FIVE-YEAR REVIEW REPORT

CENTRAL ILLINOIS PUBLIC SERVICE COMPANY SITE
TAYLORVILLE, ILLINOIS

Prepared By:
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U.S. Environmental Protection Agency
Region V
Chicago, Illinois

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Date

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CACO	Consent Agreement Compliance Order
CAFO	Consent Agreement Final Order
CIL	Compliance Inquiry Letter
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
LTRA	Long-Term Remedial Action
MCL	Maximum Contaminant Level
NCP	National Priorities List
O&M	Operation and Maintenance
PECL	Preliminary Enforcement Conference Letter
POTW	Public Owned Treatment Works
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 Immediate Removal Action for Ameren CIPS Site in Taylorville, Illinois included excavation of approximately 12,000 cubic yards of contaminated soil which was completed in January, 1987. A permanent alternative water supply was provided to approximately 20 residences in October, 1987, along with plugging and abandonment of the associated private drinking water wells. Monitoring of groundwater, surface water, pond sediment and fish downstream of the site was conducted for a remedial investigation and feasibility study.

The final remedy addressed the remaining principal threat at the site, which was groundwater contamination. Upon signature of a Remedial Design/Remedial Action (RD/RA) Consent Decree in March 1994, Ameren CIPS constructed a Groundwater Pump and Treat Plant, completed in February, 1995. The monitoring program for untreated groundwater and treatment system effluent was expanded to supplement current monitoring efforts. Institutional controls were placed on the site which included complete fencing with "no trespassing" signs posted, and land use and deed restrictions.

The assessment of this Five-Year Review finds the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). In order to meet the requirements set forth in the ROD and remain protective of human health and the environment, the pump and treat system must continue its current operation. The next five-year review will be conducted June 30, 2009, five years from the date of this report.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: **Ameren Central Illinois Public Service Company (CIPS), Taylorville**

EPA ID *(from WasteLAN)*: ILD981781065

Region: 5	**State:** IL	**City/County:** Christian County

SITE STATUS

NPL status: ₦ Final ☐ Deleted ☐ Other (specify)

Remediation status (choose all that apply): ☐ Under Construction x Operating ☐ Complete

Multiple OUs?* ☐ YES ₦ NO	**Construction completion date:** __02_ / 1995_____

Has site been put into reuse? ☐ YES ₦ NO

REVIEW STATUS

Lead agency: ☐ EPA ₦ State ☐Tribe ☐ Other Federal Agency

Author name: Erin Rednour

Author title: Remedial Project Manager	**Author affiliation:** Illinois EPA
Review period: 01-1999 to 12 -2003	
Date(s) of site inspection: 07 /30 /2003	
Type of review: ₪ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) ₪ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU #____ ☐ Construction Completion ☐ Other (specify)	☐ Actual RA Start at OU#____ ₪ Previous Five-Year Review Report
Triggering action date ***(from WasteLAN)***: 03/31/1999	
Due date ***(five years after triggering action date)***: 03/31/2004	

* ["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:
Surface water clean-up objectives will be updated to confirm that surface water discharges continue to be protective of human health and the environment. It is expected that the change in surface water clean-up objectives will be addressed through an Explanation of Significant Differences to the ROD.

Recommendations and Follow-up Actions:
The pump and treat system is performing as envisioned within the ROD and facility design documents. However, groundwater monitoring data indicates the clean-up objectives have not been met throughout the aquifer. In order to meet the requirements set forth within the ROD and remain protective of human health and the environment, the pump and treat system must continue its current operation. Ameren has also been investigating alternative treatment methods to attain the clean-up objectives for groundwater. Ameren has recently submitted a proposal for review to the Illinois EPA to allow for a pilot study for the direct injection of an oxidizer. It is the goal of the study to eliminate or greatly reduce the ultimate length of time the pump and treat system will need to be operated. Although the operation of the pump and treat system will need to be halted for the duration of the study in order for the oxidizer to have ample contact time for reaction, Ameren has proposed additional monitoring to ensure detection of any migration of contaminants from the site. Additionally, the pump and treat system will not be disabled during the study period and can be available for restart at any time monitoring indicates the necessity of such. Illinois EPA looks positively toward such efforts and should support the pilot study if review of the project specifics verifies the study will not jeopardize the protectiveness of the remedy. See also Section IX.

Protectiveness Statement(s):

The remedy in place continues to be protective of human health and the environment. The excavation and site fencing restricts any surface soil exposures while the pump and treat facility, in conjunction with the municipal water line restricts exposure to any contaminated groundwater. Although this five year review recommends that surface water objectives be adjusted for the facility's effluent, the existing groundwater treatment operation is providing adequate treatment prior to any surface water discharge.

Other Comments:

No additional comments

FIVE-YEAR REVIEW REPORT
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY SITE
TAYLORVILLE, ILLINOIS

I. INTRODUCTION

The Illinois Environmental Protection Agency ("Illinois EPA") has conducted a five-year review at the Central Illinois Public Service Company Superfund Site ("Ameren CIPS site") in Taylorville, Illinois. Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended, and section 300.430 (f)(4)(ii) of the National Oil and Hazardous Substances Contingency Plan ("NCP") require that periodic reviews (no less than every five years) be conducted at sites where the selected remedial action results in hazardous substances, pollutants, or contamination remaining at the site above levels that allow for unrestricted exposure and unlimited use. The purpose of the five-year review is to confirm that the selected remedial action continues to be protective of human health and the environment.

This report is intended to document the completion of the five-year review at the Ameren CIPS site. A statutory review was conducted at this Site because contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

1883-1932	Manufactured Gas Plant operated at site.
1932	Plant closed, most of above ground structures removed, below ground structures filled with debris and left in place.
10-1985	Contamination discovered by septic tank contractor. Ameren CIPS notified Illinois EPA of contamination and began on site investigation. Identified as coal tar and its constituents.
11-1985 – 9-1986	Soil borings conducted and contamination confirmed onsite and in drainage swale to the south.
4-1986 – 9-1986	Sediment and surface water sampling conducted.
8-1986	Domestic well sampling conducted.
11-1985 – 8-1986	Groundwater monitoring wells installed. Concentrations of total PAHs of up to 8,676 ppb detected in on site wells.

7-2-1986	Notice pursuant to Section 4(g) of the Environmental Protection Act issued by Illinois EPA.
1-19-1987	Ameren CIPS began immediate removal.
3-1987	Excavation complete.
10-1987	Water main to provide water to five area residents on well water completed.
12-1988	Fencing to enclose entire site completed.
9-30-1992	Record of Decision
3-1994	Signature of Remedial Design/Remedial Action Consent Decree
2-1995	Completion of Groundwater Pump and Treat System

III. BACKGROUND

A. PHYSICAL CHARACTERISTICS

The Ameren CIPS site is located in Christian County at 917 South Webster Street in Taylorville, Illinois. The site is owned by the Central Illinois Public Service Company ("Ameren CIPS") and is slightly less than one acre in size. The site is bordered on the north by typical residential block arrangements. On the south, the site is bounded by Seaman Estates subdivision which consists of eight large wooded tracts with single family residences on several. All of the tracts surround Seaman Estates Pond which is also directly south of the site. To the east is Manners Park which is the City's main multi-use facility. The site is bounded immediately on the west by the Ameren CIPS pole yard and railroad tracks. Figure 1, taken from Barr Engineering Company's July 2003 Direct Push Investigation/Treatability Study prepared for Ameren Services displays the site's location. Figure 2, taken from the same report, although of less than desired quality, exhibits the site's layout.

B. History of Contamination

A Manufactured Gas Plant operated on the site from 1883 to 1932. In 1932 the plant closed and most of the above-ground structures were torn down while the below-ground tanks were apparently filled with debris and left in place (Hanson Engineers, Phase I). Contamination was discovered at the site by a septic tank contractor on October 20, 1985 (Cochran). Ameren CIPS notified the Illinois EPA and the company began an on-site investigation. The contaminants on-site were identified as coal tar and its constituents. Coal tar is a byproduct of the coal gasification process and is comprised mainly of polynuclear aromatic hydrocarbons ("PAHs") such as naphthalene and benzo(a)anthracene as well as volatile organic compounds ("VOCs") such as benzene and toluene.

The site is underlain by a largely unconfined aquifer, which moves from a northeast to southwest direction through fairly well sorted sand and gravel. This sand and gravel aquifer extends to approximately ninety (90) feet below ground surface where it is underlain by bedrock comprised of limestone and dolomite. The uppermost geologic unit is loess, a wind blown material, which ranges from 5 to 10 feet in depth. The loess consists of very fine sand, silt and clay that allow recharge of the aquifer from the surface. The water table beneath the site is approximately 15 feet below ground surface (Hanson Engineers, Phase II).

C. Initial Response

In response to a 4(g) Notice issued by Illinois EPA, Ameren CIPS began an Immediate Removal Action at the site on January 19, 1987 Above and below-ground structures associated with the gas plant were removed. On-site contaminated soil was removed to an average of ten feet below ground surface. Approximately 9,000 cubic yards of contaminated soil was removed and transported to Peoria Disposal Company Landfill for disposal. Additionally, an area of approximately 600 feet by 50 feet was excavated from the drainage swale running off-site towards the Seaman Estate Pond. The depth of the off-site excavation averaged about three feet. A total of 3,000 cubic yards was excavated from the drainage swale and transported to Peoria Disposal Company Landfill for disposal. The excavation was completed in March of 1987. The excavations were filled with clean soils from off-site (Illinois, Record).

The purpose of the removal action was to remove the source material, which posed a principal threat to human health and the environment. Figure 6 displays the extent of excavations within the "main area" and Figure 7 displays "Area A" south of the site. The off-site excavation within Area A addressed all off-site sediments impacted by the site which posed a human health risk outside of U.S. EPA's acceptable risk range. Twenty soil borings were conducted surrounding the facility at off-site locations. None of the samples taken from the borings immediately surrounding the site had detectable levels of PAHs. As provided within Hanson Engineer's Work Plan for Providing Phase II Site Investigation and Remedial Alternative Development, representative samples from regular intervals (2.5 to 5 feet) were classified by the field geologist and screened with organic vapor analysis. No odors or visual observations of contamination were noted for vadose zone soils within any of the borings immediately surrounding the site (Hanson Engineers, Field Investigation). As such, no vadose zone samples were analyzed within the laboratory for individual PAHs. Field scientist's observations confirmed the expectation that, with the exception of sediments south of the site, off-site soils were not impacted because surface drainage flowed **onto** the site from the east, west and northerly directions. Presumably, the lack of contamination within off-site soils (with the exception of sediments within the drainage swale) prompted risk managers to exclude these locations from further evaluation within the risk assessment.

Also as part of the removal action, Ameren CIPS extended a water main to five properties south of the site in order to provide homeowners with municipal potable water and remove those residents from private well water. The water main loop was completed in October 1987. In

December of 1988, Ameren CIPS extended the on-site fence surrounding the site to adjacent properties to the south in order to further restrict access to the site (John Mathis).

D. Basis for Taking Action

Contaminants

Hazardous substance that have been detected at the site include:

Soil

On Site Contamination of Polynuclear Aromatic Hydrocarbons (PAH)

Boring Location	Boring Depth (ft)	Total PAH Concentration (ug/kg)
B-4	25	115,700
B-6	25	7, 300
B-7	45	473, 200
B-GW7	40	19,411,000
B-GW7	60	435,400
B-GW7	80	105,300
B-9	37	9, 778
B-9	65	3, 903

Off Site Soil Contamination of PAH

Boring Location	Boring Depth(ft)	Phenanthrene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(a) anthracene (ug/kg)
GW-5	22.5	4.1	--	--
GW-6	7.5	7.3	--	--
GW-8	75	6	--	--
GW-9	25	10	--	--
GW-11	27.5	--	38	--
GW-12	17.5	43	5.3	14

(-- indicates below detection level)

Sediment Data PAH

Sample location	Sample Depth (ft)	Total PAH concentration (ug/kg)
Drainageway from Site to Lake		
S-12	0-2	14,544
S-13	0-2	172,600
S-13	2-4	155,000
S-13a	0-2	14,000
S-13a	2-4	51,740
S-13a	4-6	20,700
S-13b	0-2	23,750
S-13b	2-4	83,400
S-13b	4-6	76,000
S-16	0-2	17,110
S-16a	0-2	14,300
S-16a	2-4	3,875
Drainageway from Lake to the River		
S-14	0-2	12,850
S-27	0-2	171,000
S-32	0-2	4,600
S-35	0-2	6,700

Ground Water Data Summary

Sample Location	Total PAH Concentration (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Total Xylenes (ug/l)	Dimethyl phthalate (ug/l)	2,4-dichloro-phenol (ug/l)	2,4,6-trichloro-phenol (ug/l)
GW-3	2,665	1,200	2,900	----	3,000	---	17	150
GW-4	8,676	4,500	7,000	680	5,000	---	43	430
GW-6s	---	8.9	---	---	---	NTF	NTF	NTF
GW-6d	---	0.9	---	---	---	NTF	NTF	NTF
GW-7	3,654	4,100	3,200	120	1,400	NTF	NTF	NTF
GW-8d	0.04	---	0.9	---	---	5.6	---	---
GW-9s	0.6	---	---	---	---	---	---	---
GW-9d	0.03	6.7	5.5	---	1.5	---	---	---
GW-10	---	---	---	---	0.8	NTF	NTF	NTF
GW-11	---	---	0.8	---	2.6	NTF	NTF	NTF
GW-12	0.04	---	0.7	---	---	NTF	NTF	NTF

--- = Below Detection Limit
NTF = Not Tested For

Surface Water Data Summary

Sample Location	Benzene (ug/l)	Toluene (ug/l)	Phenanthrene (ug/l)	Naphthalene (ug/l)
SW-7	1.0*	---	---	0.9**
SW-18	---	0.8	---	---
SW-19	---	0.70	0.07	---

--- = Below Detection Limit
* = Found only in first sampling event.
**=Found only in second sampling event.

