

# Health Consultation

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(Residential Wells)

LANGNER ENTERPRISES SITE

PINE TOWNSHIP, GROVE CITY, MERCER COUNTY, PENNSYLVANIA

JUNE 14, 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

(Residential Wells)

LANGNER ENTERPRISES SITE

PINE TOWNSHIP, GROVE CITY, MERCER COUNTY, PENNSYLVANIA

Prepared By:

Pennsylvania Department of Health  
Division of Environmental Health Epidemiology  
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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## Executive Summary

At the request of the Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Health, working under a cooperative agreement with the Agency for Toxic Substances and Disease (ATSDR), prepared this Health Consultation for the Langner Enterprise Site. Specifically, the Pennsylvania Department of Environmental Protection requested that the Pennsylvania Department of Health and ATSDR review the Pennsylvania Department of Environmental Protection sampling at this site to determine whether the site poses a public health hazard to residents living near the site. The Langner Enterprises Site is located at 4142 Diamond Road in Pine Township, Mercer County, Pennsylvania. In 2005, the Langner Enterprises site was cleaned up and redeveloped, and ownership was transferred as a Pennsylvania Brownfield success story.

Approximately 15 residents live close to the borders of the site. All homes use private wells. The nearest home is about 200 – 300 feet of the site. The Pennsylvania Department of Environmental Protection has been collecting samples from the residential well close to the site since 2003. Sample results indicate that no site-related contamination is occurring in the off-site wells. No volatile organic chemicals were detected off-site above levels of health concern. The Pennsylvania Department of Health recommended that the Pennsylvania Department of Environmental Protection and/or the new owner(s) of the site continue monitoring residential wells around the site to ensure they are not impacted by site contamination. This is recommended especially in the direction of the groundwater flow and if naturally occurring manganese concentrations in the private well samples are found above the EPA's lifetime health advisory level for manganese of 300 parts per billion. Manganese could be a contaminant of concern for children in this area if well water levels chronically (consistently exposed for one year or longer) contain manganese at higher levels. Recent preliminary studies suggest that children exposed to excess manganese in foods might show adverse neurological effects [9]. The National Research Council has recommended safe and adequate daily intake levels cumulative from all sources of ingested manganese. PADOH and ATSDR are concerned about children that ingest well water that consistently tests above 500 ppb manganese. Residents with manganese results continuously above the levels of health concern for lifetime exposures and above recommended levels for a child, may want to consider installing well water treatment, using point-of-use treatment, or hooking up to the public water system now available in the area, if possible. Residential samples, especially for inorganic chemicals such as lead, should be taken at the homeowners' taps where water is usually used for purposes of ingestion.

## Introduction

At the request of the Pennsylvania Department of Environmental Protection (PADEP), the Pennsylvania Department of Health (PADOH), working under a cooperative agreement with the Agency for Toxic Substances Disease Registry (ATSDR), prepared this Health Consultation for the Langner Enterprise Site. Specifically, PADEP requested that PADOH and ATSDR review the PADEP sampling at the site to determine whether the site currently poses a public health hazard to residents living near the site. The Langner Enterprises Site is located at 4142 Diamond Road in Pine Township, Mercer County, Pennsylvania (see [Figure 1](#) and [Figure 2](#)). Previously, in 2004, this site was classified by the PADOH as a hazard to trespassers because it was unfenced, and physical hazards were accessible to the public. PADOH prepared and distributed to the area residents a Langner Enterprises site fact sheet, highlighting the physical health hazards to trespassers on this site. Since that time the site has been cleaned up and redeveloped and transferred.

