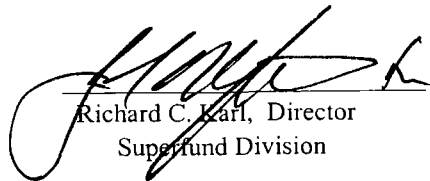




**Five-Year Review Report**  
**Koppers/Galesburg Superfund Site**  
**Knox County, Galesburg, IL**

Pursuant to CERCLA

Prepared by:  
Illinois EPA for  
U.S. Environmental Protection Agency  
Region 5  
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9/26/05  
Date

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## **List of Acronyms**

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
IAC	Illinois Administrative Code
IAGO	Illinois Attorney General's Office
IEPA	Illinois Environmental Protection Agency
MCL	Maximum Contaminant Level
NCP	National Priorities List
O&M	Operation and Maintenance
PRP	Potentially Responsible Party
RA	Remedial Action
RCRA	Resources Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
USEPA	United States Environmental Protection Agency
USDOJ	United States Department of Justice

## **Executive Summary**

The remedy for the Koppers/Galesburg Superfund Site in Galesburg, Illinois consisted of a biological landfarm for treatment of contaminated site soils, active collection trenches and Oxygen Release Compound ("ORC") treatment for contaminated groundwater, and the current institutional controls as the selected remedy in the 1989 ROD. The trigger for this five-year review was the last Five-Year review completed on September 27, 2000.

The assessment of this five-year review found that the remedy was constructed in accordance with requirements of the final ROD and is expected to be protective. Long term protectiveness requires compliance with land use restrictions that prohibit residential and other non-industrial uses at the Site and compliance with groundwater restrictions until groundwater cleanup standards are achieved throughout the plume.

### Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name ( <i>from WASTELan</i> ): Koppers/Galesburg Superfund Site		
EPA ID: ILD990817991		
Region: 5	State: IL	City/County: Knox County
SITE STATUS		
NPL status: Active		
Remediation status: Ongoing		
Multiple Operable Units* (OUs)? Yes	Construction completion date: 9/28/2001	
Has site been put into reuse? No		
REVIEW STATUS		
Lead agency: State of Illinois		
Author name: : Fred W. Nika, Jr., P.E.		
Author title: Remedial Project Manager	Author Affiliation: Illinois EPA	
Review period**: 06/01/2005 to 09/27/2005		
Date of site inspection: August 18, 2005		
Type of review: Post-SARA		
Review number: 2 (second)		
Triggering action: Date of last five-year review		
Triggering action date ( <i>from WASTELan</i> ): September 27, 2000		
Due date (five years after triggering action date): September 27, 2005		

\* ["OU" refers to operable unit.]

\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

**Five-Year Review Summary Form, cont'd.**

**Issues:**

None.

**Recommendations and Follow-up Actions:**

Conduct reviews at minimum 5-year intervals to ensure the remedy maintains its protectiveness.

**Protectiveness Statement(s):**

The remedy at the Koppers/Galesburg Superfund site is protective of human health and the environment.

**Other Comments:**

**U.S. Environmental Protection Agency  
Region 5  
Five Year Review Report  
Koppers/Galesburg Superfund Site  
Knox County, Galesburg, IL**

**I. INTRODUCTION**

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports, in addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 FR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The Illinois Environmental Protection Agency (Illinois EPA) conducted the five-year review of the remedy implemented at the Koppers/Galesburg Superfund Site in Galesburg, Illinois ("the Site"). This review was conducted by the Remedial Project Manager (RPM) for the entire Site from June 2005 through September 2005. This report documents the results of the review.

This is the second five-year review for the Site. The triggering action for this statutory review is the date of the first five-year review for the site in September 2000. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This review will be placed in the Site files and local repositories for the Koppers/Galesburg Superfund Site (the "Site") in Knox County, Galesburg, Illinois.

## II. CHRONOLOGY

Event	Date
Site proposed to the NPL	12-30-82
NPL final listing	9-8-83
RI Consent Decree signed	3-19-85
RI Report completed	8-8-86
FS Report completed	5-89
ROD signed	6-30-89
RA Consent Order	8-94
Construction Start	3-95
First Five-Year Review signed	9-00
ESD signed	8-29-01
Remedial Construction Complete (PCOR)	9-01
Second Five-Year Review visit	8-18-05

## III. BACKGROUND

### Physical Characteristics

The Koppers site has been an operating tie treating plant since 1907. It has treated ties using a variety of chemicals including creosote, coal tar, PCP and fuel oil. The treating operation consists of pressure treatment of railroad ties in treating cylinders utilizing a 70:30 mixture of creosote and coal tar. Past waste disposal practices have led to contamination in the soil and groundwater in and around the site.