IV. REMEDIAL ACTIONS

Remedy Selection

As stated within the Record of Decision, the remedy selected for this site is Alternative 5 – Soil/Sediment Removal, Institutional Controls and Groundwater Treatment. As noted within the decision summary of the ROD, the source remedial component of the selected remedy had already been implemented by the responsible party under the direction of Illinois EPA. This work consisted of removal of grossly contaminated soils down to the water table on the former gas plant site, as well as removal of highly contaminated sediments in the drainage swale serving the site, disposal of these contaminated materials in a permitted off-site landfill, and backfilling and regrading of excavation areas with clean off-site soils, followed by application of a surface gravel course or revegetation, as appropriate. This source control action to eliminate a portion of potential human health risks and minimize groundwater problems was accompanied by provision of public water to downgradient residents, implementation of a groundwater and surface water/pond monitoring program and land use/deed restrictions, as practicable, on potentially affected properties.

The selected remedy includes a groundwater component that addressed the remaining principal threat posed by groundwater contamination through an active treatment program.

ARARs Identified within the ROD and expounded upon within Hanson Engineers' Groundwater Pump and Treat System Basis of Design Report are listed below.

> National Oil and Hazardous Substances Pollution Contingency Plan at Title 40, Code of Federal Regulations ("CFR") Part 300.
>
> Safe Drinking Water Act ("SDWA") National Primary Drinking Water Standards at 40 CFR 141. This portion of CFR lists the Maximum Contaminant Levels ("MCLs") which are allowed within municipal drinking water systems.
>
> Clean Water Act ("CWA") Ambient Water Quality Criteria at 40 CFR 122 and National Pollutant Discharge and Elimination System ("NPDES") requirements at 40 CFR 125.
>
> Illinois Environmental Protection Act at 415 ILCS 5/1 et seq.
>
> Illinois Groundwater Quality Standards at Title 35 Illinois Administrative Code ("IAC") Subtitle F and Surface water Quality Standards at 35 IAC Subtitle C.
>
> Clean Air Act ("CAA") National Ambient Air Quality Standards at 40 CFR 50 and National Emission Standards for Hazardous Air Pollutants at 40 CFR 61.

> Resource Conservation and Recovery Act ("RCRA") definition and identification of hazardous wastes at 40 CFR 261 and 35 IAC 721.
>
> RCRA requirements for generators and transporters of hazardous wastes at 35 IAC 722 and 723 and RCRA requirements for owners and operators of hazardous waste treatment, storage and disposal facilities at 35 IAC 724.
>
> Air Pollution Prevention requirements at IAC Subtitle B.
>
> Occupational Safety and Health Administrative ("OSHA") regulations governing health and safety for workers involved in hazardous waste operations at 29 CFR 1910.120 and general construction regulations at 29 CFR 1926.

The Groundwater Pump and Treat System Basis of Design Report also identified criteria "to be considered" within the remedial action. The To Be Considered Criteria ("TBCs") include the following:

> The SDWA's proposed MCLs and final and proposed goals ("MCLGs") at 40 CFR 141; and,
>
> Risk derived levels for drinking water or discharge exposures for contaminants with no ARARs or TBCs.

Remedy Implementation

The remedial action at the site continues to comply with the narrative and numeric requirements within the NCP, OSHA and the Illinois Environmental Protection Act, and these ARARs continue to remain protective.

The pump and treat facility was designed and continues to be operated in accordance with RCRA ARARs. Contaminated filter media, and personal protective equipment continue to be analyzed, shipped and disposed of in accordance with RCRA and State solid waste regulations. Spent carbon taken from the carbon treatment columns from within the facility are taken off-site by the service contractor for re-generation, and re-use at the Ameren CIPS facility.

No changes have occurred at the Federal level to the CAA or at the State level within 35 IAC Subtitle B that call into question the protectiveness of the remedy.

The remedy has produced a past compliance with the CWA as well as the State's surface water regulations. Surface water numerical standards will be utilized to monitor the remedial action in the future. In addition to the requirements set forth within the CWA, the Seaman Estate Pond

Annual Monitoring Program ensures that the remedial action continues to be protective through an intensive monitoring of surface water, fish tissue and sediment within the pond.

With regard to groundwater, the remedial action continues to comply with the SDWA as well as the State's 35 IAC 620 regulations. As discussed within the ROD, a Groundwater Management Zone ("GMZ") has been instituted at the site based on the regulations at 35 IAC 620.250. The remedy continues to meet the requirements necessary for a GMZ to remain in effect. Groundwater numerical standards, which will be utilized to monitor the remedial action in the future, are discussed within the section below.

The clean-up objectives set forth within the ROD for groundwater were based on the drinking water regulations at 40 CFR 141 and 35 IAC 620, including any proposed standards, as well as risk based criteria. Any revisions to 40 CFR 141 and 35 IAC 620 were compared to levels set within the ROD. In addition, all new criteria utilized by the State of Illinois based on risk were also reviewed. Thorough evaluation indicated that the levels set within the ROD for groundwater restoration continue to be protective. Since the ROD was signed in September of 1992, MCLs have been established at .0002 mg/L and .005 mg/L for benzo(a)pyrene and dichloromethane,
respectively. The table below compares the newly promulgated levels to those established within the ROD.

Compound	ROD Objective	Newly Promulgated MCL
benzo(a)pyrene	.00023 mg/L	.00020 mg/L
dichloromethane	.0002 mg/L	.005 mg/L

No changes to the ROD are necessary based on the newly promulgated MCL for dichloromethane. Since the MCL is higher than the clean-up objective set within the ROD, the original standard will continue to be utilized. However, the newly promulgated MCL for benzo(a)pyrene is lower than the clean-up objective set within the ROD. Calculations performed using the site's approved risk assessment indicate that the standard set within the ROD (.00023 mg/L) remains protective, and therefore, will not be changed.

Clean-up objectives set within the ROD for surface water focus on concentrations of contaminants within the treated water to be discharged (i.e. effluent limitations) as well as concentrations of the surface water body to which the effluent is discharged. The effluent limitations and surface water quality concentrations set forth within the ROD are the same for each contaminant because the ROD assumes the discharge occurs into a stream with no existing flow. Clean-up objectives set within the ROD for surface water are contained within Table 4 (attached). Toxicity data taken from the scientific literature along with formulas from within 35 IAC Part 302 were utilized to calculate the maximum allowable concentrations set forth within the ROD. However, since September of 1992, toxicity information has become available for compounds which previously had no data, and, in addition, the toxicity data for a number of compounds has changed. In order to ensure that the requirements set within the ROD continue to be protective, surface water quality standards were re-calculated utilizing new toxicity information for the contaminants of concern. Table 5 identifies the newly calculated standards. Illinois EPA considers the new numbers to be more precise and to more accurately reflect concentrations which are protective of human health and the environment because new and more accurate toxicity data have been utilized within the calculations. Therefore, Illinois EPA shall require the effluent from the pump and treat facility to meet all new standards where the concentration is lower than that identified within the 1992 ROD

The institutional controls at the site, in the form of deed restrictions, continue to be in effect for all the properties (Richardson, telephone). The properties include the site itself along with three parcels of land immediately south of the site. See Figure 8, Restricted Land Use Areas (Hanson Engineers, Remedial Action). These parcels are also fenced and "No Trespassing" signs are posted. In addition, there was an agreement with the property owners along Seaman Estates prohibiting the use of groundwater for consumption and the private wells were properly plugged and abandoned. The institutional controls continue to serve their intended purpose and are protective of human health and the environment.

System Operation/ Operation and Maintenance

The primary objectives of the pump and treat system were identified within Hanson Engineers' 1989 document Groundwater Pump and Treat System Basis of Design Report and reiterated in the ROD. The primary objectives for the system include:

1) To prevent contaminants from migrating off-site;

2) To remove contaminants from extracted groundwater to levels suitable for surface water discharge; and,

3) To eventually cleanse the aquifer to levels which no longer present a threat to public health (Illinois EPA, Record).

Hanson Engineers' Groundwater Pump and Treat System Basis of Design Report states that "Data from the ground water modeling studies performed by HEI *(Hanson Engineers Incorporated)* indicated that pump rates ranging from a minimum flow of 200 gallons per minute (gpm) to a maximum flow of 500 gpm are predicted to be needed for hydraulic containment (Hanson Engineers)" *(added text)*. The pump and treat system has been designed and operated to meet these parameters. Pressure transducers were installed within wells surrounding the extraction wells to determine hydraulic gradient and to ensure containment.

On December 1, 1997, Hanson Engineers submitted a report to Ameren CIPS evaluating hydraulic containment at the site. The report concludes that with discharge to the Seaman Estate Pond, hydraulic containment can be achieved with pumping rates as low as 50 gpm. Illinois EPA determined that Hanson's data did not conclusively demonstrate hydraulic containment at pumping rates of 50 gpm. Ameren CIPS indicated within its October 23, 1997 Third Quarter Report that the west well will continue to operate at 250 gpm and the east well at its maximum of 125 gpm (Richardson, Third Quarter). Additionally, as discussed previously, Ameren CIPS has attempted to maintain the east extraction well through cleaning to allow for rates higher than 125 gpm. The plant has been running continuously (except for minor interruptions) since July 10, 1995. From July of 1995 through December 31, 2003 the plant pumped and treated 704,131,346 gallons of groundwater, averaging 158 gallons per minute.[1] Illinois EPA believes that the pump and treat system continues to maintain hydraulic containment thereby arresting migration of contaminants and protecting human health and the environment as envisioned within the ROD.

The groundwater which is extracted by the pump and treat system contains concentrations of contaminants which must be treated prior to discharge. The ROD established average and daily maximum contaminant concentrations, which the treatment system must achieve before releasing the water to the environment. Table 4, which is based on the ROD is attached. Table 4 is taken from Hanson Engineers' July 1995 Contractor Quality Control Plan.

With the exception of test results for semi-volatile samples collected November 23 and November 30, 1999, the pump and treat system has consistently produced and discharged effluent within compliance limits. Illinois EPA believes that the treatment system currently meets the objectives set forth within the ROD.

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[1] Average flow rate calculated using data from monthly summaries submitted to Illinois EPA by CIPS.

In addition to the surface water discharge limits set within the ROD, the Seaman Estate Pond Annual Monitoring Program ensures that the remedial action continues to be protective through an intensive monitoring of surface water, fish tissue and sediment within the pond. Tables 1, 2, and 3 (attached) are taken from Mactec's Final 2002 Annual Report Seaman Estate Pond Study Ameren Taylorville Gas Plant Site and identify the priority PAHs and pesticides which were detected in fish tissue, sediment, and surface water taken from the pond from 1990 through 2002. Concentrations within all three media (i.e. fish tissue, sediment and surface water) are sporadic and show no apparent trends. In connection with the Risk Assessment, the ROD states that 0.119 mg/kg of total carcinogenic PAHs in fish tissue corresponds to a carcinogenic risk of 1.0×10^{-5} (Illinois EPA, Record). The risk level of 1.0×10^{-5} falls within U.S. EPA's acceptable risk range. Utilizing the assumptions within the Risk Assessment, fish tissue concentrations for carcinogens identified within the Risk Assessment and their corresponding risks have remained below 1.0×10^{-5} from 1989 through 2002. Data for 2003 is not yet available.

The ROD established groundwater clean-up objectives that when attained, would no longer present a threat to public health. Table 4 (attached) identifies clean-up objectives for the groundwater. Each of the chemicals listed within Table 4 have been identified within the groundwater beneath the site. Tables A, B, and C below, compare groundwater concentrations of three compounds within three shallow on-site wells.

