This would remove the waste site from the community all together. Also, this would remove the need for government oversight of the State Superfund site. After discussion, it was decided that the site was currently industrial and would continue to be considered as such.

Lead in Surface Soil Sampling Results

The *Letter Report: H.O. Forgy Site* prepared for EPA in 1998, detailed a site investigation including soil sampling. Soil was collected in four-point composite 0 to 4 inch surface samples from within grids that were roughly 75 feet by 75 feet. Of the samples collected, only the lead in surface soil data were reviewed for this consultation. The lead sampling results are displayed in Table 1 below. Units are milligrams of lead per kilogram of soil (mg/kg). This value can also be expressed in the equivalent parts of lead per million parts of soil (ppm).

TABLE 1. Former aluminum smelter, H.O. Forgy site, lead in surface soil, composite 0-4” samples data (EPA 1998). See Figure 1 for locations of the grids on the site. All sample values reported in milligrams per kilogram of soil or parts per million. The mean of the lead data was 1,322 mg/kg within a range of 71 to 3,350 mg/kg.

| grid number | mg/kg | grid number | mg/kg |
|-------------|-------|-------------|-------|
| HO-01-SS | 268 | HO-12-SS | 1090 |
| HO-02-SS | 1090 | HO-13-SS | 770 |
| HO-03-SS | 995 | HO-14-SS | 784 |
| HO-04-SS | 1210 | HO-15-SS | 508 |
| HO-05-SS | 2280 | HO-16-SS | 2480 |
| HO-06-SS | 2080 | HO-17-SS | 3350 |
| HO-07-SS | 2920 | HO-18-SS | 2540 |
| HO-08-SS | 602 | HO-19-SS | 3080 |
| HO-09-SS | 289 | HO-20-SS | 2070 |
| HO-10-SS | 71 | HO-21-SS | 213 |
| HO-11-SS | 270 | HO-22-SS | 119 |

Public Health Implications

The PRP, CSX Railroad, and their consultant, Shaw Environmental and Infrastructure, Inc., provided TDEC feedback during the site investigation. Shaw prepared a memorandum dated December 13, 2006, that explained their understanding of the trespasser exposure scenario. The most sensitive trespasser who would be able to breach the fence was considered to be a woman of child-bearing age who trespasses through the site five time per week, 50 weeks per year for one hour each time.

Based on results of the adult blood lead model, there should be no exposure of significance due to trespassing. The parameters and assumptions used were within reason. Based on our calculations, TDH EEP agrees that harmful exposure to lead from trespassing is unlikely. The driving parameters for this result are the few minutes per day that a trespasser would be exposed and the observation that there is a good amount of vegetative ground cover on the H.O. Forgy site. Shaw mentioned that their calculated exposure scenario considered open access, and that any theoretical risk would be greatly reduced by the perimeter fence which restricts site access.

On December 19, 2006, representatives from TDEC DoR, TDH EEP, CSX, and Shaw held a conference call. During the call, a plan that provided fence repair and subsequent perimeter security was presented. The idea focused around using the environmental crimes unit of the railroad to both maintain the site with restricted access and communicate the restriction with the local residents. These institutional controls should be able to meet public health needs as well as regulatory needs. Therefore, the issues of lead contamination at the H.O. Forgy site, in Jackson, Madison County, were considered resolved prior the publication of this report.

Child Health Considerations

The many physical differences between children and adults demand special emphasis. Children are at greater risk than adults from exposure to lead (ATSDR 2005). Children can be exposed to lead at any point of childhood including in the womb. Babies and children can swallow and breathe lead in dirt, dust, or sand. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If lead exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Lead has been shown to have harmful effects on blood, development, and behavior in children (ATSDR 2005). Finally, children are dependent on adults for access to housing, nourishment, medical care, and risk identification.