## History of the Site

The history of the site is as follows:

- In 1998 and 1999, PADEP received complaints regarding large amounts of oil on the ground, 55-gallon drums leaking oil and chemicals, and areas of soil saturated with oils and solvents on the site. PADEP documented unpermitted acceptance of waste activities, including the disposal and burning of solvents and batteries, and the puncturing of drums of liquid waste, resulting in the release of their contents onto the ground [1].
- In 2002, prompt cleanup was initiated by PADEP at the site to: 1) protect the public from direct contact with hazardous substances in containerized and uncontainerized wastes and associated contaminated soils at the property; and 2) eliminate the ongoing release and threat of release of hazardous materials into the environment from containerized and uncontainerized wastes and contaminated soils [2].
- In January 2003, three shallow monitoring wells were placed on-site and groundwater was sampled for Phase I investigation. Soil and groundwater were sampled in May 2003. Off-site residential well sampling was completed in June 2003. Later, deeper wells were installed on-site for Phase II and III sampling, which was then completed in the summer of 2004 [1].
- PADOH visited the site in fall 2003, the summer 2004 and fall 2004. At these times, the site was an abandoned, unfenced property with unrestricted access to trespassers and local children. Previous to 2005, the site had been strewn with military surplus equipment, old vehicles, large appliances and other numerous items, but these have since been cleaned up.

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- In 2005, the Langner Enterprises site was cleaned up and redeveloped, and the ownership was transferred to a private business as a Pennsylvania “Brownfield” success story [3].

### **On-site Contamination and Direction of Ground water Flow**

In 2003, TCE was found in one on-site monitoring well. Later sample results showed that there maybe some very low levels of TCE, *below the public drinking water maximum contaminant level (MCL) and below levels of health concern*, in one shallow monitoring well. It was determined by PADEP that the groundwater moves from the site in an easterly direction toward the off-site pond and the residence(s) across Diamond Road [1].

## **Discussion**

### **Evaluation Process**

PADOH evaluates the environmental and human components (or exposure pathways) that could lead to human exposure. Exposure pathways are descriptions of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or become exposed to) the chemical. For a chemical specific adverse health effect to occur, ATSDR recognizes that five components of a completed exposure pathway must first occur: a source of the contaminant; the fate and transport of the contaminant into a media (water, soil, air, or food); an exposure point (drinking water, soil contact, air, or other); an exposure route (ingestion, dermal contact, inhalation); and an exposed population.

ATSDR has developed health-based comparison values (CVs) or uses other agency health based values to help identify site-specific chemicals environmental contaminants of health concern [4]. While specific media concentrations less than CVs are unlikely to pose a health threat, media-specific concentrations above CVs do not always represent a health threat, but are used to determine which contaminants require further evaluation [4]. See Appendix C for more information on the PADOH and ATSDR process of health assessment.

### **Residential Wells**

In May 2003 and again in December 2003 (as part of Phase 1 and Phase 2), PADEP sampled residential wells near the site. These residential well water samples were analyzed for volatile organic chemicals (VOCs), pesticides and semi-volatiles, and inorganic chemicals. Many of the inorganic compounds detected during these sampling rounds, such as iron and manganese, are found naturally in this area.

In the May sampling event, PADEP sampled well water at seven residences surrounding the site. Four of the seven residences had some type of water treatment unit installed on their wells, though it is not known if these units are working properly. In phase 1, the samples were taken *before* the water system treatment units, if the resident had treatment units in place. In this first round of sampling only lead and manganese were found to exceed the CVs. The sample results are shown on [Table 1](#).

In the December sampling event, PADEP sampled five residential wells. All of these wells were previously sampled during the May 2003 sampling event and all but one of these residences had a treatment unit already installed on their well. Sampling was done *after* the treatment unit, if applicable. In this second round of sampling, only manganese was found to exceed its CV. The sample results are shown on [Table 1](#).

The following paragraphs evaluate the public health significance of lead and manganese detections found in the residential well water near the site.