The Galesburg/Koppers site is a 105-acre area located approximately two miles south of Galesburg. The land surrounding the site is sparsely populated, with the Burlington Northern Railroad Yard to the north, a landfill to the east and four residences and a lumberyard to the south and west. Farmland abuts these areas.

### Land and Resource Use

The surrounding area is utilized primarily for agricultural purposes. The Galesburg area lies within the Galesburg Plain physiographic province of western Illinois. This area is characterized by a generally subdued topography, with glacial end moraines forming low ridges and hills. The Galesburg Plain is underlain by wind-blown silt (loess) and glacial till. Much of the surface topography mimics the underlying bedrock surface.

Bedrock beneath the Galesburg area is primarily shale, but also includes lesser amounts of sandstone, limestone, coal, and clay. This series of sedimentary rock is of Pennsylvanian age and ranges in thickness between 225 and 275 feet in the area.

Overlying bedrock in the region are glacial deposits resulting from four major stages of Pleistocene glaciation. The three oldest glacial stages (Nebraskan, Kansan, and Illinoian) deposited drift consisting of till, sand, and gravel over the Galesburg area. The Wisconsinan glacial stage terminated north and east of Galesburg. Wind-blown loess deposits originating from the Wisconsinan Stage glacial drift to the northeast, however, also cover western Illinois including the Galesburg area.

The unconsolidated deposits beneath the Site are comprised of fill overlying glacial deposits consisting of loess, glacial till, and glacial outwash sand and fine gravel. The fill material is typically 0-3 feet thick and consists of poorly-drained and reworked silty clay soils mixed with varying amounts of cinder and fine gravel. Fill thicknesses are locally greater in areas where soils have been previously disturbed as the results of ongoing site operations. Underlying the fill is a loess deposit ranging from 5 to 15 feet in thickness. The glacial till that underlies the loess deposit functions as an aquitard to the underlying outwash sand deposit. The outwash sand unit is a semi-confined aquifer directly beneath the till aquitard.

## **History of Contamination**

The first indication of environmental problems came in the Spring of 1965 when a citizen's complaint was received by the State Sanitary Water Board. Phenol was found in the plant's discharge water and lime sludge was observed in the BN Ditch (See Site Map) From 1966 to 1980, Koppers took a series of actions to remediate the problems including cleaning and closing lagoons and installing wastewater spray fields.

During 1980, an hydrogeologic study was initiated by Koppers that included the installation of groundwater monitoring wells. PCP and creosote were found to be present in the shallow groundwater in various locations about the site.

The site was proposed for inclusion on the NPL on December 30, 1982. Its final listing on the NPL occurred on September 8, 1983. The Illinois EPA accepted lead responsibilities for conducting a Remedial Investigation/Feasibility Study ("RI/FS"), with support from the U.S. EPA. Negotiations were carried out with Koppers, and Burlington Northern ("BN"), throughout 1984 and 1985 toward an agreement to allow them the opportunity to voluntarily undertake an appropriate RI/FS. On March 19, 1985, Koppers and BN entered into a Consent Order with the State of Illinois. The purpose of this Consent Order was to determine the nature and extent of contamination at the site and generate alternatives for remediating the contamination found. The PRPs completed a RI Report on June 9, 1986 (with an Addendum on August 8, 1986) and completed a FS Report on March 30, 1989 (with an Addendum in May, 1989).

## **Initial Response**

Initial responses were minimal due to the operating nature of the plant. Remedial efforts comprised the bulk of the response actions. A number of lagoons and waste piles existed on site before responses were initiated. Groundwater had already been adversely affected in the shallow till aquifer

as well as the deeper sand aquifer. Non-Aqueous Phase Liquids ("NAPLs") were detected in the shallow aquifer comprised of wastes from site operations.