There are residential homes to east and northeast of the H.O. Forgy site. Between the houses and the site are physical barriers to trespassing including railroad tracks and property fencing. On-site the vegetative groundcover was complete and should hinder possible exposure to surface soil. No serious health hazards, beyond the typical industrial site setting, appear to be present to children trespassing at H.O. Forgy. Still, as a matter of prudent public health practice, the locked gate and fencing should be maintained to insure that the site does not become an attractive place for children to wander or play.

Conclusions

Trespassing in the past, at the H.O. Forgy site in Jackson, Madison County, Tennessee, may have resulted in a completed exposure pathway. EEP agrees with the consultant in regard to the trespasser scenario used with the adult blood lead model and with the idea that no exposure of significance should have occurred from trespassing. If site security is maintained through institutional controls and community communications, then exposure to lead in surface soil should not occur and the site should pose no public health hazard.

Recommendations

Complete the planned site restrictions including fence repair and future site security. Maintain the locked gate and restrictive fencing such that the site discourages trespassing and does not become an attractive place for children to wander or play.

Public Health Action Plan

The responsible party and their contractors plan to correct the trespassing issue and maintain site security. Given that these actions are sufficient to prevent exposure, no further action is needed at this time.

Preparers of Report

Author

David Borowski, MS
Environmental Health Program Manager

Tennessee Department of Health (TDH)
Communicable and Environmental Disease Services (CEDS)
Environmental Epidemiology (EEP)
1st Floor Cordell Hull Building
425 5th Avenue North
Nashville TN 37243



Technical Advisors

Ron Sells
Environmental Program Manager

Shanda Hunt
Environmental Specialist

Tennessee Department of Environment and Conservation (TDEC)
Division of Remediation (DoR)



Bonnie Bashor, MS
Director

Tennessee Department of Health
Environmental Epidemiology



ATSDR Technical Project Officer

Trent LeCoultre, MSEH, REHS
LT, US Public Health Service

Division of Health Assessment and Consultation
Superfund Site Assessment Branch



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[ATSDR] Agency for Toxic Substances and Disease Registry. 2005. Toxicological profile for Lead – update draft for public comment edition. Atlanta: GA.

[EPA] Environmental Protection Agency. 1998. Letter Report: H.O. Forgy Site, Jackson, Madison County, Tennessee. Atlanta: GA. December 14, 1998.

[Shaw] Shaw Environmental & Infrastructure, Inc. 2006. Memorandum from Paul F. Goetchius to Terry Whitt - Evaluating Lead in Surface Soil at the H.O. Forgy Site: Trespasser Exposure Scenario. Jamesville, NY. December 13, 2006.

Figures

FIGURE 1. Map of triangular-shaped, 1.6 acre H.O. Forgy site, Jackson, Madison County, Tennessee. Lead values were handwritten on the original paper sampling grid. Lead ranged from 71 to 3,350 mg/kg with an average of 1,3222 mg/kg. A freeform line was added to show the approximate path that trespassers likely used to get from one opening in the fence to another (EPA 1998).