### **Evaluation of Lead Found in Residential Wells**

In residential wells surrounding the site, four of seven residential well samples from the May 2003 sampling event detected lead. One of the wells had concentrations that exceeded the EPA action level (AL) which is enforceable for public water systems at or above 15 ppb. To clarify this, for public water systems, the EPA regulation states that statistically 90 percent of the sample sets must be under or at the AL and 10 percent are allowed to be over the AL [5]. The highest lead concentration was 19.6 ppb, but it must be noted that the May 2003 samples were obtained *before* any treatment system. Actual concentrations of metals, such as lead that may be in the sediment particles or in the initial plumbing directly from the well, may be lower at the tap after passing through a treatment system. This is consistent with the results from the December 2003 sampling event. These samples were taken *after* the home treatment units, if applicable. Lead was not detected above the AL of 15 ppb in any of the five wells that were re-sampled in this second sampling event. Lead was found significantly below the AL in the preliminary on-site shallow groundwater samples. Therefore, the levels of lead detected in the residential wells most likely were not related to the site. In particular, the home with the 19.6 ppb lead result may have been a result of the plumbing in this home between the well and the treatment unit.

Cumulative exposures to environmental sources of lead are a concern for young children and pregnant women. This is especially true for children under the age of six years [6, 7]. However, because it appears that the elevated lead concentrations in these private wells do not appear at the tap where people are actually consuming the water, it is not likely that these levels pose a health threat to the residents.



## Evaluation of Manganese Found in Residential Wells

The highest manganese result from the residential well water sample data was 836 ppb, but this was *before* the well water treatment system. The next highest detected level was 605 ppb at a drinking water tap with *no treatment*. These concentrations are above the ATSDR CV of 500 ppb for children and above the EPA lifetime health advisory CV of 300 ppb [4]. The EPA has set an advisory level of 50 ppb for Manganese to prevent staining of fixtures and bad taste. [8]. The EPA lifetime health advisory value of 300 ppb will protect against concerns of potential neurological effects. However, it is advised that for infants younger than 6 months that they not ingest water with because of the possibility of a higher absorption and lower excretion in young infants [8].

## Community Concerns and Child Health Consideration

### Community Concerns

In 2005 and 2006, PADOH answered several calls related to the site. The concern was that the residential wells, especially in the direction of the ground water flow, should continue to be monitored for site-related contaminant migration.

### Child Health Considerations

ATSDR and PADOH recognize that children may be especially sensitive when exposed to contaminants. At this particular site, children had been trespassing on-site and had been vulnerable to the physical hazards on-site. In fall 2004, PADOH distributed a fact sheet to the community. Since that time, the site has been cleaned up and ownership transferred.

Because children generally receive higher doses of contaminants per body weight than adults and may be more sensitive to chemical exposures than adults under similar circumstances, the PADOH generally uses the exposure doses calculated for children in forming its conclusions about noncarcinogenic health effects of site-related contaminants when children are known or thought to be involved.

The non-site related Lead in one residential well *before* the treatment unit was above the EPA action level for lead, but *after* the well water treatment system the lead concentration water at this residence *was below the AL*. Lead levels in the other residential wells that were sampled were all below the EPA AL or no lead was detected. Based on the phase 2 results, PADOH does not expect the levels of lead to cause health effects for adults or children using the well water, though any water treatment units do need to be continuously maintained. However, cumulative exposure to environmental

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sources of lead is a concern for children, especially those under the age of 6 years. Experts now recognize that exposure to even small amounts of lead poses a potentially significant health risk, especially in infants and young children. Recent studies indicate that lead is even more harmful than previously believed to the brain and the rest of the nervous system [6]. Residents should keep in mind the various ingestion and inhalation sources of environmental lead exposure that could raise a child's blood-lead level. Some of the most common sources of exposure for children include:

- Lead-based paint in older homes,
- Drinking water plumbing containing lead solder,
- Pottery containing lead, and
- Hobbies involving lead materials used in the home.