TABLE A **GW-7** (concentrations in ppb)

	CUO	5/97	11/97	5/98	11/98	5/99	2/00	2/01	2/02	5/03
Benzene	5	2.0*	83.7	2.0*	2.0*	1.8	ND	ND	ND	ND
Naphthalene	25	1	2.2	3.3	.9	ND	ND	ND	ND	ND
Anthracene	2100	6.6*	6.6*	6.6*	6.6*	ND	ND	ND	ND	ND

TABLE B **GW-3** (concentrations in ppb)

	CUO	5/97	11/97	5/98	11/98	5/99	2/00	2/01	2/02	2/03
Benzene	5	18	26.2	125.2	8.6	199	5.4	24.2	13.8	65.5
Naphthalene	25	318	362	984	123.7	1596	33.1	99.4	14.9	172
Anthracene	2100	6.6*	6.6*	6.6*	6.6*	ND	ND	ND	ND	ND

* Compound not detected above Project Acceptable Detection Limit which is shown.

TABLE C GW-16S (concentrations in ppb)										
	CUO	5/97	11/97	5/98	11/98	5/99	2/00	2/01	2/02	2/03
Benzene	5	2.0*	2.0*	2.0*	2.0*	ND	ND	ND	ND	ND
Naphthalene	25	5.6	2.2	.6	0.6*	ND	ND	ND	ND	ND
Anthracene	2100	6.6*	6.6*	6.6*	6.6*	ND	ND	ND	ND	ND

* Compound not detected above Project Acceptable Detection Limit which is shown.

The wells within Tables A, B, and C were chosen based on proximity to the extraction wells (GW-7 being the closest to the center of the site, GW-16S being the most distant). Benzene, Naphthalene, and Anthracene were chosen from the entire list of contaminants for use within the tables because of their prevalence within the groundwater. In addition, the three chemicals' physical characteristics are representative of a wide range of chemical solubility, vapor pressure, etc. which coal tar's constituents possess. Temporary fluctuations in contaminant concentration such as those identified within Tables A and B for GW-7 and GW-3 on 11/97 and 5/99, could potentially be the result of a "slug" of contaminated groundwater passing by the wells on the way towards the point of extraction.

Monitoring well data for all on-site wells indicate that the pump and treat system is progressing towards the goal set within the ROD, "To eventually cleanse the aquifer to levels which no longer present a threat to public health (Illinois EPA, Record)". The pump and treat system is performing as envisioned within the ROD and facility design documents. However, groundwater monitoring data indicates that clean-up objectives have not been met throughout the aquifer. In order to meet the requirements set forth within the ROD and remain protective of human health and the environment, the pump and treat system must continue its current operation.

V. PROGRESS SINCE LAST FIVE YEAR REVIEW

Since the last five-year review, the Site continued to operate in accordance with the ROD. The protectiveness statement from the last review stated that the remedy selected for this Site remained protective of human health and the environment. The recommendations cited in the last five year review stated that the pump and treat system must continue to operate to remain protective of human health and the environment until the clean-up standards have been achieved.

VI. FIVE YEAR REVIEW PROCESS

The five year review was conducted by Erin Rednour of the Illinois EPA, Project Manager for Ameren CIPS in Taylorville Site.

The review consisted of the following:

Document Review
Data Review
Site Inspection
Five Year Report Review and Update

On July 30, 2003 the project manager conducted a site visit. Site fencing was inspected and site access continues to be adequately restricted. No areas of non-compliance were identified. As of the date of the inspection, groundwater was being extracted and the network of monitoring wells used to monitor the progress of the pump and treat system as well as ensure its protectiveness remained intact.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision document?

The remedy in place continues to be protective of human health and the environment. The excavation and site fencing restricts any surface soil exposures while the pump and treat facility in conjunction with the municipal water line restricts exposure to any contaminated groundwater. Although this five-year review recommends that surface water clean-up objectives be adjusted for the facility's effluent, the existing groundwater treatment operation is providing adequate treatment prior to any surface water discharge.

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

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 clean-up objectives set forth within the ROD for groundwater were based on the drinking water regulations at 40 CFR 141 and 35 IAC 620, including any proposed standards, as well as risk based criteria. Any revisions to 40 CFR 141 and 35 IAC 620 were compared to levels set within the ROD. In addition, all new criteria utilized by the State of Illinois based on risk were also reviewed. Thorough evaluation indicated that the levels set within the ROD for groundwater restoration continue to be protective. Since the ROD was signed in September of 1992, MCLs have been established at .0002 mg/L and .005 mg/L for benzo(a)pyrene and dichloromethane respectively. The table below compares the newly promulgated levels to those established within the ROD.

Compound	ROD Objective	Newly Promulgated MCL
benzo(a)pyrene	.00023 mg/L	.00020 mg/L
dichloromethane	.0002 mg/L	.005 mg/L

No changes to the ROD are necessary based on the newly promulgated MCL for dichloromethane. Since the MCL is higher than the clean-up objective set within the ROD, the original standard will continue to be utilized. However, the newly promulgated MCL for benzo(a)pyrene is lower than the clean-up objective set within the ROD. Calculations performed using the site's approved risk assessment indicate that the standard set within the ROD (.00023 mg/L) remains protective, and therefore, will not be changed.

Clean-up objectives set within the ROD for surface water focus on concentrations of contaminants within the treated water to be discharged (i.e. effluent limitations) as well as concentrations of the surface water body to which the effluent is discharged. The effluent limitations and surface water quality concentrations set forth within the ROD are the same for each contaminant because the ROD assumes the discharge occurs into a stream with no existing flow. Clean-up objectives set within the ROD for surface water are contained within Table 4 (attached). Toxicity data taken from the scientific literature along with formulas from within 35 IAC Part 302 were utilized to calculate the maximum allowable concentrations set forth within the ROD. However, since September of 1992, toxicity information has become available for compounds which previously had no data, and, in addition, the toxicity data for a number of compounds has changed. In order to ensure that the requirements set within the ROD continue to be protective, surface water quality standards were re-calculated utilizing new toxicity information for the contaminants of concern. Table 5 identifies the newly calculated standards. Illinois EPA considers the new numbers to be more precise and to more accurately reflect concentrations which are protective of human health and the environment because new and more accurate toxicity data have been utilized within the calculations. Therefore, Illinois EPA shall require the effluent from the pump and treat facility to meet all new standards where the concentration is lower than that identified within the 1992 ROD.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No new ecological targets were identified during the five year review. Therefore monitoring of ecological targets will continue as outlined in the ROD. There were no weather related events that have affected the protectiveness of the remedy. 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 Inspection, the remedy is functioning as intended by the final ROD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. Many of the ARARs or performance standards for the Site, as described in the ROD, have been met. There are some performance standards that have not been achieved. There is no other information that calls into question the protectiveness of the remedy.

VIII. ISSUES

Pursuant to the aforementioned recommendations, surface water clean-up objectives will be updated to confirm that surface water discharges continue to be protective of human health and the environment.

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The pump and treat system is performing as envisioned within the ROD and facility design documents. However, groundwater monitoring data indicates that clean-up objectives have not been met throughout the aquifer. In order to meet the requirements set forth within the ROD and remain protective of human health and the environment, the pump and treat system must continue its current operation.

Ameren has also been investigating alternative treatments to attain the clean-up objectives for groundwater. Ameren has recently submitted a proposal for review to the Illinois EPA to allow for a pilot study for the direct injection of an oxidizer. It is the goal of the study to eliminate or greatly reduce the ultimate length of time the pump and treat system will need to be operated. Although the operation of the pump and treat system will need to be halted for the duration of the study in order for the oxidizer to have ample contact time for reaction, Ameren has proposed additional monitoring to ensure detection of any migration of contaminants from the site. Additionally, the pump and treat system will not be disabled during the study period and can be available for restart at any time monitoring indicates the necessity of such. Illinois EPA looks positively toward such efforts and should support the pilot study if review of the project specifics verifies the study will not jeopardize the protectiveness of the remedy.

As discussed within Section V.B, since the completion of the ROD in 1992, an MCL for benzo (a) pyrene was promulgated which is lower than the groundwater clean-up objective set within the ROD. According to the assumptions made within the approved risk assessment for the site, the original groundwater clean-up objective remains protective. Because the original clean-up objective continues to be protective of human health and the environment, no action is recommended.

Additionally, new toxicity data became available for several compounds included as surface water clean-up objectives since the completion of the ROD in 1992. In response, surface water quality standards were re-calculated utilizing new toxicity information for the contaminants of concern. Illinois EPA considers the new surface water clean-up objectives to be more precise and to more accurately reflect concentrations that will protect human health and the environment.

Therefore, Illinois EPA recommends that effluent from the pump and treat facility be required to meet all new standards where newly calculated standards are lower than those identified within the 1992 ROD as represented within Table 5.

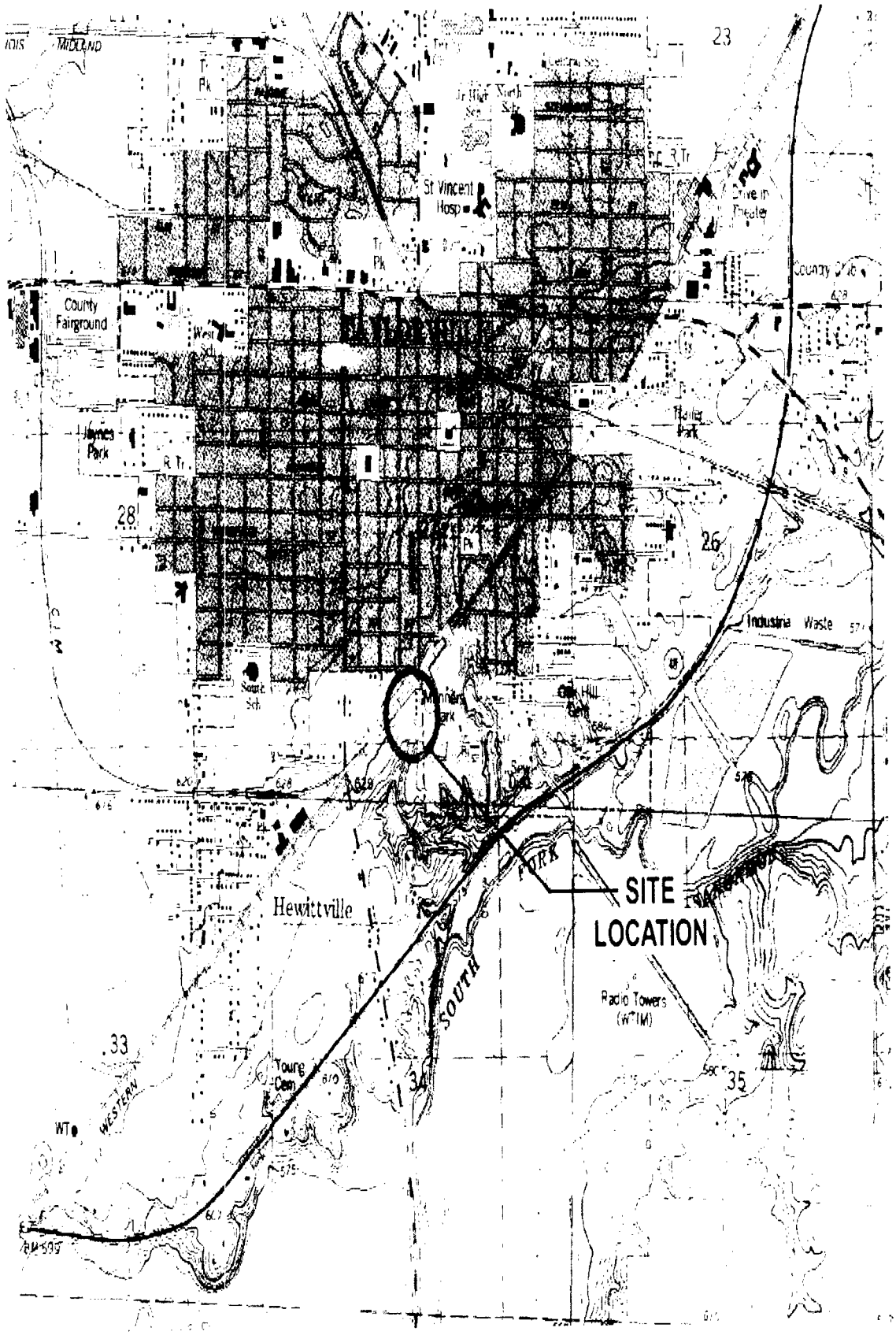
Pursuant to the aforementioned recommendations, surface water clean-up objectives will be updated to confirm that surface water discharges continue to be protective of human health and the environment. It is expected that the change in surface water clean-up objectives will be addressed through an Explanation of Significant Differences to the ROD.