### **Basis for Taking Action**

The RI indicated that past site operations resulted in contamination of soil, sediment, surface water, and groundwater at different locations around the site. Contaminants at the site in these locations included various levels of phenol, pentachlorophenol, creosote, and poly-aromatic hydrocarbons ("PAH" s). The primary locations of concern for soil contamination on the site that were identified include:

- The Lime Slurry/Sludge areas;
- The Drip Track area;
- The Penta Lagoon;
- North and South Creosote Lagoons;
- Surface Water Ditches;
- Existing Spray Field, and;
- Waste Pile Area.

The FS Report contained a proposed plan for remedial action at the site. The FS report identified both soil and groundwater contamination by the contaminants of concern. It also indicated that the contamination at the site presented an endangerment to public health, welfare, and the environment.

Groundwater at the site has been impacted throughout the site with higher concentration of contaminants in the areas of the soil contamination. Twenty-seven groundwater-monitoring wells were installed at the site by Koppers in 1980 to monitor groundwater in the shallow glacial deposits. In 1982, eleven shallow, three intermediate, and two deep groundwater monitoring wells were added to the existing network. Samples analyzed from these wells indicated that two plumes of contamination exist in the site groundwater. The first is located in the area of the north and south creosote lagoons. The other was determined to be located in the area of the penta lagoon. Due to irregularities in the local groundwater flow patterns, the plume near the creosote lagoons is migrating in a southeastern direction while the plume in the penta lagoon area is migrating in a northeasterly direction.

To that end, a Record of Decision ("ROD") was signed on June 30, 1989 and dictated the selected remedy to be biological treatment for contaminated site soils and pump-and-treat remediation for site groundwater.

## **IV. REMEDIAL ACTIONS**

### **Remedy Selection**

A ROD was signed on June 30, 1989, which dictated the selected remedy to be biological treatment for contaminated site soils and "Best Available Technology" for site groundwater.

## Remedy Implementation

A Remedial Design/Remedial Action consent order was issued in August 1994 and stated that the named Responsible Parties (Burlington Northern Railroad Company and Beazer East, Inc. and necessary party Koppers Industries, Inc.) must initiate design and cleanup activities at the site per the ROD. Since that time, the biological treatment technology has been demonstrated and construction of the full scale Soil Storage Unit ("SSU") and Land Treatment Unit ("LTU") has been completed. Contaminated soil was excavated from all identified operable units and placed in the SSU for treatment.

In 1997, the first lift of the LTU was filled with soil and treatment was initiated. After one summer of treatment, the soil in the LTU was sampled and evaluated for the effectiveness of treatment. After successful treatment, the remaining contaminated soil in the SSU was treated in 1998 and 1999. At the conclusion of the final loading of the LTU, the SSU was decommissioned and dismantled.

A special focused investigation was conducted in the southeast area of the site known as the trestle area. The trestle area has been of particular concern with the appearance of DNAPL at the ground surface. This area has a history of DNAPL concern. During May, June and July of 1995, DNAPL was observed in the BN ditch both north and south of the culvert pipe that runs beneath the trestle.

The source of the creosote in the BN ditch has remained elusive despite repeated efforts to determine its cause. Historically, wastewater effluent from the former creosote lagoons was discharged to the Koppers and/or BN ditch. This wastewater may have carried traces of DNAPL that accumulated in the ditches. However, the past observations of DNAPL seepage into the ditch indicate that creosote likely traveled through the subsurface.

The ROD stipulated that the groundwater component of the remedy should be comprised of the "BAT groundwater treatment", with BAT meaning "Best Available Technology". This treatment was to be developed based upon design studies to be conducted later. This design study became known as the Trench and Well Study. At the time of the ROD signing, it was generally assumed that this would entail some form of pump and treat technology in which collection wells and trenches would be installed to collect impacted groundwater and treat it for discharge at the local Publicly Owned Treatment Works ("POTW"). Pumping and treating groundwater was one of the only treatment technologies available at the time.

This remedial action was chosen by Illinois EPA and U.S. EPA in negotiations with BNRR and Beazer East, Inc following completion of the FS and issuance of the ROD for this site. Under the groundwater management component of the remedial action for the site, as specified in the Consent Order, the remedy consists of:

- Collection of impacted groundwater from the site;
- Pretreatment of impacted groundwater on-site as necessary;
- Final treatment at the POTW; and
- Routine monitoring of groundwater collection/treatment systems.