The naturally occurring manganese could be in this area if well water levels are consistently high. Recent preliminary studies of children exposed to excess manganese in foods indicate potential adverse neurological effects [9]. The National Research Council has recommended safe and adequate daily intake levels for manganese that range from 300 to 1000 micrograms per day (ug/day) for children up to 1 year; 1,000 to 2,000 ug/day for children up to age 10; and 2,000 to 5,000 ug/day for children 10 and older [10]. This is all sources of ingested manganese. A significant portion of this amount would come from water where water levels are at or above 500 ppb (which is the same as 500 micrograms of manganese per liter). Therefore, PADOH and ATSDR are concerned about ingestion of well water that consistently tests above 500 ppb manganese by children [4]. Although the one residence with manganese above 500 ppb would be a concern for a child if they were drinking that water on a chronic basis, the residents at that home stated that they were not using the water for drinking purposes. A fact sheet will be provided by PADOH to the residents that explains that: water levels over 300 ppb manganese should be treated before consumption for health reason and recommends reducing manganese concentrations to or below 50 ppb for staining and taste considerations.

## **Conclusions**

This site is classified as posing no apparent public health hazard. However, PADOH and ATSDR are concerned about the naturally occurring manganese found in some of the local private wells.

## **Recommendations**

1. PADEP and /or the new owner(s) of the site should continue monitoring residential wells around the site to ensure that they are not further impacted by the site contamination, especially in the direction of the groundwater flow. Sampling should be done on residential well water near the site, especially if the manganese sample results are chronically above the EPA's lifetime health advisory level of 300 ppb and the ATSDR health screening level of 500 ppb for children. If manganese results continuously remain above the levels of health concern, residents may want to consider installing well water treatment, using point of use treatment on faucets used for drinking water purposes, or linking to the public water system now in the area. Residential samples, especially for inorganic chemicals such as lead, should be taken at the homeowners' taps where water is usually used for drinking purposes.
2. PADOH will evaluate any future off-site residential well sample results if requested by PADEP.

## **Public Health Action Plan**

### **Completed Actions**

1. PADOH completed three site visits to the site (fall 2003, summer 2004, fall 2004).
2. PADOH prepared and distributed a Langner Enterprises site fact sheet, highlighting the hazards to trespassers on this site. PADOH distributed this fact sheet to the area residents in September 2004.

### **Ongoing Action**

1. PADOH will make this health consultation available to the community and be available to answer questions.
2. PADOH will distribute a fact sheet from ATSDR on manganese exposure in drinking water and the health recommendation to accompany the health consultation.
3. PADOH will evaluate any further residential well samples for the off-site wells if requested by PADEP.

## References

1. PADEP Response Justification Document, received by PADOH from PADEP September 12, 2003; Nomination of Sites for PADOH and ATSDR Work plan 2002-3 reports; and the Laboratory reports from Lionville Laboratories, Lionville, Pennsylvania and Baker Environmental Laboratories, Moon Township, Pennsylvania.
2. PA Bulletin – “Applications, Actions, and Special Notices” – November 2002. <http://www.pabulletin.com/secure/data/vol32/32-50/2235e.html>, last accessed 2006 September.
3. PA Bulletin – “Hazardous Sites Cleanup Under the Act of October 18, 1988, Proposed Consent Order and Agreement, Langner and Murphy Site, Pine Township, Mercer County - Under section 1113 of the Hazardous Sites Cleanup Act” – May 2005, [http://pacode.com/secure/data/vol35/35-22/35\\_22\\_not.pdf](http://pacode.com/secure/data/vol35/35-22/35_22_not.pdf), last accessed 2006 September.
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8. The Environmental Protection Agency’s Drinking Water Health Advisory for Manganese [http://www.epa.gov/safewater/ccl/pdfs/reg\\_determine1/support\\_cc1\\_magnese\\_dw\\_report.pdf](http://www.epa.gov/safewater/ccl/pdfs/reg_determine1/support_cc1_magnese_dw_report.pdf), last accessed 2006 September.
9. Agency for Toxic Substance and Disease Registry. Toxicological profile for Manganese. Atlanta: US Department of Health and Human Services, 2000. Available at: <http://www.atsdr.cdc.gov/toxprofiles/tp151.html>, last accessed 2006 September.
10. Agency for Toxic Substance and Disease Registry. Toxicological fact sheet for Manganese. Atlanta: US Department of Health and Human Services, 2000. Available at: <http://www.atsdr.cdc.gov/tfacts151.html>, last accessed 2006 September.