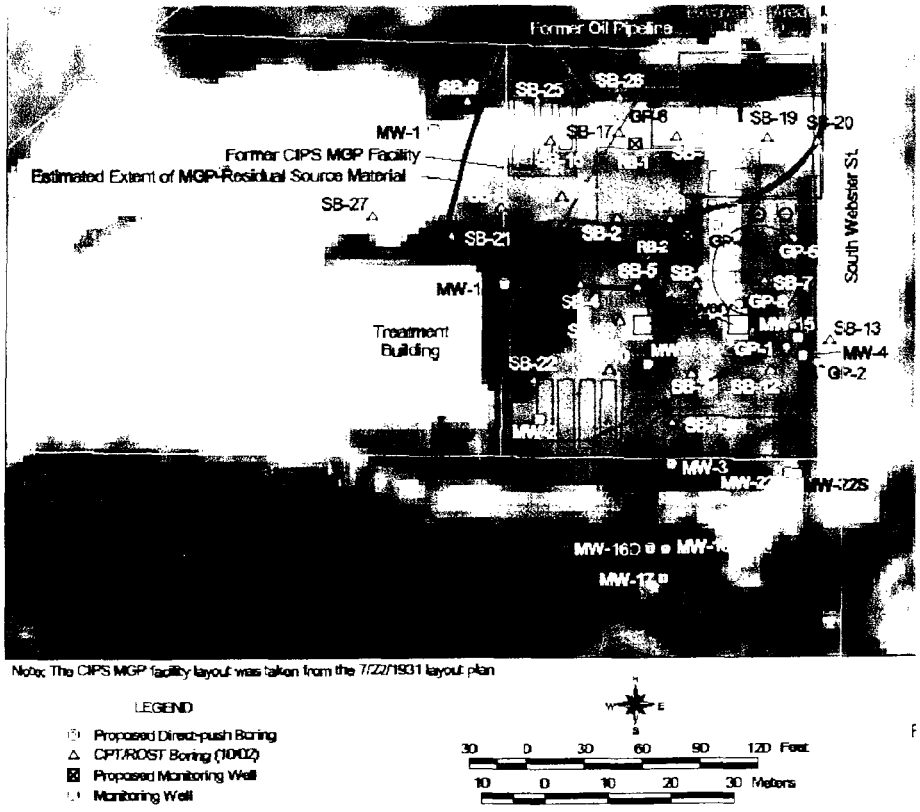
X. PROTECTIVENESS STATEMENT

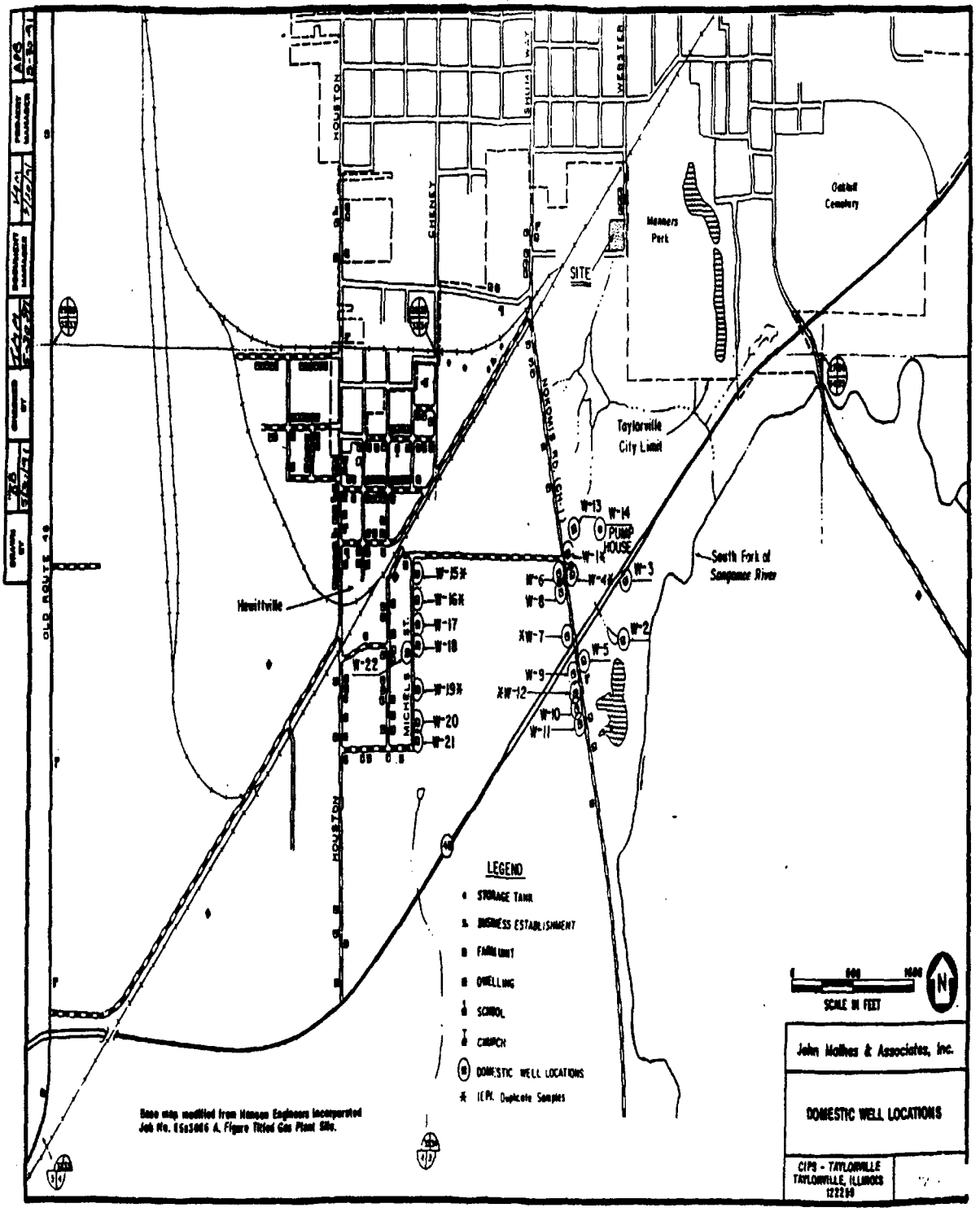
The remedy in place continues to be protective of human health and the environment. The excavation and site fencing restricts any surface soil exposures while the pump and treat facility, in conjunction with the municipal water line restricts exposure to any contaminated groundwater. Although this five year review recommend that surface water objectives be adjusted for the facility's effluent, the existing groundwater treatment operation is providing adequate treatment prior to any surface water discharge.

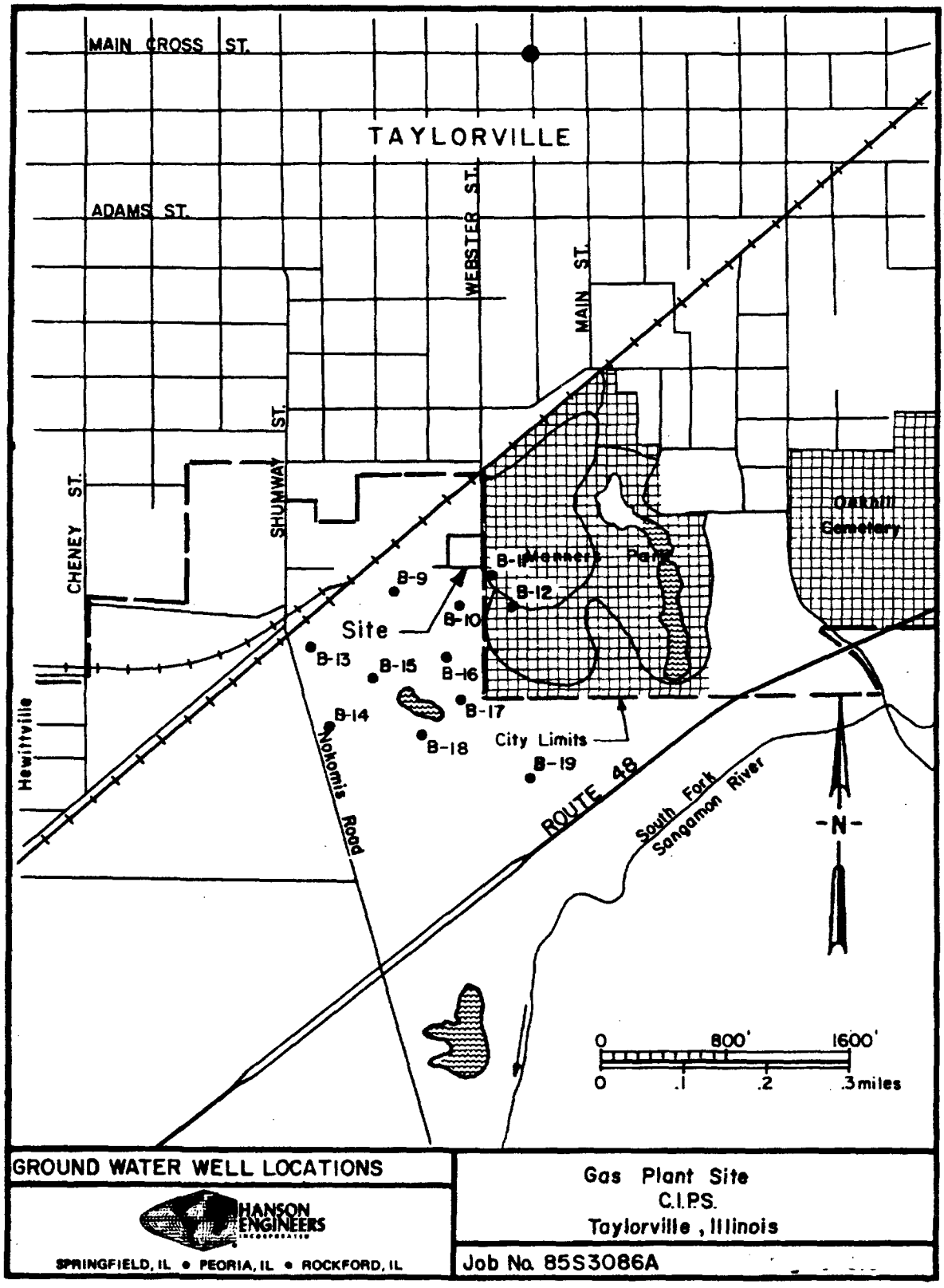
XI. NEXT REVIEW

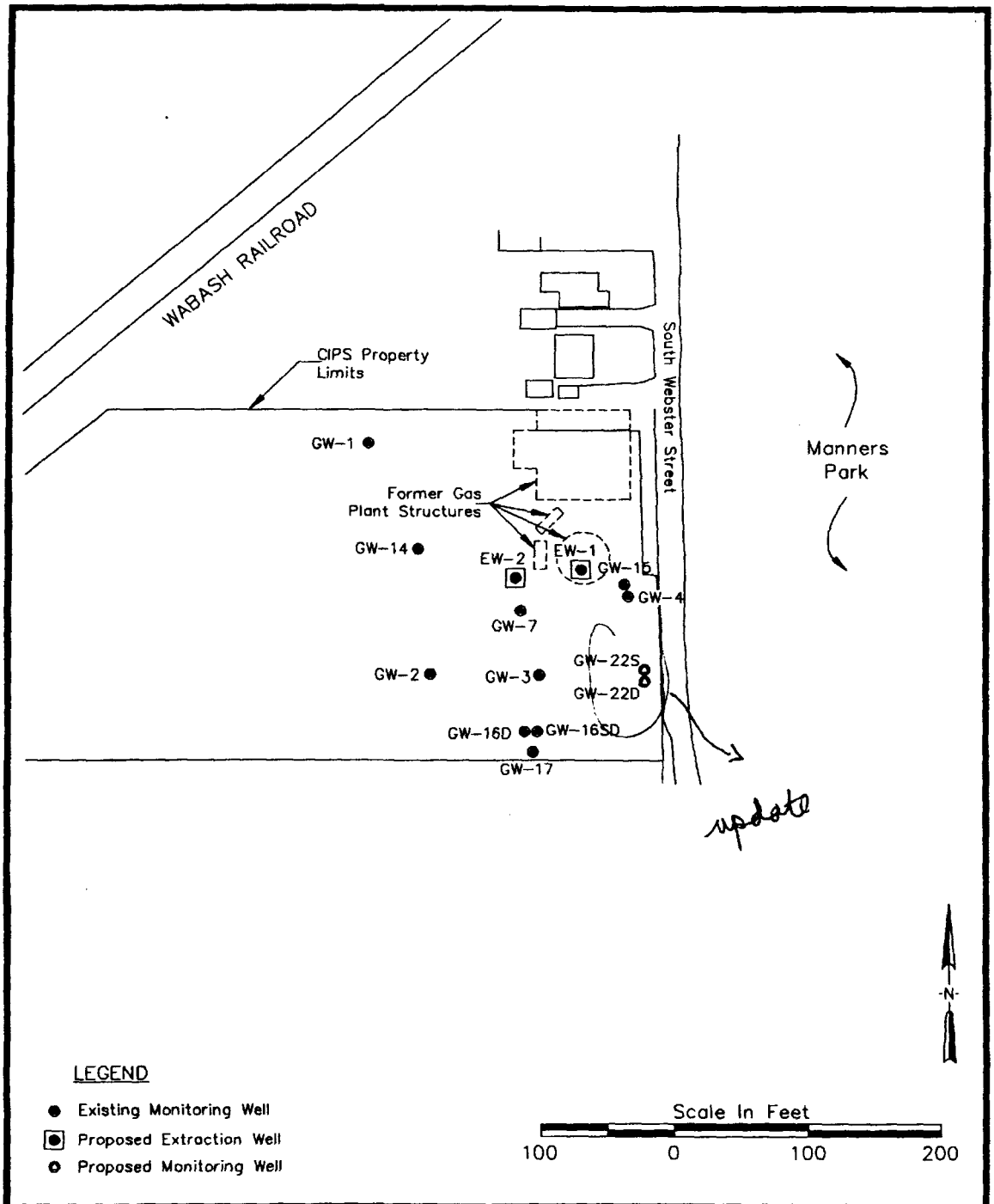
The Risk Assessment and existing data do not establish that the levels remaining at the site following the completion of the remedial action will allow unrestricted exposure and unlimited access. Therefore, the Illinois EPA will conduct a five-year review by June 30, 2009.


