ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

# Public Health Assessment for

**HEGELER ZINC**
**HEGELER, VERMILION COUNTY, ILLINOIS**
**EPA FACILITY ID: ILN000508134**
**FEBRUARY 2, 2007**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment 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.



Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Additional copies of this report are available from:
National Technical Information Service, Springfield, Virginia
(703) 605-6000

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

# PUBLIC HEALTH ASSESSMENT

HEGELER ZINC

HEGELER, VERMILION COUNTY, ILLINOIS

EPA FACILITY ID: ILN000508134

Prepared by:

Illinois Department of Public Health
under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

## TABLE OF CONTENTS

## Summary

The Hegeler Zinc site is a former zinc smelting facility located approximately 3.5 miles south of Danville, Illinois. The site began operating in 1906 and ceased operations about 50 years later. The site was proposed for placement on the National Priorities List (NPL) in September 2004 and was listed in April 2005. Since that time, contaminated areas on the site have been fenced off and warning signs have been posted to discourage trespassing on the site.

Physical hazards and chemical contamination in waste piles remain on the site. Exposure to lead in slag piles could cause health effects in older children and adults that may trespass the site. Currently, a fence is preventing access to the site. Shallow groundwater on the site is contaminated by metals; however, it does not produce enough water to be a permanent source of drinking water. A municipal water supply provides drinking water to residences surrounding the site.

The Illinois Department of Public Health (IDPH) concludes that the site poses no apparent public health hazard. Currently, no one is being exposed to chemicals at levels that would be expected to cause adverse health effects.

IDPH recommends that the Illinois Environmental Protection Agency and the U. S. Environmental Protection Agency continue to restrict site access until potential physical and environmental hazards are removed from the property.

## Purpose

The Agency for Toxic Substances and Disease Registry (ATSDR) requested that the Illinois Department of Public Health (IDPH) complete a public health assessment for the Hegeler Zinc site. In March 2003, ATSDR issued a health consultation prepared by IDPH which concluded the site posed no apparent public health hazard [1]. The purpose of this public health assessment is to update the status of the site and to evaluate any known or potential adverse health hazards related to the site based on information currently available.

## Background and Statement of Issues

### Site Location

The Hegeler Zinc site occupies about 100 acres in a rural area about 750 feet west of the Village of Hegeler and about 3,000 feet south of the town of Tilton in Vermilion County, Illinois (Attachment 1). The former zinc smelting facility produced various grades of zinc slab and rolled zinc products, sulfuric acid and cadmium. The operation produced large amounts of slag through a burning process, which was then stored on the site. The slag was a cinder material with incombustible residues, and generally contained metals such as lead, cadmium, and zinc.

The site has two unnamed waterways bordering it on the west. One waterway flows from the north and the other flows from the south. The waterways meet and flow northeast across the site. Farmland borders the site on the west and north.

CCL Custom Manufacturing, a company manufacturing chemicals for use in household and personal care products, was south and east of Hegeler Zinc. The CCL Custom Manufacturing property was originally part of the 100-plus-acre Hegeler Zinc property. In May 2005, CCL Custom Manufacturing became part of KIK Custom Products.

Approximately 235 persons live within a ½-mile radius of the site. Most live in the Village of Hegeler and receive water from a municipal surface water supply. No private water wells have been identified within a 1-mile radius of the site [2].

### Site History

Hegeler Zinc began operations in 1906 as Hegeler Brothers and in 1913 became known as Hegeler Zinc. During its operation, sulfuric acid was produced from sulfur gas collected from the zinc ore prior to smelting. Most of the zinc ore used at the plant came from mines in Missouri. The company, however, operated its own local coal mine to charge its smelting furnaces. The production of cadmium began on the site in 1943. The cadmium-laden dust product was sent off the site to cadmium smelters to be further refined. Over years of operation, large amounts of slag were produced and stored in waste piles on the site. Subsequently, a zinc oxide plant was built to recover more of the metals from the slag. In November 1947, zinc smelting ceased, but zinc-rolling and sulfuric acid production operations continued until at least 1954 [2].