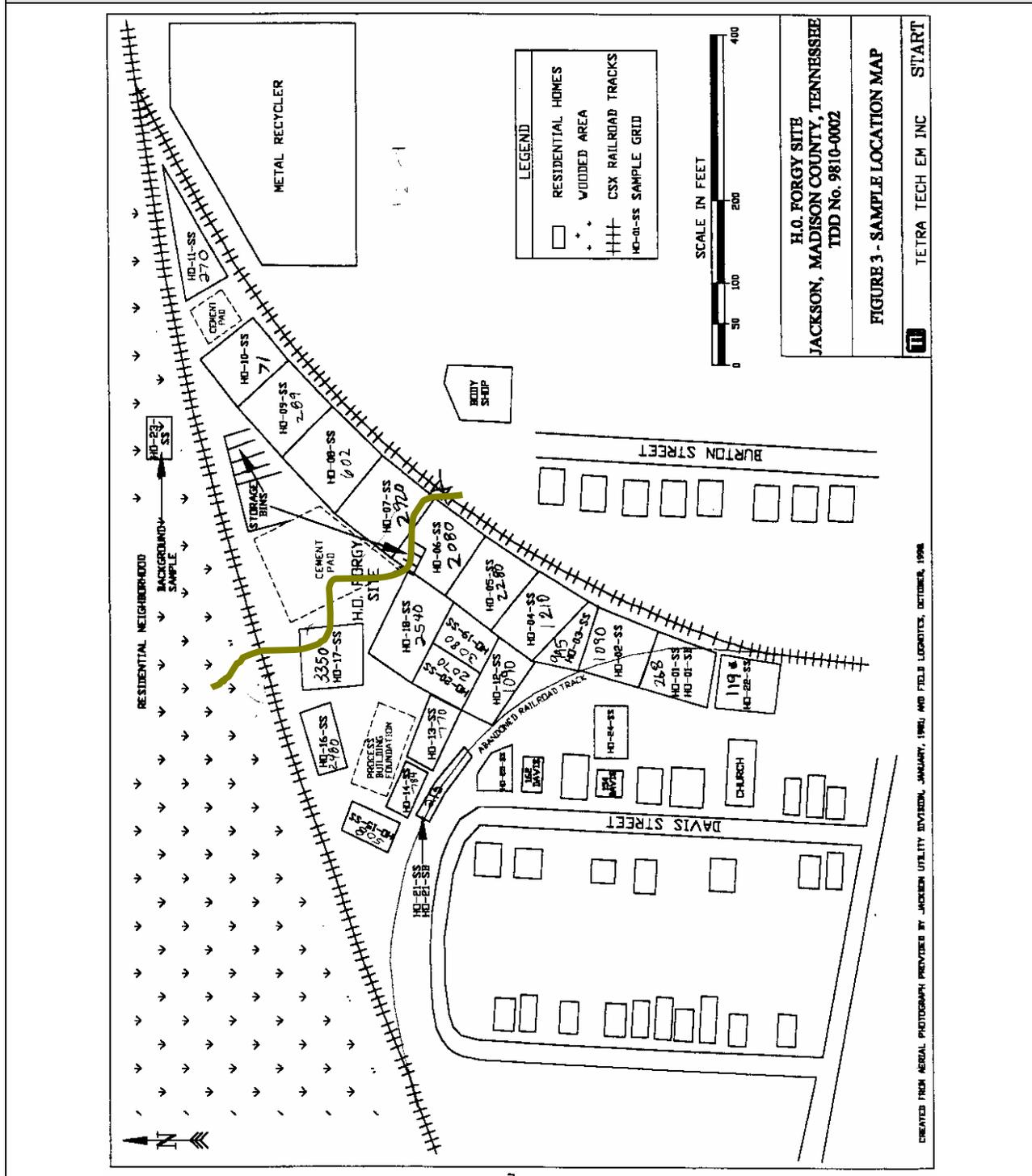


FIGURE 2. Photo of the main gate to H.O. Forgy looking northeast. This gate is on the southwest side behind the church. Note the fall season ground cover, swing gate, and barbed wire fence (photo: David Borowski, 11/28/06).



FIGURE 3. Photo of fence where it has been compromised to allow for trespassers to use the site as a shortcut (photo: David Borowski, 11/28/06).



FIGURE 4. Photo of H.O. Forgy looking south toward an auto body shop. Note the person walking their bicycle across the site, the railroad track, vegetative cover, and nearby homes (photo: David Borowski 11/28/06).



Certification

This Technical Health Consultation: H.O. Forgy, Jackson, Madison County, Tennessee, was prepared by the Tennessee Department of Health Environmental Epidemiology under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was prepared in accordance with the approved methodology and procedures that existed at the time the health consultation was begun.



Technical Project Officer, CAT, SPAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.



Team Leader, CAT, SPAB, DHAC, ATSDR