MIDLAND
St Vincent Hosp
County Fairground
Industrial Waste
SITE LOCATION
Hewittville
Radio Towers (WTIM)
South
Fork
23
28
26
33
34
35


Former Oil Pipeline
SB-25
SB-26
SB-19
SB-20
MW-1
SB-17
GP-6
Former CIPS MGP Facility
Estimated Extent of MGP-Residual Source Material
SB-27
SB-21
SB-2
RB-2
GP-5
South Webster St.
SB-5
SB-7
MW-1
GP-4
Treatment Building
MW-15
SB-13
MW-4
GP-1
GP-2
SB-22
SB-12
MW-3
MW-16D
MW-17D
Note: The CIPS MGP facility layout was taken from the 7/22/1931 layout plan
LEGEND
Proposed Direct-push Boring
CPT/ROST Boring (10/02)
Proposed Monitoring Well
Monitoring Well
30 0 30 60 90 120 Feet
10 0 10 20 30 Meters


OLD ROUTE 48
HOUSTON
CHENEY
WEBSTER
SITE
Manners Park
Oakhill Cemetery
Taylorville City Limit
South Fork of Sangamon River
Hewittville
PUMP HOUSE
W-1
W-2
W-3
W-4
W-5
W-6
W-7
W-8
W-9
W-10
W-11
W-12
W-13
W-14
W-15*
W-16*
W-17
W-18
W-19*
W-20
W-21
W-22
XW-7
XW-12
LEGEND
STORAGE TANK
BUSINESS ESTABLISHMENT
FARM UNIT
DWELLING
SCHOOL
CHURCH
DOMESTIC WELL LOCATIONS
DUPL. Duplicate Samples
SCALE IN FEET
John Mathes & Associates, Inc.
DOMESTIC WELL LOCATIONS
CIPS - TAYLORVILLE
TAYLORVILLE, ILLINOIS
122269


MAIN CROSS ST.
TAYLORVILLE
ADAMS ST.
WEBSTER ST.
MAIN ST.
SHUMWAY ST.
CHENEY ST.
Hewittville
Oakhill Cemetery
B-9
B-10
B-11
B-12
Site
B-13
B-15
B-16
B-17
B-14
B-18
B-19
City Limits
Nokomis Road
ROUTE 48
South Fork Sangamon River
-N-
0
800'
1600'
0
.1
.2
.3miles
GROUND WATER WELL LOCATIONS
HANSON ENGINEERS
SPRINGFIELD, IL • PEORIA, IL • ROCKFORD, IL
Gas Plant Site
C.I.P.S.
Taylorville, Illinois
Job No. 85S3086A

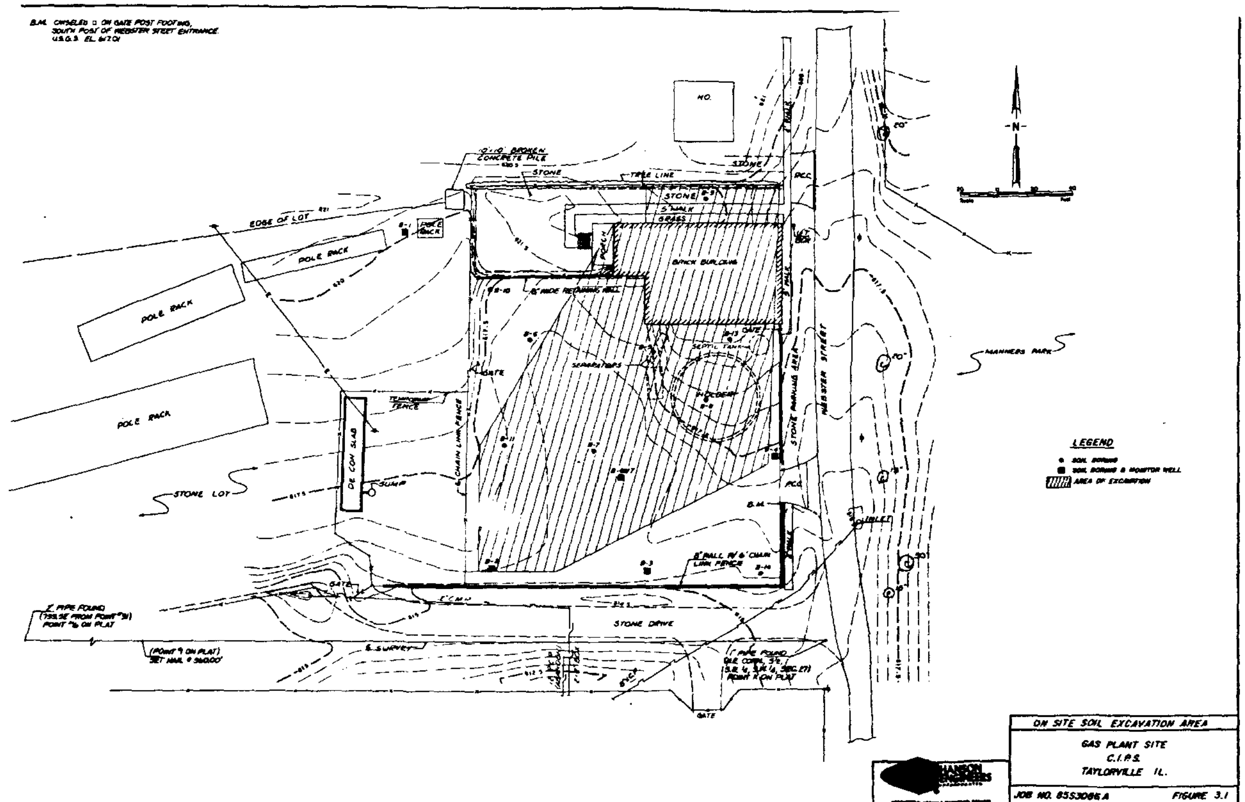


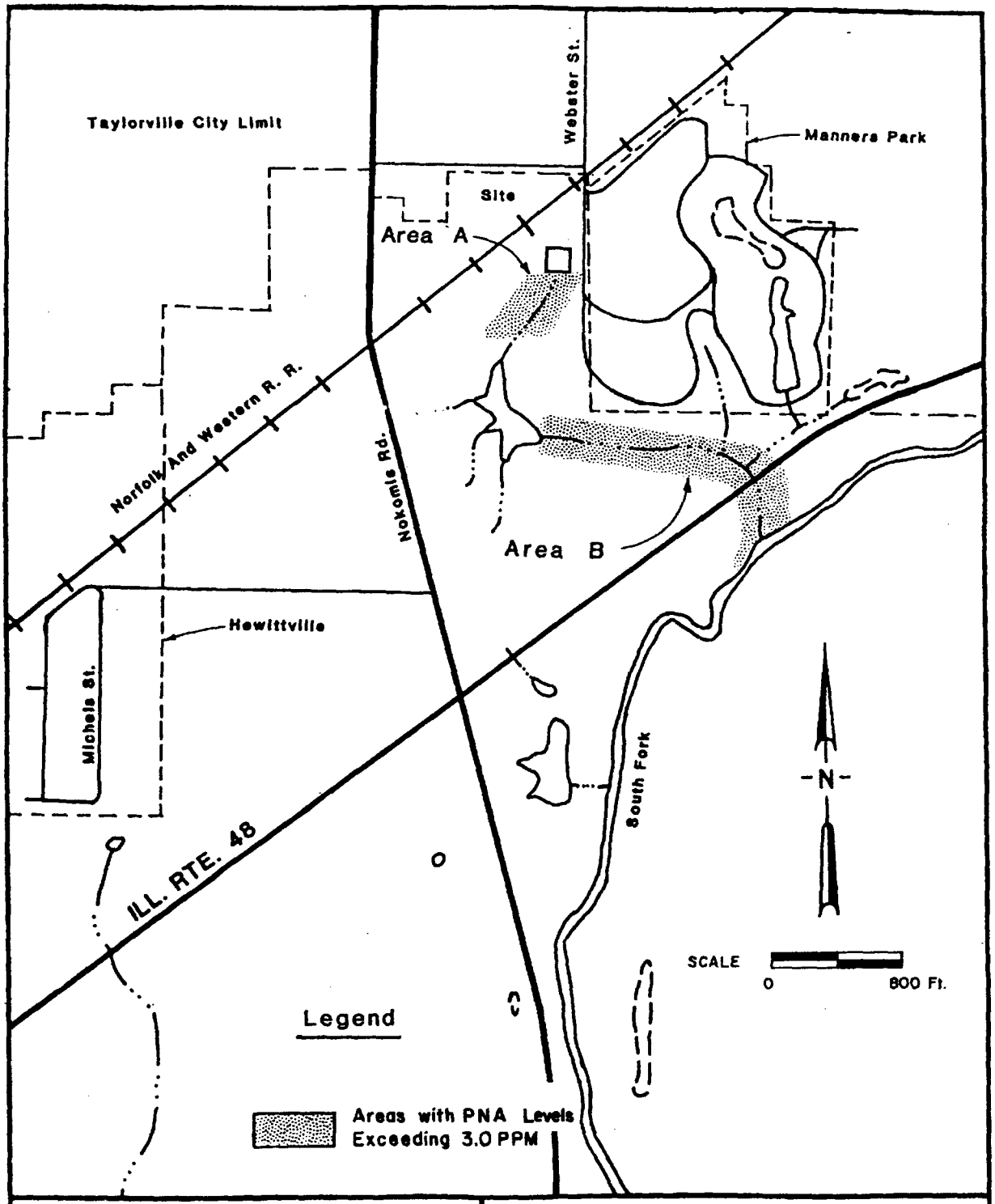
PROPOSED MONITORING WELL LOCATIONS

HANSON ENGINEERS INCORPORATED

REMEDIAL DESIGN
CIPS - GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Job No. 85S3086R Figure 3.2


EDGE OF LOT
POLE RACK
POLE RACK
POLE RACK
STONE LOT
DE CON SLAB
SUMP
CHAIN LINK FENCE
GATE
STONE
TREE LINE
BRICK BUILDING
SEPTIC TANK
STONE DRIVE
WEBSTER STREET
MANNERS PARK
-N-
LEGEND
SOIL BORING
SOIL BORING & MONITOR WELL
AREA OF EXCAVATION
ON SITE SOIL EXCAVATION AREA
GAS PLANT SITE
C.I.P.S.
TAYLORVILLE IL.
JOB NO. 85S3066.A
FIGURE 3.1