In April 2000, the U.S. Environmental Protection Agency (USEPA) requested that the Illinois EPA Site Assessment Unit conduct an Integrated Assessment for the Hegeler Zinc site. In September 2000, the site was placed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list [2]. In May 2001, the Illinois EPA conducted an Integrated Assessment. During this investigation, on-site waste (slag), sediment, and groundwater samples were collected as well as off-site samples of residential soil and sediment.

In May 2002, Illinois EPA conducted an Expanded Site Inspection north of the Hegeler Zinc site. Illinois EPA tested residential soil in Tilton, north of the site, using an X-ray fluorescence instrument. Illinois EPA also collected some soil samples for laboratory analysis.

In September 2002, the site owner reported that trespassers were using the property as a track for riding dirt bikes and 4-wheel drive all-terrain vehicles (ATVs).

In March 2003, ATSDR issued a health consultation prepared by IDPH that concluded the site posed no apparent public health hazard; however, it was recommended that access to the site be restricted by fencing until potential physical and environmental hazards are removed from the property.

Illinois EPA conducted additional soil screening sampling at three Hegeler residences in April 2003. Elevated levels of nickel were found in some driveways and IDPH issued cautionary letters to the homeowners. The site was proposed to the National Priorities List (NPL) in September 2004 and was listed in April 2005. Meanwhile, the U.S. EPA has secured the site by fencing areas where there is elevated metal contamination, and Illinois EPA is evaluating whether to seal the site from public access [3].

**Site Visits**

The most recent site visit was conducted in February 2005. The site appeared to be in similar condition as in the previous visits. Brick and concrete buildings (both intact and partially demolished) remain on the site. A motor home was observed parked on the roadway adjacent to buildings. The area of the site containing elevated levels of chemicals is now fenced and warning signs were posted (Attachment 2). The signs stated “Warning--Site Contains High Levels of Lead--Avoid Direct Contact With Site Materials and Dust”.

**Demographics**

Danville, with a population of 33,900, is the county seat of Vermilion County. The Hegeler Zinc site is in a rural area about 3.5 miles south of Danville. Approximately 1,700 persons live within 1 mile of the site.

**Natural Resource Use**

Most of the land surrounding the site is agricultural and manufacturing. An unnamed waterway flows north approximately 5,100 feet to become Grape Creek. The unnamed waterway and

portions of Grape Creek nearest the site do not appear to be used for fishing. However, the creek does flow through a small area of forested wetlands just east of U.S. Route 150, in the Town of Tilton. Citizens interviewed by the Illinois EPA concerning fishing habits in the area were unaware of anyone fishing in Grape Creek [4].

## Discussion

### Chemicals of Interest

IDPH compared the maximum level of each contaminant detected during environmental sampling with appropriate screening comparison values, when available, to select contaminants for further evaluation of both carcinogenic and noncarcinogenic health effects. An explanation of each comparison value used can be found in Attachment 2.

Comparison values are used only to screen for contaminants that should be evaluated further and do not represent thresholds of toxicity. Although some chemicals may exist at levels greater than comparison values, they can only affect a person who comes in contact with them and receives a high enough dose for adverse effects to occur.

#### *On-site Groundwater*

During the 2001 Integrated Assessment, six groundwater samples were collected from five locations on the Hegeler Zinc site. Samples of groundwater were collected from depths of 3.5 to 18 feet. No volatile organic chemical contamination was detected in the on-site groundwater samples; however, some metals were detected at levels exceeding drinking water comparison values. These metals included beryllium at .0183 parts per million (ppm), cadmium at 3.370 ppm, iron at 24.1 ppm, manganese at 8.62 ppm, nickel at 0.724 ppm, thallium at .0056 ppm, and zinc at 171 ppm [2]. Shallow groundwater generally flows across the site to the northwest. Also, water production from the sample points at these depths suggested that the groundwater was not adequate for a permanent source of drinking water.

#### *Surface Water*

No surface water samples were collected during the Integrated Assessment. The unnamed on-site waterways later become Grape Creek, which eventually flows into the Vermilion River. Any site-related contamination entering the Vermilion River would be diluted before it reached water supply intakes.