## Remedy Modification

As mentioned before, the groundwater treatment method selected in the 1989 ROD involved a pump and treat technology. Since the volume of water generated during the pump test was so much greater than originally anticipated, doubt arose whether or not the POTW would be able to handle the volume of water that would be generated.

Consequently, groundwater treatment alternatives were explored in the southeast corner of the site to more appropriately deal with the groundwater. One alternative considered and pursued was an in situ groundwater remediation strategy to stimulate microbial growth. The shallow till aquifer would use injected air to encourage microbial growth. The deep sand aquifer would be oxygenated via chemical oxygen supply "socks" which will release oxygen slowly over time. To assist in the dispersal of the oxygenated water, special "pump and packer wells" were installed to circulate the deep sand groundwater between the top and bottom of the aquifer. The intent in both of these systems is that this microbial growth will result in the biological destruction of the dissolved constituents of groundwater contamination. The pilot trenches were constructed in the early portions of 2000 and a three-month pilot test was conducted.

Additionally, in August 1994, a Consent Order was negotiated to ensure that the selected remedy would be implemented. The RD/RA Consent Order signed in 1994 specified treatment methods for the contaminated soils but did not specify the groundwater treatment method. Chemical specific performance goals were established for a number of constituents found at the site.

To recap, the selected remedy, as established in the Consent Order, specified that the Performance Goals for the deep sand aquifer shall be:

*The following chemical specific concentration, or background concentrations (which shall be determined by sampling a well(s) upgradient of the Site in an area not affected by Site operations), whichever are greater:*

1. Phenol: 100 ppb
  2. Naphthalene: 25 ppb
  3. Pentachlorophenol: 1 ppb
  4. PH: 6.5-9.0 (except for natural causes)
  5. Total potentially carcinogenic Poly-Aromatic Hydrocarbons ("PAHs ") (benzo(a) pyrene, benzo (a) anthracene, benzo(b) fluoranthene, benzo (k) fluoranthene, chrysene, dibenzo(a,h) anthracene and indeno(1, 2,3-c, d) pyrene) The concentration set forth in the ROD, except that if an MCL is promulgated, the MCL shall be the cleanup goal.
- b. *The concentration as determined by groundwater monitoring, if such concentration exceeds the standard set forth above and: (i) to the extent practicable the exceedence has been minimized and to the extent practicable the beneficial use, as appropriate for the class of groundwater, has been returned; and (ii) any threat to public health or the environment has been minimized; or*
- c. *After construction and operation of the remedial action program for Site groundwater, an alternative concentration limit based upon the factors set forth in 35 III. Adm. Code Section 724.194 (b) and(c) (1991).*

Also, per the Consent Order: Performance Goals for the shallow till unit were to be "based on groundwater studies yet to be performed." The PRPs and Illinois EPA agreed that the goal for remediation of the shallow till aquifer was to minimize to the extent practicable the contribution of this unit to contamination in the deep sand aquifer.

Of all the potentially carcinogenic PAH listed, only benzo(a) pyrene has had an Maximum Contaminant Limit ("MCL") established with a value set at 0.0002 mg/1. The remaining listed PAHs would therefore still be subject to the ROD established concentration of  $2.9 \times 10^{-6}$  mg/1. As this cleanup objective is well below the limit of analytical equipment, a successful achievement of the stated cleanup objectives was impossible as it could not be analytically verified. Therefore, new cleanup objectives needed to be generated that are in agreement with current cleanup objective criteria.

In pursuit of these new cleanup objectives, Illinois EPA's Office of Chemical Safety was tasked to generate these numbers. The new numbers generated at that time are given below.

**Tier I Groundwater Criteria**

<b>Carcinogenic PAHs</b>	<b>Class I (mg/L)</b>	<b>Class II (mg/L)</b>
Benzo (a) anthracene	0.00013	0.00065
Benzo (b) fluoranthene	0.00018	0.0009
Benzo (k) fluoranthene	0.00017	0.00085
Benzo (a) pyrene	0.0002	0.002
Chrysene	0.0015	0.0075
Dibenzo (a, h) anthracene	0.0003	0.0015
Indeno (1,2,3-cd) pyrene	0.00043	0.00215
Naphthalene	0.025	0.039
Pentachlorophenol	0.001	0.005
Phenol	0.1	0.1

On August 29 2001, an Explanation of Significant Difference was signed by the Illinois EPA with concurrence by USEPA to formally modify the groundwater component of the selected remedy. Additionally, the groundwater cleanup objectives were adjusted to reflect newer toxicity data.