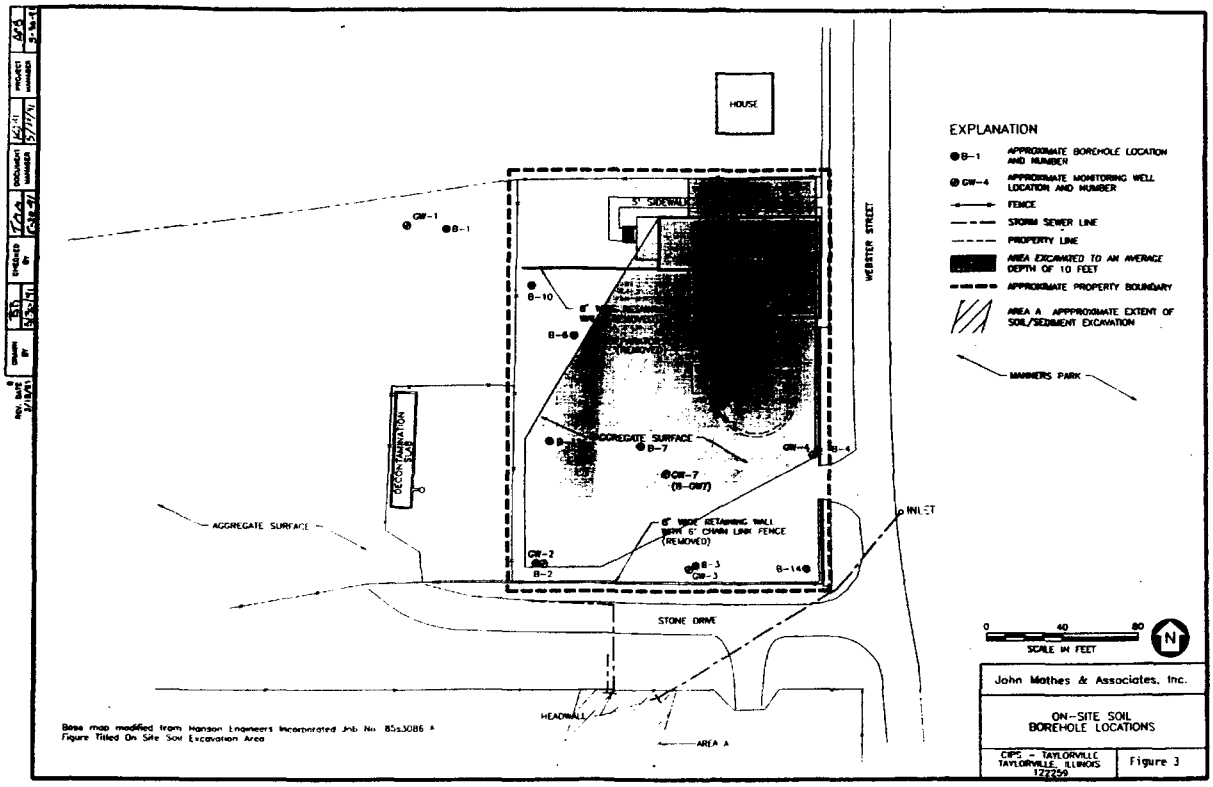
AREAS WITH PNA's EXCEEDING 3.0 PPM

HANSON ENGINEERS

SPRINGFIELD, IL • PEORIA, IL • ROCKFORD, IL

Gas Plant Site
C.I.P.S.
Taylorville, Illinois

Job No 85S3086A Figure 8.1


HOUSE
WEBSTER STREET
5' SIDEWALK
GW-1
B-1
B-10
B-6
B-7
GW-4
B-4
GW-7
(B-GW7)
DECON FACILITATION
AGGREGATE SURFACE
6' WIDE RETAINING WALL
WITH 6' CHAIN LINK FENCE
(REMOVED)
GW-2
B-2
B-3
GW-3
B-14
INLET
STONE DRIVE
HEADWALL
AREA A
MANNERS PARK
EXPLANATION
B-1 APPROXIMATE BOREHOLE LOCATION AND NUMBER
GW-4 APPROXIMATE MONITORING WELL LOCATION AND NUMBER
FENCE
STORM SEWER LINE
PROPERTY LINE
AREA EXCAVATED TO AN AVERAGE DEPTH OF 10 FEET
APPROXIMATE PROPERTY BOUNDARY
AREA A APPROXIMATE EXTENT OF SOIL/SEDIMENT EXCAVATION
0 40 80
SCALE IN FEET
N
John Mathes & Associates, Inc.
ON-SITE SOIL
BOREHOLE LOCATIONS
CIPS - TAYLORVILLE
TAYLORVILLE, ILLINOIS
127259
Figure 3
Base map modified from Hanson Engineers Incorporated Job No. 85s3086 A
Figure Titled On Site Soil Excavation Area

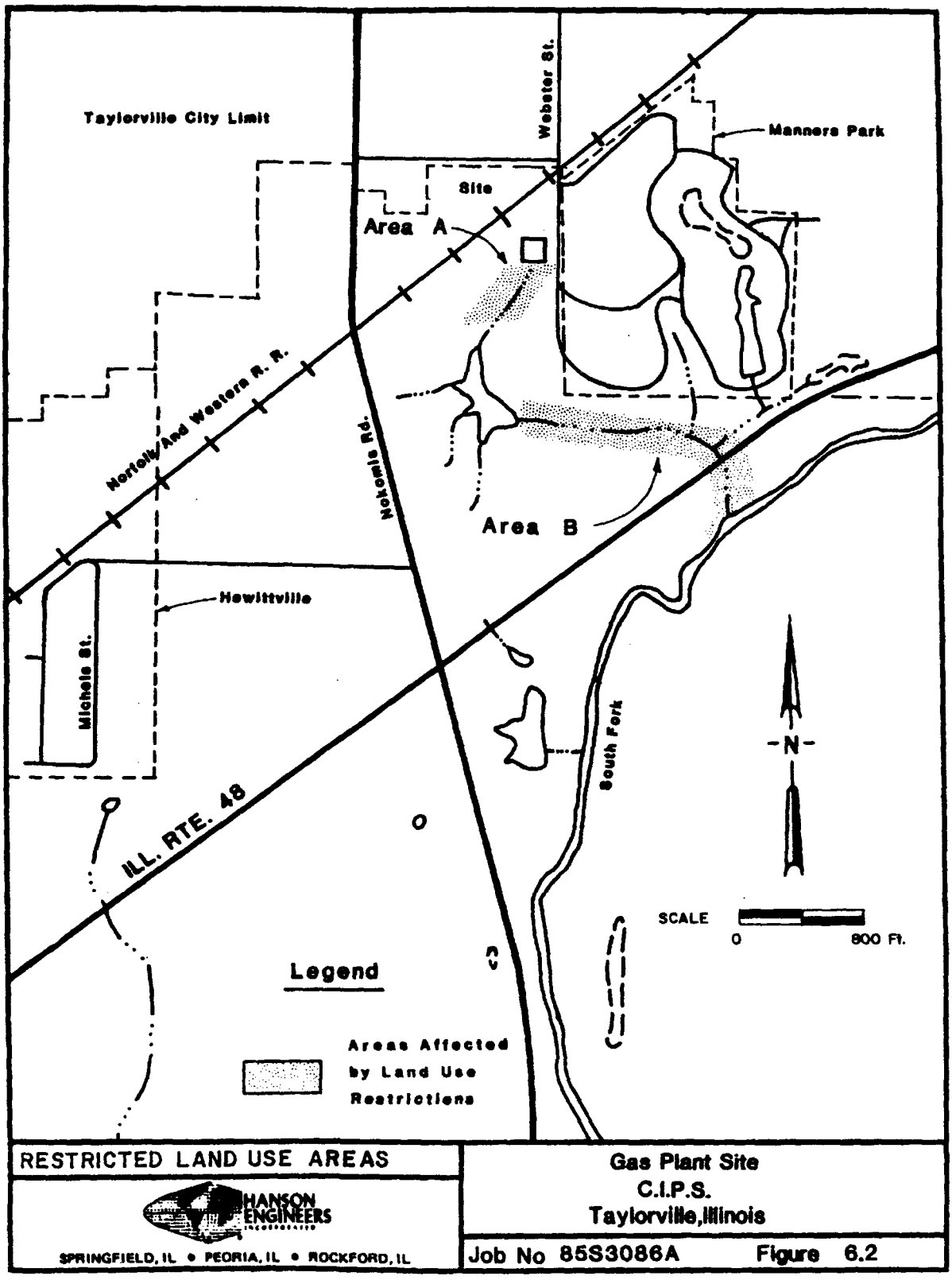

Taylorville City Limit
Webster St.
Manners Park
Site
Area A
Area B
Norfolk And Western R. R.
Nokomis Rd.
Hewittville
Michele St.
South Fork
ILL. RTE. 48
N
SCALE
0
800 Ft.
Legend
Areas Affected by Land Use Restrictions
RESTRICTED LAND USE AREAS
HANSON ENGINEERS
SPRINGFIELD, IL • PEORIA, IL • ROCKFORD, IL
Gas Plant Site
C.I.P.S.
Taylorville, Illinois
Job No 85S3086A
Figure 6.2

Table 4-1. Detected Priority PAHs (µg/kg-dry) Found in Sediment Samples Collected from the Seaman Estate Pond in August 1990 through August 2002* (Page 1 of 5)

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Acenaphthene	1990	2461	5752	---	---	---	2462	3725	2180	3936
	1991	---	5550	3200	---	---	---	---	---	---
	1992	---	---	---	---	---	---	---	---	---
	1993	---	---	---	---	---	---	---	---	---
	1994	---	---	---	---	---	---	---	---	---
	1995	---	---	---	---	---	---	---	---	---
	1996	15200	10100	16200	10500	7100	20500	5830	3230	12700
	1997	---	---	---	---	---	---	---	---	---
	1998	25000	38000	22000	47000	85000	28000	44000	32000	50000
	1999	---	---	---	---	---	---	---	---	---
	2000	---	---	---	---	---	---	---	---	---
	2001	---	---	---	---	---	---	---	---	---
	2002	---	---	---	---	---	---	---	---	---
Anthracene	1990	---	---	---	220	---	---	---	---	---
	1991	---	---	---	12	22	---	---	25	---
	1992	---	---	---	---	23.8	---	---	7.1	---
	1993	---	---	---	---	11	---	---	---	---
	1994	194	197	417	195	207	169	241	302	407
	1995	151	581	288	205	171	101	70.2	250	---
	1996	105	280	179	835	271	205	54.6	311	462
	1997	---	---	---	---	305	---	---	---	---
	1998	---	---	---	---	---	---	---	---	---
	1999	---	---	---	---	---	---	---	---	20
	2000	---	---	---	---	8.1	---	---	---	---
	2001	6.0	5.4	11	8.6	13	6.4	---	4.7	8.9
	2002	4.8	5.6	8.5	7.8	8.4	7.9	8.3	7.7	9.9
Benzo(a)anthracene	1990	---	---	---	---	---	---	---	---	---
	1991	---	50	50	49	87	26	---	81	42
	1992†	---	23.5	714	143	177	50.5	---	---	210
	1993	---	---	---	---	11	---	---	28	22
	1994	52.3	36.9	62.8	53.2	37.4	51.9	38.6	46.3	63.1
	1995	25.5	123	47.7	62.1	29.4	22.5	17.3	31.8	2.30
	1996	91.8	103	81.7	31.2	36.1	33.9	42.4	26.1	40.9
	1997	32.1	43.4	28.5	13.3	39.6	23.3	6.48	37.7	58.7
	1998	---	---	---	---	130	---	---	---	190
	1999	25	25	28	29	56	32	25	28	91
	2000	28	32	36	28	41	21	26	24	57
	2001	38	37	57	50	80	38	31	33	61
	2002	35	39	55	40	53	43	54	46	63
Benzo(a)pyrene	1990	---	---	535	---	92	---	---	---	202
	1991	---	90	81	83	150	44	---	110	72
	1992	21.4	21.6	74.5	38.4	86.8	29.3	20.6	29.0	23.7
	1993	---	64	73	85	19	48	---	54	39
	1994	75.4	50.7	89.7	63.4	45.9	63.8	60.0	62.4	82.9
	1995	40.9	217	79.7	680	43.6	43.9	26.9	56.7	3.51

Table 4-1. Detected Priority PAHs (µg/kg-dry) Found in Sediment Samples Collected from the Seaman Estate Pond in August 1990 through August 2002* (Page 2 of 5)