#### *Sediment*

During the 2001 Integrated Assessment, sediment samples were collected along the unnamed waterways and north of the site in Grape Creek in the town of Tilton. The Grape Creek sample was collected in a residential area where a resident suggested children sometimes swim. No fishing activities were observed or reported at this location. Organic chemicals and metals were found at levels greater than background, but only benzo(a)pyrene at 1.2 ppm and lead at 6,550 ppm were detected at levels greater than comparison values (Table 1).

***On-site Soil and Waste***

During the 2001 Integrated Assessment, 16 soil and waste samples were collected from 15 locations at the former zinc smelter. Eight slag samples and eight soil samples were collected primarily from 0 to 1 inch below the ground surface. All 16 samples had detectable levels of metals. Arsenic, lead and zinc were the metals most commonly found in both soil and slag samples. The maximum values of metals in the slag samples were arsenic at 725 ppm, lead at 72,100 ppm, and zinc at 64,100 ppm. The maximum values of metals in the soil samples were arsenic at 35.7 ppm, lead at 31,600 ppm and zinc at 50,400 ppm [5].

***Off-site Soil***

During the 2001 Integrated Assessment, off-site residential surface soil samples showed lead, cadmium, and zinc at levels three times greater than background levels [5]. Illinois EPA observed small amounts of slag material that were apparently used as fill and road base materials in alleys in Tilton. Soil samples not containing slag materials also contained elevated levels of metals that could have been the result of air deposition from the zinc smelter facility.

In November 2001, IDPH reviewed data from the residential soil samples collected by Illinois EPA at seven residential properties approximately 1,000 feet east of the site. IDPH sent letters to residents that contained a health-based interpretation of the laboratory results. Cadmium (17.9 ppm) was the only metal detected at levels greater than soil comparison values (Table 1).

In September 2002, IDPH reviewed the residential soil data collected by Illinois EPA in Tilton. IDPH sent letters to residents contained a health-based interpretations of the sampling results. No metals were detected at levels greater than comparison values.

Illinois EPA collected additional residential samples in April 2003 to determine if slag materials from Hegeler Zinc were used as road base material in communities surrounding the site. Nickel was detected at 120,000 ppm on the surface of one driveway in the Village of Hegeler. Although IDPH sent letters to residents explaining the potential exposure to metals in their driveways, metals in slag material are not likely in a form that presents an exposure hazard.

**Exposure Analysis**

IDPH evaluates human exposure pathways to determine the potential for the development of adverse health effects as a result of exposure to contaminants. Exposure pathways are separated into completed and potential exposure pathways. An exposure pathway consists of five elements: 1) a source of contamination; 2) transport through an environmental medium; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

In completed exposure pathways, all five exposure elements must exist, and exposure has occurred in the past, is currently occurring, or will occur in the future without some type of intervention. There were no completed exposure pathways identified in this health assessment. In potential exposure pathways, at least one element is missing, but the missing element could

exist. Potential exposure pathways suggest that exposure could have occurred in the past, could be occurring, or could occur in the future. An exposure pathway is eliminated if one or more of the elements is missing and will never be present.

***Potential Exposure Pathways***

The potential for exposed persons to experience adverse health effects depends on several factors including:

- the specific chemical and the level to which a person is exposed.
- how long a person is exposed, and
- the health condition of the exposed person.

Potential exposure pathways associated with the site are summarized in Table 2. Children playing in Grape Creek in southern Tilton could be exposed to contaminated sediments primarily through ingestion and skin contact. IDPH estimated exposure to lead and benzo(a)pyrene at the highest levels detected in the Grape Creek sediment for children less than 12 years of age. A 30 kilogram (kg) child playing in the creek 7 days per week for 3 months per year would not experience any adverse health effects.

In addition, children playing in residential yards in the Village of Hegeler could be exposed to metals in soil. Cadmium exceeded comparison values in residential soil. IDPH estimated a 16 kg child ingesting 100 milligrams of soil per day, 5 days per week, 26 weeks per year. Based on this scenario, exposure to cadmium would not be expected to cause adverse health effects.

Nickel was also detected off the site at elevated levels in two residential driveways. Based on the aforementioned exposure scenario, no adverse health effects would be expected from the ingestion of slag materials containing nickel at the levels detected.