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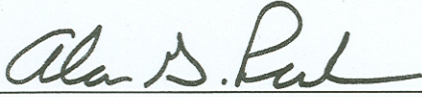
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Senior Regional Representative  
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## Certification

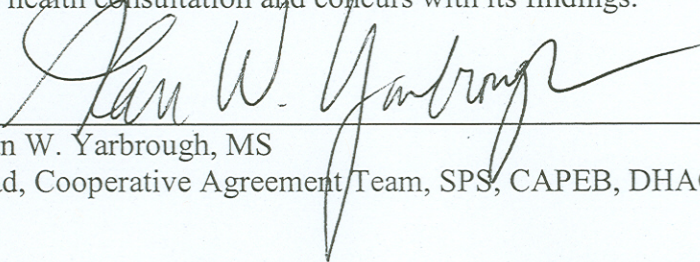
This health consultation for the Berkley Products Company site was prepared by the PADOH under a cooperative agreement with ATSDR. It is in accordance with approved methodology and procedures existing at the time the health consultation were initiated. Editorial review was completed by the cooperative agreement partner.



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LCDR Alan G. Parham, MPH, REHS  
Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

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



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Alan W. Yarbrough, MS  
Lead, Cooperative Agreement Team, SPS, CAPEB, DHAC, ATSDR

### Appendix A – Table 1

**Residential Well Water Sample Results near the Langner Enterprises Site – Pine Township, Grove City, PA;  
Contaminants Detected at Levels Above the Health-based Comparison Values.**

<i>Chemical</i>	<i>Frequency Detected</i>	<i>Concentration Range - ppb</i>	<i>CV - ppb</i>	<i>Source</i>
<i>Lead (Phase 1)</i>	4/7	ND – 7.8 (19.6)	15*	EPA PWS AL
<i>Lead (Phase 2)</i>	0/5	ND	15*	EPA PWS AL
<i>Manganese (Phase 1)</i>	7/7	77.3 – 605 (836)	300 / 500	EPA LTHA / EPA RMEG
<i>Manganese (Phase 2)</i>	5/5	0.19 - 335	300 / 500	EPA LTHA / EPA RMEG

Source: Results were received from PADEP and are from residential wells around the site sampled in May and December 2003.

Phase 1 - samples are from water without treatment or pre-treatment if the resident had a treatment unit on the well water system.

Phase 2 - samples are from water without treatment or post-treatment if the resident had a treatment unit on the well water system.

**KEY:**

() = highest sample result where the sample was taken *before* a well water treatment system.

\* - EPA’s 90<sup>th</sup> percentile or 90 percent of the sample results must be at or below 15 ppb for PWS requirements

ppb = sample result concentrations are in parts per billion and also the same as micrograms of the chemical per liter of water.

CVs = Comparison Values used by PADOH

ND = Chemical was not detected when sampled was analyzed

PWSs = Public Water Systems

AL = EPA’s action level for public water systems

LTHA = EPA’s Health Advisory levels considered safe for ingestion over a Lifetime