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Benzo(a)pyrene	1996	193	218	110	66.1	51.3	54.3	62.0	38.2	64.5
(Cont'd)	1997	45.5	59.0	37.2	16.3	53.1	30.4	7.19	46.8	54.8
	1998	—	—	—	—	—	—	—	—	130
	1999	38	37	39	37	73	36	36	34	94
	2000	—	48	—	45	57	—	39	34	87
	2001	51	50	72	62	97	49	37	41	69
	2002	34	39	67	40	53	43	58	48	66
Benzo(b)fluoranthene	1990	—	—	—	—	131	143	—	134	—
	1991	—	170	190	120	200	91	—	180	220
	1992	61.2	129	253	94.7	146	86.5	46.4	69.8	63.7
	1993	45	35	93	106	23	44	—	61	47
	1994	85.0	54.0	106	86.1	64.7	81.4	70.1	726	109
	1995	43.2	221	85.6	75.5	54.5	43.3	33.8	66.3	3.54
	1996	198	200	133	67.0	64.8	60.0	63.1	45.8	75.1
	1997	58.9	67.0	47.2	26.1	70.4	55.8	11.6	59.0	97.5
	1998	230	300	280	370	360	240	260	200	530
	1999	—	—	—	—	—	—	—	—	—
	2000	74	95	110	110	110	83	78	75	170
	2001	56	57	83	78	120	69	48	48	87
	2002	55	56	76	66	83	70	86	78	130
Benzo(g,h,i)perylene	1990	—	—	—	—	—	—	—	—	—
	1991	—	140	100	72	87	30	—	99	51
	1992	—	—	—	—	—	—	—	—	—
	1993	—	—	55	—	14	—	—	36	31
	1994	124	128	128	104	90.5	104	78.2	96.1	134
	1995	74.3	310	120	78.7	62.8	48.5	35.1	80.2	1.87
	1996	201	290	152	70.1	62.8	64.6	70.5	20.0	101
	1997	65.6	109	80.9	26.9	68.4	41.8	15.0	84.6	133
	1998	—	—	—	—	—	—	—	—	—
	1999	—	40	—	45	78	—	—	36	97
	2000	61	—	78	60	75	—	50	—	95
	2001	52	51	80	64	99	49	38	38	65
	2002	34	43	70	49	66	49	64	56	70
Benzo(k)fluoranthene	1990	—	—	—	—	76	—	—	—	—
	1991	—	45	43	39	68	25	—	59	41
	1992	—	—	—	17.9	41.8	17.3	20.1	16.2	17.0
	1993	—	—	—	—	—	—	—	19	—
	1994	40.6	26.1	69.2	38.3	27.2	36.7	36.2	34.2	50.2
	1995	18.5	89.9	35.8	30.6	21.6	20.9	17.6	25.6	1.73
	1996	85.6	96.7	69.9	32.3	29.4	29.3	28.8	15.1	35.2
	1997	26.2	33.5	25.6	10.2	32.3	19.9	4.99	29.3	40.7
	1998	—	—	—	270	—	—	—	—	—
	1999	—	42	—	—	—	—	47	31	—
	2000	—	29	38	—	43	—	30	26	80
	2001	54	48	75	71	100	53	37	40	82
	2002	55	44	67	43	63	51	65	50	67

Table 4-1. Detected Priority PAHs (µg/kg-dry) Found in Sediment Samples Collected from the Seaman Estate Pond in August 1990 through August 2002* (Page 3 of 5)

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Chrysene	1990	---	---	---	---	84	---	---	---	---
	1991	---	60	58	56	85	44	---	79	47
	1992†	---	23.5	714	143	177	50.5	---	---	210
	1993	---	---	51	78	17	40	---	46	34
	1994	123	102	156	161	84.3	109	74.3	107	162
	1995	10.8	19.4	67.1	39.2	47.8	---	---	---	2.91
	1996	490	553	348	---	170	168	96.2	7.52	189
	1997	28.4	37.4	---	11.2	34.0	27.4	3.80	39.4	31.8
	1998	---	100	---	---	210	---	---	---	280
	1999	---	---	---	---	33	---	---	---	---
	2000	36	40	43	42	57	34	37	30	62
	2001	45	43	61	58	100	53	36	38	71
	2002	31	37	53	44	54	42	51	49	58
Dibenzo(a,h)anthracene	1990	---	---	---	---	191	195	353	180	1489
	1991	---	---	---	---	---	---	---	---	---
	1992	---	---	234	---	---	---	---	---	---
	1993	---	---	139	---	14	---	---	---	---
	1994	21.4	20.7	23.2	18.4	14.6	17.5	13.4	15.2	24.4
	1995	7.42	45.7	16.1	21.8	5.07	3.91	4.40	7.72	---
	1996	37.5	45.2	17.7	10.7	8.60	7.12	11.6	6.43	10.5
	1997	19.5	16.7	15.5	8.08	---	16.5	3.36	0.60	---
	1998	---	190	130	---	280	210	---	100	280
	1999	---	---	---	---	---	---	---	---	---
	2000	---	---	---	---	---	---	---	---	---
	2001	13	12	20	16	23	13	10	10	17
	2002	9.3	9.2	16	12	12	10	13	11	17
Fluoranthene	1990	---	155	270	---	264	187	---	247	367
	1991	33	220	260	250	400	200	41	360	240
	1992	---	---	---	---	---	---	---	---	---
	1993	74	94	205	149	37	81	37	94	67
	1994	109	74.6	139	137	85.2	113	97.2	96.9	140
	1995	60.1	284	110	149	90.5	83.7	58.0	90.6	8.14
	1996	225	218	211	96.5	89.2	92.1	77.6	48.7	106
	1997	77.3	90.6	99.7	41.3	99.9	74.9	22.1	81.2	145
	1998	170	130	---	170	190	260	---	---	280
	1999	100	---	100	110	180	---	110	99	340
	2000	75	71	100	140	110	84	77	77	190
	2001	46	48	81	87	110	65	51	48	83
	2002	53	62	88	83	90	93	130	65	87
Fluorene	1990	---	---	---	---	---	---	---	---	---
	1991	---	---	---	---	---	---	---	---	---
	1992	---	---	---	---	---	---	---	---	---
	1993	---	---	---	---	---	---	---	---	---
	1994	1370	485	1170	2320	597	779	3700	651	937
	1995	5430	1620	1130	9670	3780	1230	2800	577	177

Table 4-1. Detected Priority PAHs (µg/kg-dry) Found in Sediment Samples Collected from the Seaman Estate Pond in August 1990 through August 2002* (Page 4 of 5)

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Fluorene (Cont'd)	1996	---	---	---	---	---	---	---	---	---
	1997	1240	689	1250	987	2450	1530	287	1400	910
	1998	---	---	---	---	---	---	---	---	---
	1999	---	100	23	---	---	110	97	49	---
	2000	---	---	23	120	---	50	---	---	---
	2001	6.7	---	10	9.4	12	5.8	6.0	---	5.7
	2002	4.6	8.7	5.2	8.3	5.1	6.7	10	5.5	7.7
Indeno(1,2,3-cd)pyrene	1990	---	---	---	---	127	129	---	---	---
	1991	---	160	170	150	240	94	---	210	140
	1992	---	---	---	---	---	---	---	---	---
	1993	---	---	---	---	---	---	---	---	---
	1994	67.4	83.0	107	90.4	61.9	72.3	73.8	82.5	99.2
	1995	46.7	151	57.4	48.6	32.1	34.1	22.1	42.5	---
	1996	237	256	161	85.0	73.2	67.5	83.2	68.5	117
	1997	39.3	51.7	41.4	16.4	44.8	20.3	8.51	43.2	68.4
	1998	---	---	---	---	---	---	---	---	---
	1999	28	26	30	---	77	---	28	27	100
	2000	51	46	62	58	61	29	14	24	84
	2001	40	38	61	51	76	40	30	31	52
	2002	35	34	58	37	47	38	50	42	59
Naphthalene	1990	---	---	---	---	---	---	---	---	---
	1991	---	---	---	---	---	---	---	---	---
	1992	---	---	---	---	---	---	---	---	---
	1993	---	---	---	---	---	---	---	---	---
	1994	492	181	431	808	255	283	1370	229	241U
	1995	2700	1280	781	277	1770	663	1300	424	148
	1996	532	340	417	350	205	535	201	---	337
	1997	594	338	524	508	588	645	---	---	---
	1998	---	---	---	---	---	---	---	---	---
	1999	---	---	---	---	---	---	---	---	---
	2000	---	---	---	---	---	---	---	---	---
	2001	6.8	---	---	---	9.6	---	---	---	---
	2002	---	---	---	---	---	---	---	---	---
Phenanthrene	1990	---	---	---	---	121	110	261	131	383
	1991	---	---	43	60	99	50	---	86	36
	1992	55.8	53.7	231	---	155	40.9	33.1	86.3	66.9
	1993	74	62	99	135	60	117	19	84	44
	1994	1120	215	533	2640	254	410	511	318	278
	1995	189	605	249	691	289	484	128	347	26.2
	1996	280	336	362	3160	995	806	440	364	1110
	1997	305	124	31.3	52.8	151	198	---	592	244
	1998	190	---	---	---	670	---	---	---	---
	1999	68	27	41	120	83	41	68	93	340
	2000	14	31	22	---	44	---	18	11	---
	2001	21	18	24	23	59	18	18	18	21
	2002	17	17	19	17	21	15	24	22	18

Table 4-1. Detected Priority PAHs (µg/kg-dry) Found in Sediment Samples Collected from the Seaman Estate Pond in August 1990 through August 2002* (Page 5 of 5)

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Pyrene	1990	---	---	---	---	182	121	---	157	298
	1991	---	120	120	140	220	69	---	210	110
	1992	---	89.9	---	---	197	---	---	64.3	---
	1993	2220	2080	1850	4360	1040	1130	401	790	1350
	1994	291	189	373	453	158	246	256	254	341
	1995	111	811	346	317	220	242	119	240	10.6
	1996	105	96.8	50.7	26.2	82.8	110	22.7	15.3	90.2
	1997	137	122	77.8	45.1	124	101	16.0	104	157
	1998	140	110	120	---	---	---	160	86	410
	1999	72	60	73	68	120	110	56	52	190
	2000	65	70	87	72	120	51	59	55	130
	2001	92	88	120	120	180	94	73	76	130
	2002	58	51	110	86	100	84	94	86	130

* Only those PAHs above the PQL/MDL. See individual study year reports for details pertaining to PQL/MDL data.

† Benzo(a)anthracene and chrysene are not separated in 1992; the data reported are the sum of benzo(a)anthracene and chrysene.

PAHs - Polynuclear Aromatic Hydrocarbons
MDL - Method Detection Limit
PQL - Practical Quantitation Limits
µg/kg - Microgram per Kilogram

Source: MACTEC, Inc. 2003.

Table 4-2. Comparison of Concentrations (µg/L) of Detected Priority PAHs Found in Water Samples Collected from the Seaman Estate Pond in August 1991 through August 2002*

Parameter	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
CS1-B												
Acenaphthene	10U	1.5U†	1.44U	2.22U	2.02U	2.00U	2.00U	1.0U	0.50U	0.50U	1.0U	0.50U
Anthracene	0.1U	**0.02J**	0.02U	0.089U	0.089U	0.089U	0.099U	0.10U	0.050U	0.050U	2.0U	0.050U
Benzo(b)fluoranthene	0.1U	0.01U	0.08U	0.001U	0.002U	0.001U	0.002U	0.10U	0.050U	0.10U	0.10U	0.10U
Benzo(k)fluoranthene	0.1U	0.02U	0.04U	0.0004U	0.0004U	0.0004U	0.001U	0.10U	0.050U	0.050U	0.10U	0.050U
Fluoranthene	0.1U	0.2U	0.08U	**0.006**	**0.010**	**0.009**	**0.015B**	1.0U	0.050U	0.10U	0.10U	0.10U
Naphthalene	10U	1.1U	1.16U	0.917U	0.899U	0.596U	0.601U	1.0U	0.50U	0.50U	2.0U	0.50U
Phenanthrene	0.1U	**0.09JB**	0.10U	0.065U	0.072U	0.072U	0.074U	0.10U	0.050U	0.050U	1.0U	0.050U
CS4-B												
Acenaphthene	10U	1.5U†	1.44U	2.22U	2.02U	2.00U	2.00U	1.0U	0.50U	0.50U	1.0U	0.50U
Anthracene	0.1U	0.01U	0.02U	0.089U	0.089U	0.089U	0.99U	0.10U	0.050U	0.050U	2.0U	0.050U
Benzo(b)fluoranthene	0.1U	**0.2**	0.08U	0.001U	**0.012**	0.001U	0.002U	0.10U	0.050U	0.10U	0.10U	0.10U
Benzo(k)fluoranthene	0.1U	**0.05J**	0.04U	0.0004U	**0.006**	0.0004U	0.001U	0.10U	0.050U	0.050U	0.10U	0.050U
Fluoranthene	0.1U	0.2U	0.08U	**0.006**	**0.027**	**0.008**	**0.021B**	0.10U	0.050U	0.10U	0.10U	0.10U
Naphthalene	10U	1.1U	1.16U	0.917U	0.899U	0.596U	0.601U	1.0U	0.50U	0.50U	2.0U	0.50U
Phenanthrene	0.1U	**0.1B**	0.10U	0.065U	0.072U	0.072U	0.074U	0.10U	0.050U	0.050U	1.0U	0.050U

* "U" beside a value indicates that no peak for the analyte was detected with an area greater than the method blank on the chromatogram; this does not mean that it has been confirmed that the analyte is not present, only that it is below the MDL. "J" beside a value indicates that the analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample. "B" indicates the analyte was detected in the method blank.

† Acenaphthene and fluorene were not separated in 1992; the reported data are the sum of both analytes.

PAHs - Polynuclear Aromatic Hydrocarbons

µg/kg - Microgram per Kilogram

Source: MACTEC, Inc. 2003.