Physical hazards and chemical contaminants in surface waste exist on the site. IDPH assumed that only older children or adults would trespass onto the site 2 days per week, 12 weeks per year for 10 years. Arsenic and zinc are not at levels that would be expected to cause adverse health effects in persons trespassing on the site. Exposure to lead in slag could cause health effects and will be discussed further in the next section.

Trespassers could also inhale contaminated dust while riding dirt bikes and ATVs. Without dust samples collected during these trespassing events, inhalation exposures cannot be quantified, though they are likely to be minimal.

## Toxicological Evaluation

### Lead

Persons trespassing on the site could be exposed to elevated levels of lead. Young children, ages 6 years old and younger, would not be expected to be on the site and they are the population most sensitive to the effects of lead. On the other hand, older children and adults are more likely to trespass. Exposure to lead in older children and adults can cause central nervous system effects such as decreased reaction time, weakness in fingers, wrists, or ankles and possibly affect the memory. It may also cause anemia, a disorder of the blood and in middle-aged men, may increase blood pressure [6]. However, the installation of a fence in 2004 around the contaminated areas of the site should reduce the number of trespassers accessing the site.

## Health Outcome Data

No health outcome data have been generated for this site because of the small population surrounding the site. Larger study populations are required to provide significant health outcome statistics. In addition, current exposure to site-related chemicals found off the site is not at levels that would be expected to cause adverse health effects. The potential for exposure to levels of contaminants on the site may cause adverse health effects; however, the installation of a fence has reduced the likelihood of trespassers gaining access to site areas with elevated levels of contamination.

## Community Health Concerns

IDPH contacted Illinois EPA and the Vermilion County Health Department concerning any community health concerns. According to these agencies, no community health concerns have been mentioned by area residents. The county health department routinely conducts environmental lead investigations when children's blood lead levels indicate an exposure hazard. No elevated blood lead levels have warranted an environmental lead investigation in residences surrounding the site.

A copy of the draft Public Health Assessment for the Hegeler Zinc site was available for public review and comment at Danville Public Library, 319 North Vermilion Street, Danville, from October 8, 2006, to November 10, 2006. The comments received can be found in Attachment 3.

## Child Health Considerations

IDPH recognizes that children are especially sensitive to some contaminants. For this reason, IDPH included children when evaluating exposures to contaminants related to the Hegeler Zinc site. Children are the most sensitive population considered in this health assessment. Based on the given exposure scenarios, children would not experience adverse health effects from exposure to chemicals from the site. Additionally, restricted site access currently prevents children being exposed to chemical contaminants on the site.

## Conclusions

Based on the information reviewed, current site conditions, and the site remaining as an industrial property, IDPH concludes that chemicals from the Hegeler Zinc site pose no apparent public health hazard. Although site-related chemicals have been detected in off-site sediment and soil samples, they are not at levels that would cause adverse health effects. Shallow groundwater is contaminated on the site, but no one is using this low-producing supply of water.

Access to the site is restricted with signs and fencing and should discourage trespassers from being exposed to on-site wastes and physical hazards around deteriorating buildings.

## Recommendations

Illinois EPA and USEPA should continue to restrict site access until environmental and physical hazards are removed from the property.

## Public Health Action Plan

In November 2001, September 2002, and April 2003 IDPH sent letters to residents whose soil was sampled. These letters provided a health-based interpretation of the sample results.

IDPH will review any additional data as it is generated to determine any potential health implications.

## Preparers of Report

**Preparer**
Cary Ware
Environmental Toxicologist
Illinois Department of Public Health

**Reviewer**
Jennifer Davis
Environmental Toxicologist
Illinois Department of Public Health

**ATSDR Regional Representative**
Mark Johnson
Regional Operations, Office of the Assistant Administrator

**ATSDR Technical Project Officers**
Charisse Walcott
Division of Health Assessment and Consultation

Beatrice Lunsford-Wilkins
Division of Health Studies

Sylvia Allen-Lewis
Division of Health Assessment and Consultation

## References

1. Illinois Department of Public Health. Health consultation for Hegeler Zinc, Hegeler, Illinois. Springfield, IL: Illinois Department of Public Health; March 2003.