ATSDR = Agency for Toxic Substances and Disease Registry

## **Appendix B - Figures**



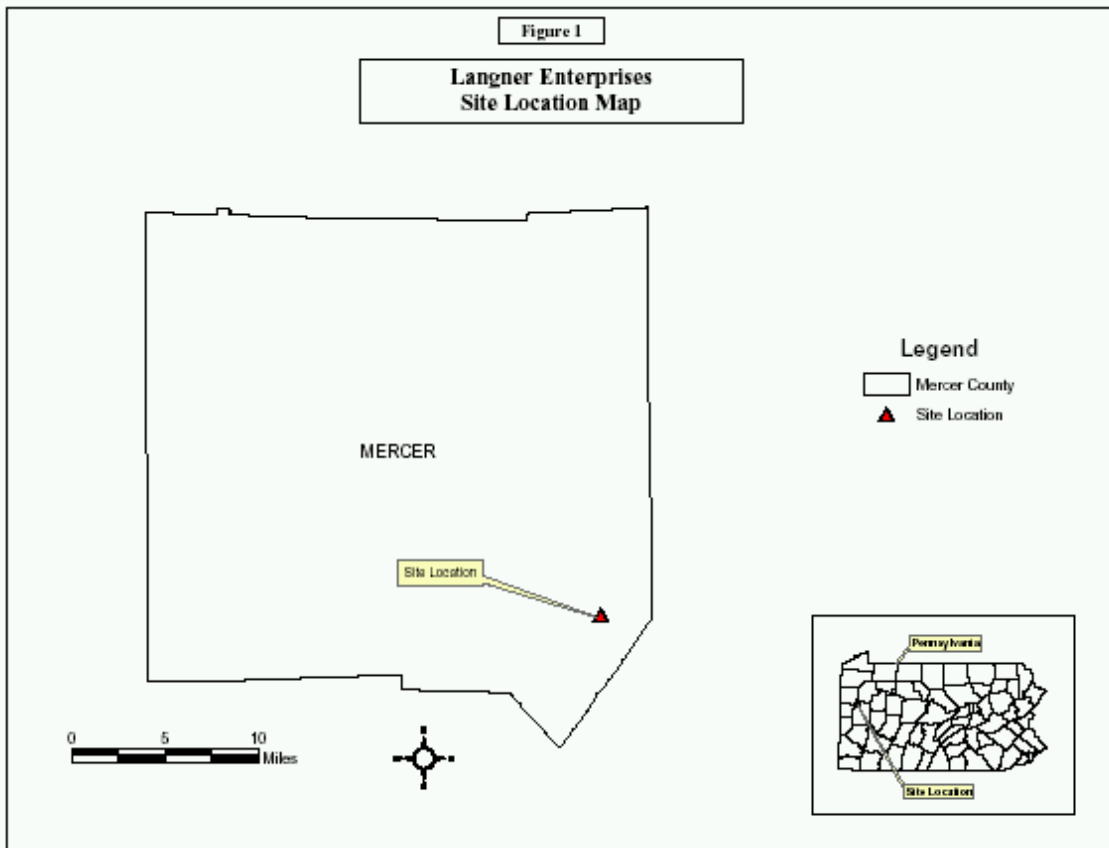
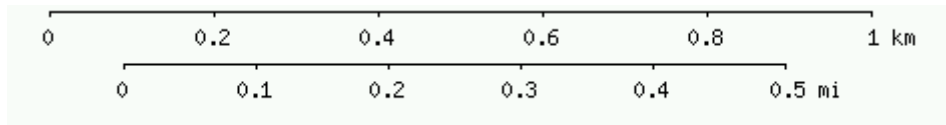
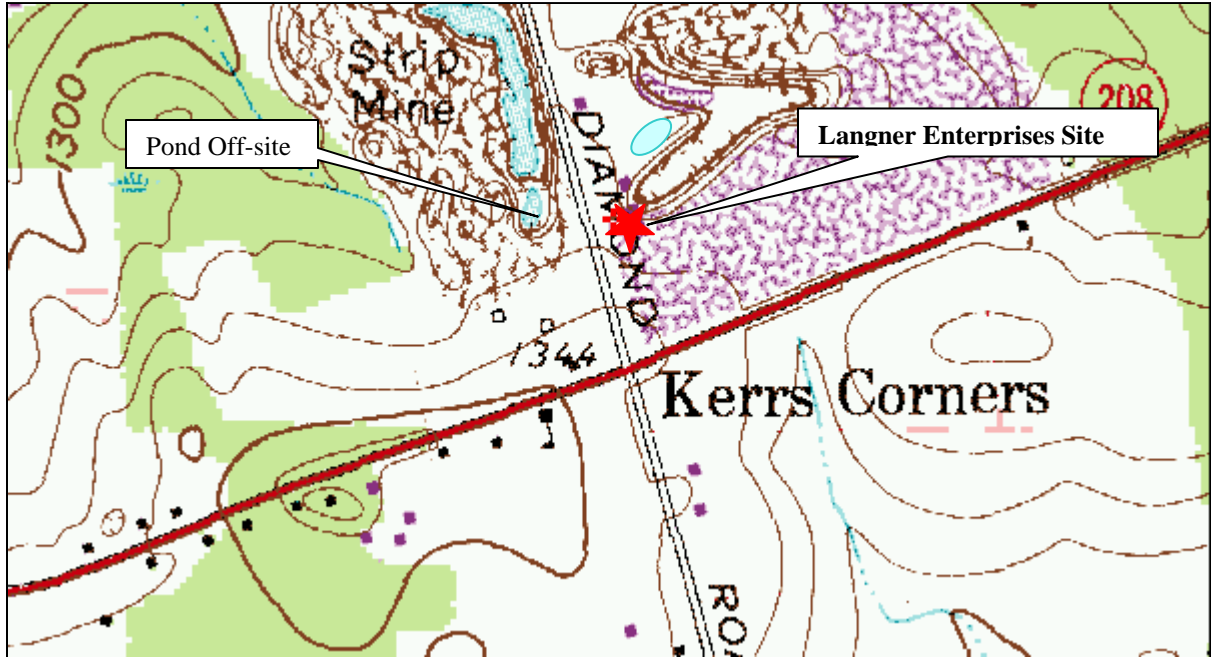