Table 4-3. Comparison of Concentrations (µg/kg-wet) of Detected Priority PAHs and Pesticides Found in Fish Tissue Samples Collected from the Seaman Estate Pond in August 1991 through August 2002* (Page 1 of 2)

Parameter	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Largemouth Bass												
Anthracene	20U	**34.9**	28	7U	**18**	6U	10U	10U	3.3U	3.3U	100U	1.7U
Benzo(b)fluoranthene	20U	**16B**	8U	0.1U	0.3U	0.1U	0.2U	**23**	6.7U	6.7U	5.0U	1.7U
Fluoranthene	20U	44.4U	**22**	**5**	1	**1**	**1B**	10U	6.7U	6.7U	10U	1.7U
Fluorene	840U	**567J†**	130U	20U	49U	17U	25U	100U	6.7U	6.7U	100U	1.7U
Dieldrin	40U	8.89U	98	0.667U	18	0.667U	1U	1U	1.0U	5.0U	1.7U	5.0U
A-Chlordane	**88**	62.4U	11U	0.667U	1U	0.667U	1U	1U	2.5U	**2.5U**	17U+	2.5U
4,4'-DDE	0J	17.8U	28U	**7.36**	**1.97**	0.667U	1U	1U	5.0U	5.0U	1.7U	5.0U
Endosulfan sulfate	0J	295U	40U	**1.32**	1U	0.667U	18	18	5.0U	5.0U	1.7U	5.0U
Aldrin	0J	17.8U	27U	0.667U	1U	0.667U	1U	**50**	2.5U	2.5U	1.7U	2.5U
Beta-BHC	0J	26.9U	18U	2.67U	1U	0.667U	1U	79	2.5U	2.5U	1.7U	2.5U
Acenaphthene	0J	**568J†**	144U	180U	403U	133U	200U	**130**	33U	33U	100U	1.7U
Benzo(a)anthracene	0J	13.3U**	98	0.1U	0.3U	0.09U	0.1U	**13**	3.3U	3.3U	5.0U	1.7U
Benzo(a)pyrene	0J	**2.2UB**	7U	0.1U	0.3U	0.8U	0.2U	**19**	3.3U	3.3U	5.0U	1.7U
Benzo(g,h,i)perylene	0J	8.9U	8U	0.3U	0.8U	0.3U	0.4U	**24**	6.7U	6.7U	10U	1.7U
Benzo(k)fluoranthene	0J	4.4U	4U	0.03U	0.09U	0.03U	0.1U	**22**	3.3U	3.3U	3.3U	1.7U
Chrysene	0J	13.3U**	7U	2U	6U	2U	3U	**14**	3.3U	3.3U	5.0U	1.7U
Dibenzo(a,h)anthracene	0J	17.8U	6U	0.2U	0.5U	0.2U	0.3U	**15**	6.7U	6.7U	5.0U	1.7U
Indeno(1,2,3-cd)pyrene	0J	26.7U	6U	0.2U	0.5U	0.2U	0.2U	**26**	3.3U	3.3U	5.0U	1.7U
Naphthalene	0J	238U	116U	**70**	180U	40U	60U	**290**	33U	33U	100U	1.9U
Bluegill												
4,4'-DDE	0J	17.8U	28U	0.667U	**3.11**	0.667U	1U	1U	5.0U	10U	1.7U	5.0U
Acenaphthene	2000U	320U†	144U	180U	403U	133U	200U	100U	33U	67U	1000U	1.7U
A-chlordane	**60J**	62.4U	11U	0.667U	**1.95**	**2.00**	1U	1U	3.5U	5.0U	17U+	1.7U
Benzo(a)anthracene	20U	13.3U**	9U	0.1U	0.3U	0.09U	0.1U	10U	3.3U	6.7U	50U	1.7U
Benzo(k)fluoranthene	0J	4.4U	4U	0.03U	**1**	0.03U	0.1U	10U	3.3U	6.7U	33U	1.7U
Benzo(g,h,i)perylene	20U	8.9U	**17**	0.3U	0.8U	**1**	0.4U	10U	6.7U	13U	100U	1.7U
Chrysene	20U	13.3U**	7U	2U	6U	2U	3U	10U	3.3U	6.7U	50U	1.7U
Dieldrin	**10J**	8.89U	9U	0.667U	**2.43**	**4.06**	1U	1U	5.0U	10U	1.7U	1.7U
Fluoranthene	20U	**138**	8U	**4**	**1**	**1**	**1B**	10U	6.7U	13U	100U	1.7U
Fluorene	840U	320U†	130U	20U	49U	17U	25U	100U	6.7U	13U	1000U	1.7U

Table 4-3. Comparison of Concentrations (µg/kg-wet) of Detected Priority PAHs and Pesticides Found in Fish Tissue Samples Collected from the Seaman Estate Pond in August 1991 through August 2002* (Page 2 of 2)

Parameter	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Bluegill (Cont'd)												
Indeno(1,2,3-cd)pyrene	20U	26.7U	18	0.2U	0.5U	0.2U	0.2U	10U	3.3U	6.7U	50U	1.7U
Phenanthrene	20U	13.3U	10	5U	14U	5U	10U	10U	3.3U	6.7U	1000U	2.0U
Heptachlor epoxide	0J	13.3U	31U	2.66	1U	0.667U	1U	1U	2.5U	5.0U	1.7U	2.5U
Benzo(b)fluoranthene	6J	2.2UB	8U	0.1U	0.3U	0.1U	0.2	10U	6.7U	13U	50U	1.7U
Aldrin	0J	17.8U	27U	0.667U	1U	0.667U	1U	43	2.5U	5.0U	1.7U	2.5U
Beta-BHC	0J	26.9U	18U	2.67U	1U	0.667U	1U	44	2.5U	5.0U	1.7U	2.5U
Channel Catfish												
4,4'-DDE	0J	17.8U	28U	0.667U	4.04	1.90	1U	1U	5.0U	5.0U	1.7U	5.0U
Acenaphthene	2000U	320U†	144U	180U	403U	133U	200U	100U	33U	33U	100U	10U
A-chlordane	36J	62.4U	11U	0.667U	7.75	7.05	1U	1U	2.5U	13	17U+	2.5U
Anthracene	20U	30.5	2U	7U	18U	6U	10U	10U	3.3U	3.3U	100U	1.9U
Benzo(a)anthracene	20U	13.3U**	9U	0.1U	0.3U	0.09U	0.1U	10U	3.3U	3.3U	5.0U	1.7U
Benzo(b)fluoranthene	7.5J	7.7B	8U	0.1U	0.3U	0.1	0.2U	10U	6.7U	6.7U	5.0U	1.7U
Chrysene	20U	13.3U**	7U	2U	6U	2U	3U	10U	3.3U	3.3U	5.0U	1.7U
Dieldrin	0J	8.89U	9U	0.667U	4.87	2.00	1U	1U	5.0U	5.0U	1.7U	5.0U
Fluoranthene	20U	44.4U	12	8	2	2	2B	10U	6.7U	6.7U	10U	4.8U
G-chlordane	10J	62.4U	11U	0.667U	6.97	1.98	1U	1U	2.5U	6.7	17U+	2.5U
Naphthalene	2000U	238U	116U	70U	180U	40U	60U	100U	33U	33U	100U	2.6U
Phenanthrene	20U	68.4	10U	5U	4U	5U	10U	10U	3.3U	3.3U	100U	8.9
Aldrin	0J	17.8U	27B	0.667U	1U	0.667U	1U	83	2.5U	2.5U	1.7U	2.5U
Endosulfan I	0J	62.2U	23U	0.667U	1U	0.667U	1U	9.6	2.5U	2.5U	1.7U	2.5U

* "U" beside a value indicates that no peak for the analyte was detected with an area greater than the method blank on the chromatogram; this does not mean that it has been confirmed that the analyte is not present, only that it is below the PQL. "J" beside a value indicates that the analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample. "B" beside a value indicates that the analyte was detected in the method blank. Bold type indicates a value greater than the PQL.

† Acenaphthene and fluorene are not separated in 1992; the data reported for 1992 are the sum of both analytes.

** Benzo(a)anthracene and chrysene are not separated in 1992; the data reported for 1992 are the sum of both analytes.

\+ A-chlordane and G-chlordane are not separated in 2001; the data reported for 2001 are the sum of both analytes.

PAHs - Polynuclear Aromatic Hydrocarbons
MDL - Method Detection Limit
µg/kg - Microgram per Kilogram

Source: MACTEC, Inc. 2003.

TABLE 2.3

SURFACE WATER TREATMENT DISCHARGE PARAMETERS
CIPS - GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Contaminants of Concern	Avg./Max., mg/l	Basis
Total PAH's (exc. naphthalene)	-/0.1	BPJ determination of BAT
Naphthalene	0.053/0.67	W. Q. Criteria
Total Phenols	0.1/0.2	35 IAC 304.124
Benzene	-/0.05	BPJ determination of BAT
Ethylbenzene	0.017/0.216	W. Q. Criteria
Toluene	0.07/0.75	W. Q. Criteria/BPJ determination of BAT
Xylenes	0.117/0.75	W. Q. Criteria/BPJ determination of BAT
pH	6-9	35 IAC 304.125
Total Iron	2/4	35 IAC 304.124
Dissolved Iron	-/1	35 IAC 302.208

BPJ - Best Professional Judgement
W.Q. - Water Quality
BAT - Best Available Technology
IAC - Illinois Administrative Code

Reference - IEPA Letter of January 24, 1992. Tim Kluge, IEPA, DWPC, to Don Richardson CIPS, Record of Decision, Appendix A, Table 13.

Table 5

Maximum Allowable Concentrations for Surface Water

Compound	CAS Number	ROD Standard		New Standards for Consideration		
		Protection of Aquatic Life in ug/L[1]	Protection of Aquatic Life and Technology Based Standards in ug/L[2]	Protection of Aquatic Life in ug/L		Protection of Human Health for Fish Consumption in ug/L
		Acute	Average/Maximum	Acute	Chronic	
Acenaphthene	83329	60.8		120	62	880
Acenaphthylene	208968			190[3]	15[3]	--
Anthracene	120127	2.3		--	--	35,000
Benzene	71432	2,200	--/50[4]	1,300	110	21
Benzo(a)anthracene	56553	1		--	--	--
Benzo(a)pyrene	50328	0.5		--	--	0.16
Benzo(b)fluoranthene	205992			--	--	0.16
Benzo(k)fluoranthene	207089			--	--	1.6
Bis (2 ethyl hexyl phthalate)	117817			--	--	1.9
Bromoform	75252			--	--	100
Dibenzo(a,h)anthracene	53703			--	--	0.16
Di-n-butyl phthalte	84742	73		--	--	3,800
t-1,2-dichloroethene	540590	14,000		14,000[3]	1,100	--
Dichloromethane	75092	19,300		17,000	1,400	340
Ethyl benzene	100414	3,200	17[5]/216[5]	220	17	9,300
Fluoranthene	206440	398		--	--	120
Fluorene	86737			--	--	4,500
Iron	15438310			--	1000[6]	--

Compound	CAS Number	ROD Standard		New Standards for Consideration		
		Protection of Aquatic Life in ug/L[1]	Protection of Aquatic Life and Technology Based Standards in ug/L[2]	Protection of Aquatic Life in ug/L		Protection of Human Health for Fish Consumption in ug/L
		Acute	Average/Maximum	Acute	Chronic	
Indeno(1,2,3-cd)pyrene	'93395			--	--	0.16
Table 5 (continued) Maximum Allowable Concentrations for Surface Water 2-Methyl phenol	95487	1,900		4,700	370	18,000
4-Methyl phenol	106445	1,900		670	120	--
Naphthalene	91203	790	53[5]/670[5]	510	68	--
Phenanthrene	85018	10		46	3.7	--
Phenol	108950	100		100	100	--
Pyrene	129000			--	--	3,500
Toluene	108883	2,400	70[5]/750[4]	1,300	110	62,000
Xylene	1330207	2,090	117[5]/750[4]	1,500	120	62,000
Total PNAs except Naphthalene			--/100[4]	--	--	--
Total Phenols			100[6]/200[6]	100[6]	--	--
pH			6-9[6]			
Total Iron			2000[6]/4000[6]			
Dissolved Iron			--/1000[6]			
NOEC		> 100% effluent				

1. Pump and Treat System discharge limits based on protection of aquatic life in receiving water.
2. Surface Water Clean-up Objectives and effluent limits based on either protection of aquatic life or the lowest level which can be reasonably achieved using best available technology.
3. Technology based standard in consideration of best professional judgement of the best available treatment technology.
4. Water Quality criteria calculated utilizing toxicity data from literature for protection of aquatic life.
5. Numeric Standard from Illinois Surface Water Quality regulations.
6. Advisory standard. Not calculated according to Illinois Surface Water Quality regulations.

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