2. Illinois Environmental Protection Agency. CERCLA integrated assessment report for Hegeler Zinc. Springfield, IL: Division of Remediation Management; September 2001.

3. Illinois Environmental Protection Agency. Hegeler Zinc Fact Sheet #1. Springfield, IL: Office of Community Relations; June 2003.

4. Illinois Environmental Protection Agency. CERCLA Expanded Site Inspection for Hegeler Zinc. Springfield, IL: Bureau of Land, Office of Site Evaluation; September 2002.

5. Illinois Environmental Protection Agency. Residential soil samples for the Hegeler Zinc site. Springfield, IL: October 2001.

6. Agency for Toxic Substances and Disease Registry. Toxicological profile for lead. Atlanta, GA: US Department of Health and Human Services; July 1999.

## Certification

This Hegeler Zinc Public Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

Charisse J. Walcott
Technical Project Officer, CAT, CAPEB, DHAC

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

Alan Yarbrough
Team Lead, CAT, CAPEB, DHAC, ATSDR

# Tables

**Table 1.** Concentrations of Off-site Sediment and Soil Contaminants

| Contaminant | Maximum Concentration (ppm) | Comparison Value (ppm) | Source of Comparison Value |
|---|---|---|---|
| Benzo(a)pyrene | 1.2 | 0.1 | CREG |
| Lead | 6,550.0 | 400.0 | IDPH |
| Cadmium | 17.9 | 10.0 | EMEG |
| Nickel | 120,000.0 | 1000.0 | RMEG |

ppm – parts per million
CREG – Cancer Risk Evaluation Guide
IDPH – Illinois Department of Public Health Lead Poisoning Prevention Guide
EMEG – Environmental Media Evaluation Guide
RMEG – Reference Dose Media Evaluation Guide

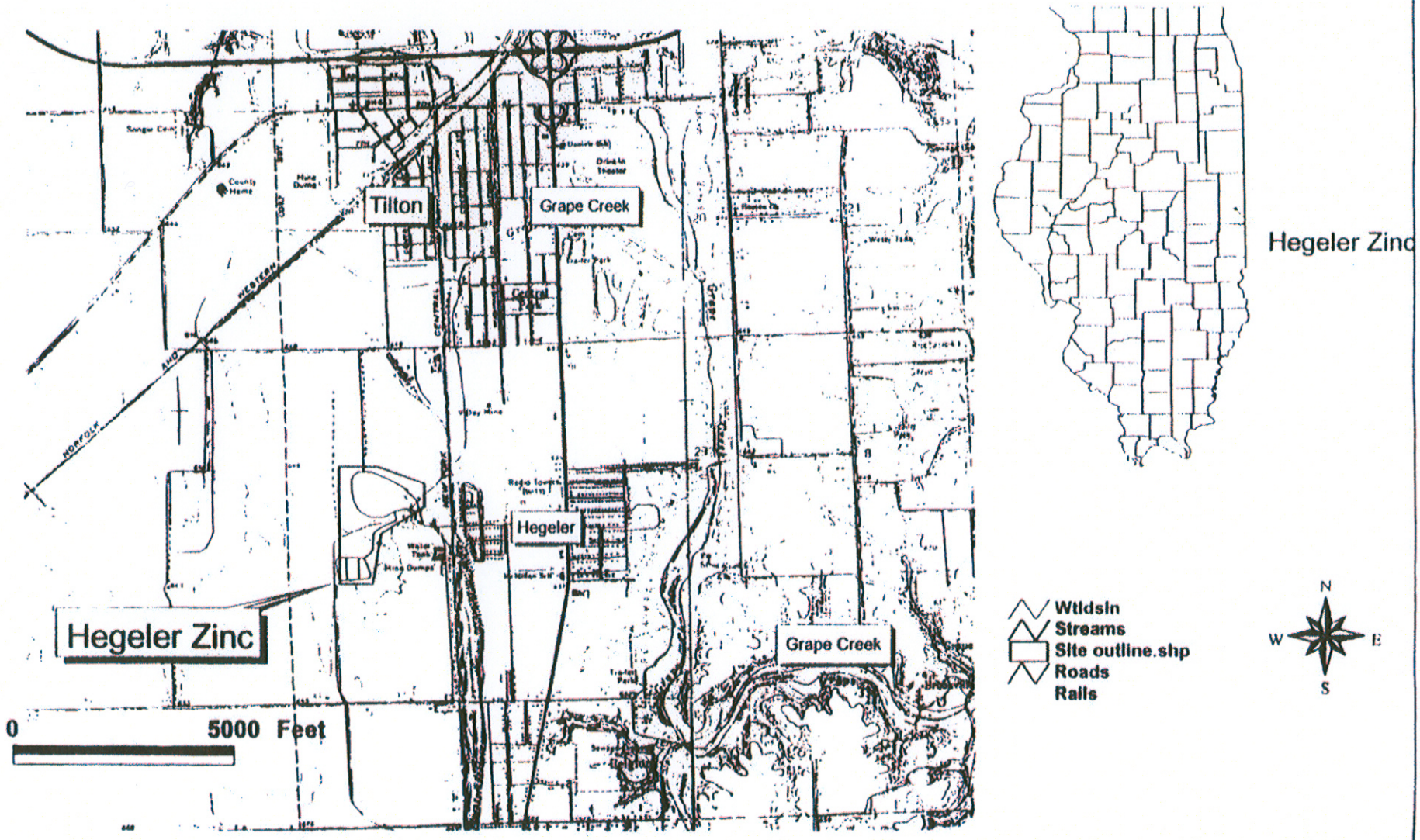
**Table 2. Elements of potential exposure pathways at Hegeler Zinc, Hegeler, Illinois.**