Figure 2 – Langner Enterprises Site Location Map



## Appendix C - Health Effects Evaluation Process Used by PADOH and ATSDR

ATSDR has developed a toxicological evaluation process for chemicals and exposure pathways in question at Superfund sites. This evaluation consists of two processes: a screening analysis and, at some sites, based on the results of the initial screening analysis, a weight-of-evidence analysis. The screening analysis, however, involves more than a simple comparison of one number against another. Site information is reviewed to select the substance concentrations and comparison values (CVs) that best represent site and exposure conditions. Typically, selecting the maximum detected substances concentrations and the lowest available CVs is used to screen the data. However, an evaluation may also be refined so that the analysis reflects more realistic exposure scenarios. During this selection process, an assessor should be mindful of community concerns, health outcomes of interest, the characteristics of potentially exposed populations, and possible exposures to multiple chemicals and/or pathways.

CVs are concentrations or doses that are conservatively derived (i.e., with many uncertainty or safety factors applied) based on the health effects literature and are below the levels associated with adverse health effects. CVs are used to assess voluminous data sets in an efficient and consistent manner during the screening analysis. They enable identification of substances that are not expected to result in adverse health effects (i.e., substances detected below CVs) and substances requiring further evaluation (i.e., substances detected above CVs). CVs should not be used to predict adverse health effects or to set cleanup levels at a site. These values serve only as guidelines to provide an initial screen of human exposure to substances. ATSDR has developed two types of CVs: health guidelines and environmental guidelines.