Additionally, in preparation for this Five-Year Review, Illinois EPA once again tasked our Office of Chemical Safety to review cleanup objectives. In review, it was determined that the Class 1 and Class 2 groundwater standards for naphthalene have changed from the values in the table above to 0.14 and 0.22 mg/1, respectively.

**Institutional Controls**

ROD required institutional controls call for "Application and enforcement of access and land use

restrictions for the "area of contamination" in accordance with the terms of the anticipated Consent Decree with the responsible parties." The documents on record at the Knox County Recorder of Deeds include Environmental Land Use Control ("ELUC") for the site and the attachment of the Consent Order to the deed. The IC's, as called for in the ROD are in place and functioning as called for. The ELUC calls for:

1. The maintenance of the engineered barrier in the Hopper Car Building (one area of contamination);
2. The prohibition of groundwater wells for any purpose other than collection of groundwater samples;
3. The use of the Site property only for commercial/industrial purposes;
4. The development of a site safety plan meeting the requirements of 29 CFR for any construction beneath the aforementioned Hopper Car Building; and
5. Any soil removed from beneath the engineered barrier must be managed in accordance with 35 IAC, Subtitle G: Waste Disposal.

In addition, the RD/RA Consent Order of 1994 is attached to the deed for the property to inform any potential buyers of the environmental restrictions and liabilities associated with the property. The site continues to operate as a wood treating facility, and thus, the usage has not changed.

An IC plan will be developed to determine if there are issues with the scope and effectiveness of existing institutional controls.

## **V. PROGRESS SINCE LAST FIVE YEAR REVIEW**

This is the second Five-Year Review for this site. Since the initial Five-Year Review, we have achieved Construction Completion in 2001. An ESD was also completed in 2001 to alter the selected groundwater treatment method. The groundwater treatment system continues to function.

## **VI. FIVE YEAR REVIEW PROCESS**

### **Administrative Components**

The Koppers/Galesburg Five Year Review team was led by Fred Nika of the Illinois EPA, Project Manager for the Koppers/Galesburg Superfund Site. Also, Bill Hammel, the Illinois EPA Community Relations coordinator participated in the Five Year Review process. From June 2005 to September 2005, the review team established and followed the review schedule as follows:

- Document Review;
- Data Review;
- Community Involvement;
- Press Release;
- Site Inspection;
- Five-Year Review Report Development and Review

The public was notified of the five-year review in September 2005 through a press release.

## Document Review

For purposes of this review, the ROD, Consent Order, 2001 BSD and biannual groundwater data were reviewed. In addition, RPM Fred Nika visited the Knox County Recorder's office to confirm the presence of the Environmental Land Use Control ("ELUC") for the site and the attachment of the Consent Order to the deed, verifying that the required institutional controls are in place.

## VII. TECHNICAL ASSESSMENT

### **Question A: Is the remedy functioning as intended by the decision documents? YES**

The remedy is operating and functioning as designed. The soil treated in the biological landfarm achieved and "A" grade in all phases of treatment and has been decommissioned. The groundwater treatment system is also operating properly and cleanup objectives are being met. No areas of the site will currently support unlimited use. Compliance with the existing land use restrictions is necessary to ensure that the remedy is functioning as intended and for the remedy to remain protective of human health and the environment.

No activities were observed that would have violated the intent of proposed institutional controls. There were no new uses of ground water observed at the Site.

### **Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid? YES**

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

#### Changes in Standards and Things to be Considered

The cleanup objectives for the site groundwater have been reviewed, revised and determined to be protective.

#### Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

### **Question C: Has any other information come to light that could call into question the protectiveness of the remedy? NO**

There is no other information that calls into question the protectiveness of the remedy.

## Technical Assessment Summary

According to the data reviewed and the Site inspections, the remedy is functioning as intended by the final ROD and the subsequent ESD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been only minor changes in

the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and these changes do not affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

## **VIII. ISSUES**

No issues were found as a result of this Review. An IC plan will be developed to determine if there are issues with the scope and effectiveness of existing institutional controls.