| Pathway | Source | Medium | Exposure point | Exposure route | Receptor population | Time of exposure | Exposure activities | Estimated # exposed | Chemicals |
|---|---|---|---|---|---|---|---|---|---|
| Sediment | Hegeler Zinc | Sediment | Grape Creek | Ingestion Dermal | Nearby children | Past Present Future | Wading | 20 | Lead Benzo(a)pyrene |
| Soil | Hegeler Zinc | Surface soil | Residential yards and driveways | Ingestion | Children | Past Present Future | Playing | 40 | Cadmium Nickel |
| Soil | Hegeler Zinc | Soil | On-site soil | Ingestion Inhalation | Children | Past | Trespassing on the site | 25 | Lead |

# Attachments

ATTACHMENT 1

LOCATION MAP



**Attachment 2**

**Comparison Values Used In Screening Contaminants for Further Evaluation**

Environmental media evaluation guides (EMEGs) are developed for chemicals on the basis of their toxicity, frequency of occurrence at National Priorities List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations. They are not action levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure. They are very conservative concentration values, designed to protect sensitive members of the population.

Reference dose media evaluation guides (RMEGs) are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer risk evaluation guides (CREGs) are estimated contaminant concentrations based on a probability of 1 excess cancer in 1 million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Maximum contaminant levels (MCLs) have been established by USEPA for public water supplies to reduce the chances of adverse health effects from contaminated drinking water. These standards are well below levels for which health effects have been observed, and take into account the financial feasibility of achieving specific contaminant levels. MCLs are enforceable limits that public water supplies must meet.

Lifetime health advisories for drinking water (LTHAs) have been established by USEPA for drinking water and are the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects over a lifetime of exposure. These are conservative values that incorporate a margin of safety.

## Attachment 3

A copy of the draft Public Health Assessment for the Hegeler Zinc site was available for public review and comment at the Danville Public Library, 319 North Vermilion Street, Danville from October 8, 2006 to November 10, 2006. The following comments were received.

1. In the summary, it could be mentioned that the site was placed on the NPL in April 2005.

The text has been added.

2. On page 2 in section "Background and Statement of Issues", a reference is made to CCL Custom Manufacturing. This plant became part of KIK Custom Products in May 2005.

The text has been changed.

3. We suggest that all of the units are either in ppm or ppb. The on-site groundwater section uses unites of ppb and the sediment and on-site soil and waste section use units of ppm.

The change has been made.