Health guidelines generally represent doses of a substance, usually expressed as milligrams of a substance per kilogram of body weight per day (mg/kg/day). For air exposures, the health guidelines are expressed as exposure concentrations (usually in parts per billion [ppb] or  $\mu\text{g}/\text{m}^3$ ). Health guidelines are protective of human health and are developed for both non-carcinogenic and carcinogenic effects. Health guidelines for non-carcinogenic effects are derived from human or experimental animal data and modified, as necessary, by a series of "uncertainty" factors (also known as safety factors) that ensure that guidelines are set at levels safely below those that could result in adverse health effects. Health guidelines for cancer are derived by the EPA and represent hypothetical estimates of cancer risk at low levels of exposure. Health guidelines are available for specific routes of exposure, such as ingestion and inhalation. No CVs have been established for dermal contact exposures.

ATSDR and EPA have developed health-driven CVs for non-carcinogenic effects resulting from substance exposures. Minimal Risk Levels (MRLs) are the health guidelines derived by ATSDR. Reference doses (RfDs) and reference concentrations (RfCs) are the health guidelines derived by EPA. In addition, EPA has derived factors to

measure the relative potency of various carcinogens (known as cancer slope factors or CSFs and unit risk values for oral and inhalation exposures, respectively). ATSDR and others (e.g., EPA, state governments, the World Health Organization) derive CVs for substances for which adequate data regarding time periods of exposure and routes of exposure are available. CVs are generally available for three specified exposure periods: acute (14 days or less), intermediate (15 to 365 days), and chronic (continuous exposure one year or longer). CVs are also generally available for two exposure routes: ingestion (soil and water) and inhalation. Usually CVs are available for many, but not always all substances found at a site. When CVs are available for a substance, the screening analysis is used. When no CVs are available, the data for the contaminant is generally retained for further evaluation. Exceptions exist, however. For example, essential nutrients (e.g., calcium, iron, magnesium) might only be harmful at very high concentrations or doses and would not necessarily be retained for further analysis. During the assessment it may be helpful to compare these and other naturally occurring elements to background concentrations. In selecting environmental guidelines for screening, the assessor should also consider several issues beyond which value is lowest. Consideration should also be given to *exposure duration, site-specific conditions, and toxicological equivalency of specific chemicals.*

ATSDR has developed environmental guidelines for substances in drinking water, soil, and air. These guidelines include environmental media evaluation guidelines (EMEGs), cancer risk evaluation guidelines (CREGs), and reference dose media evaluation guidelines (RMEGs). ATSDR sometimes uses these EPA-generated CSFs to derive CREGs. CREGs are estimated contaminant concentrations that would be expected to cause no more than one excess cancer in a million ( $10^{-6}$ ) persons exposed during their lifetime (70 years). ATSDR's CREGs are calculated from EPA's CSFs for oral exposures or unit risk values for inhalation exposures. These values are based on EPA evaluations and assumptions about hypothetical cancer risks at low levels of exposure.

To meet their unique mandates, other government agencies, such as EPA, the Food and Drug Administration, and state and tribal environmental and health departments, have developed their own CVs. These other CVs may address hazardous substances in water, soil, air, fish, or other biota. Because the mandates of other agencies may not always be strictly health-driven or consistent with the concerns of Superfund sites, fully understanding the derivation, uncertainties, and possible limitations of a comparison value is key to determining its appropriateness for use in the public health assessment process. Understanding the derivation of a particular comparison value is more important during the weight-of-evidence analysis when evaluating the possible public health significance of exceeding that value.

When RfDs and MRLs are not available, and to estimate chronic health guideline doses below which no adverse health effects (noncancerous) are expected, no observed adverse effect levels (NOAELs) and lowest observed adverse effect levels (LOAELs) are often used where there are recognized studies. Greatest weight is put on human or primate chronic exposure studies, if available. One approach is the use of margin of safety (MOS) analysis based on LOAELs. In general, when the MOS is greater than 1000, harmful

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effects are not expected. When the MOS ranges from approximately 100 to 1000, further toxicological evaluation is needed. If the MOS is less than 10, harmful effects might be possible, but further toxicological evaluation might still be advisable.