## **IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS**

The recommendation resulting from this five year review would be to continue maintenance of the remedy components (deed restrictions and covenants, groundwater system operation, and groundwater sampling) as components of the remedy and to continue to perform 5-year reviews to ensure these restrictions are maintained. Additionally, an IC plan will be developed to evaluate the effectiveness of institutional controls.

## **X. PROTECTIVENESS STATEMENT**

The remedy is protective of human health and the environment.

## **XI. NEXT FIVE-YEAR REVIEW**

The next five-year review will be completed by September 27, 2010, which is five years from the date of this five-year review.

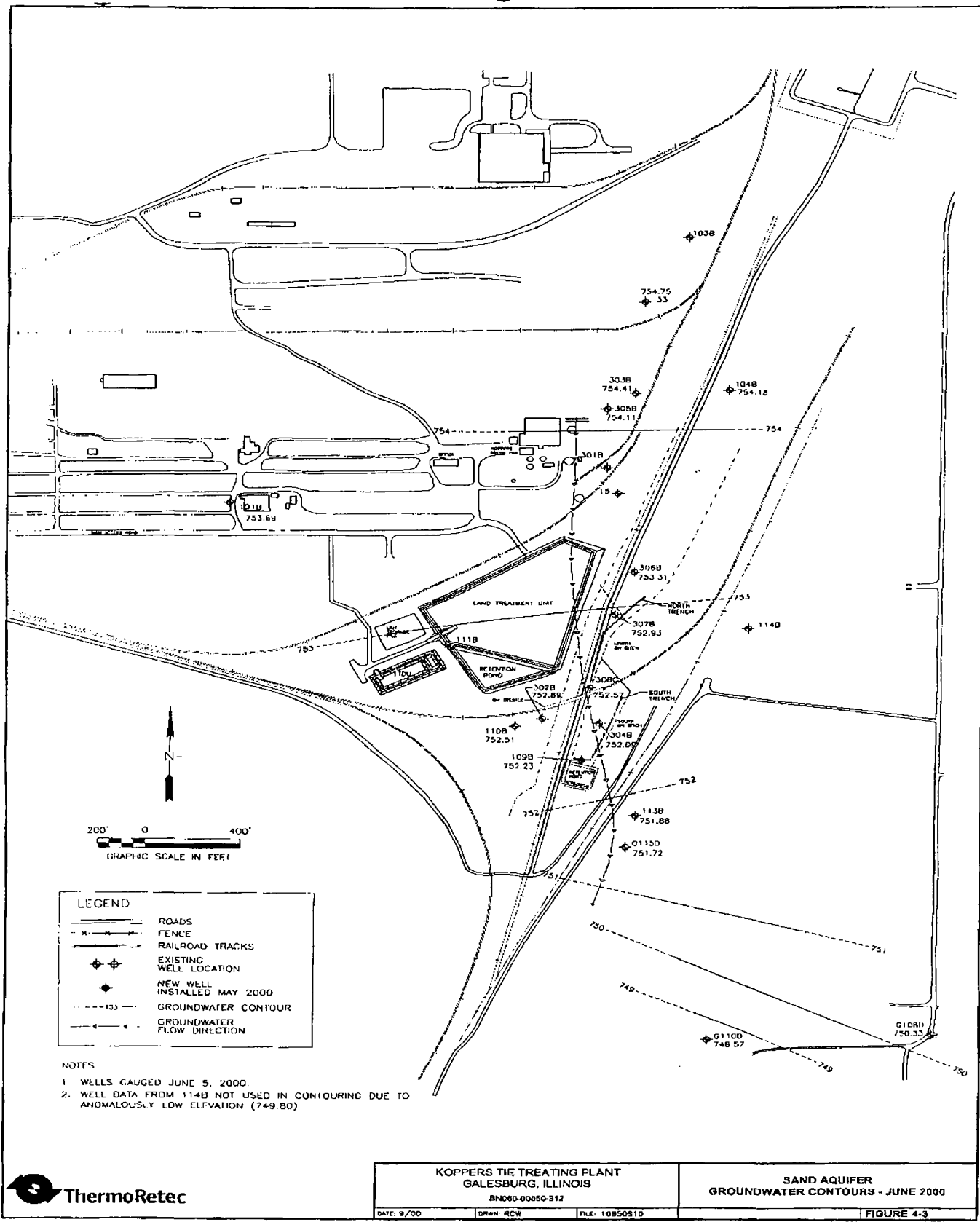


Figure 1-1 Site Map