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United States Environmental Protection Agency | Office of Emergency and Remedial Response | EPA/ROD/R05-92/219 September 1992 PB93-964127

EPA

Superfund Record of Decision:

Central Illinois Public Service, IL

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R05-92/219	2.	3. Recipient's Accession No.
4. Title and Subtitle SUPERFUND RECORD OF DECISION Central Illinois Public Service, IL First Remedial Action - Final			5. Report Date 09/30/92 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460			13. Type of Report & Period Covered 800/000 14.

15. Supplementary Notes

PB93-964127

16. Abstract (Limit: 200 words)

The 1-acre Central Illinois Public Service (CIPS) site is a former manufactured gas plant in Taylorville, Christian County, Illinois. Land use in the area is predominantly residential, with Manners Park, a multi-use recreational facility, located adjacent to the site. Seaman Estate pond, located south of the site, is used for fishing and swimming. Ground water beneath the site is no longer used as a drinking water source, and residences have been connected to a municipal water supply. The CIPS/Taylorville plant, constructed in 1892, was operated by CIPS from 1912 until 1932. The plant produced a low-quality gas from coal, which was used for lighting and heating. Coal tar, produced as a by-product, was typically disposed of offsite, sold, or given away to be used for various purposes. After higher quality natural gas became available in the area, the plant was closed. Onsite contamination by coal tar was discovered in 1985 during site construction. As a result of state investigations, an immediate removal action (IRA) was performed by CIPS in 1987 to remove all buried tanks, contaminated soil, and sediment at the site; to provide an alternative water supply to affected residences; and to implement institutional controls. This ROD

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Central Illinois Public Service, IL
First Remedial Action - Final
Contaminated Media: soil, sediment, debris, gw
Key Contaminants: VOCs (benzene, toluene, xylenes), other organics (PAHs, phenols)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 80
	20. Security Class (This Page) None	22. Price

EPA/ROD/R05-92/219
Central Illinois Public Service, IL
First Remedial Action - Final

Abstract (Continued)

addresses a final remedy for the remaining principal threat posed by ground water contamination at the site, and also documents the prior 1987 removal action. The primary contaminants of concern affecting the soil, sediment, debris, and ground water at the site are VOCs, including benzene, toluene, and xylenes; and other organics, including PAHs and phenols.

The selected remedial action for this site includes documenting the previously implemented source control measures which included removal and offsite disposal of the structures associated with the original gas plant; excavation and offsite disposal of approximately 9,000 cubic yards of visibly contaminated soil down to the ground water table level and excavation and offsite disposal of 3,000 cubic yards of soil and sediment from the drainageway section leading to Seaman Estate pond; backfilling excavated areas with clean soil from offsite; plugging and abandoning private drinking water wells; and connecting affected residents to a public water supply. The selected remedial actions to be implemented now include extracting and neutralizing contaminated ground water prior to onsite treatment in a liquid phase carbon adsorption column, with onsite discharge of the treated water to the drainageway downgradient of Seaman Estate pond; transporting contaminated carbon offsite to a facility for regeneration or incineration; removing precipitated solids from the treatment process, and testing them for hazardous waste characteristics, prior to appropriate disposal; conducting long-term ground water and surface water monitoring; and implementing erosion controls, institutional controls, including deed and land use restrictions, and site access restrictions, including fencing. The estimated present worth cost for this remedial action is $9,346,034, which includes an annual O&M cost of $401,400 for 30 years.

PERFORMANCE STANDARDS OR GOALS:

Chemical-specific ground water clean-up standards, which are based on state and federal drinking water criteria, include benzene 0.005 mg/l; toluene 1 mg/l; ethylbenzene 0.7 mg/l; xylenes 10 mg/l; anthracene 2.1 mg/l; benzo(a)pyrene 0.00023 mg/l; and 2-methylphenol 0.35 mg/l. In addition to meeting the individual ground water objectives indicated certain toxicity equations as defined in the ROD must be satisfied to protect against liver tumors and liver, kidney, and blood toxicity.

Illinois Environmental Protection Agency · P. O. Box 19276. Springfield. IL 62794-9276

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Central Illinois Public Service (CIPS) Co.
Taylorville Manufactured Gas Plant (MGP) Site
Christian County, Illinois

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selected remedial action for the CIPS/Taylorville (MGP) Site in Christian County, Illinois. This action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

The United States Environmental Protection Agency (USEPA), Region V is expected to concur with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

An immediate removal action, which constitutes an operable unit for this site, has been completed voluntarily by the responsible party under a state superfund notice. Major elements included:

- Excavation of source materials above the water table (9,000 c.y. of soil; 3,000 c.y. of sediment); disposal of source materials off-site in a permitted landfill; and backfilling of excavation areas with clean materials.

- Connection of potentially affected residents to the public water supply; and plugging and abandonment of associated private drinking-water wells.

- Monitoring of groundwater, surface water, pond sediment and fish downstream of the site; completion of a remedial investigation and feasibility study for the site.

This final remedial action provides for treatment of the remaining principal threat at the site, that posed by groundwater contamination. The major components of the selected remedy include:

- Construction of an on-site groundwater pump and treat system; and operation and maintenance of the system until Agency cleanup objectives are met.

- Expansion of the monitoring program for untreated groundwater and treatment system effluent, to supplement current monitoring efforts.

- Complete fencing (with signs) of the site; and land use and deed restrictions, to the extent possible, for the site and affected off-site areas.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies which employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted at least every five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

9/30/92
Date

Mary A. Gade
Director
Illinois Environmental Protection Agency

MAG:KN:dks/rmi/sp/596r

CIPS/Taylorville Manufactured Gas Plant Site
Decision Summary Table of Contents

RECORD OF DECISION SUMMARY
CIPS/TAYLORVILLE MANUFACTURED GAS PLANT SITE

I. Site Location and Description

The Central Illinois Public Service Company (CIPS) Manufactured Gas Plant (MGP) site is specifically located at 217 South Webster Street in Taylorville, Christian County, Illinois. The site itself is bordered by Manners Park to the east, a CIPS pole storage yard and railroad line to the west, private residences to the north and a small wooded residential subdivision to the south. The general site location is shown in Figure 1, followed by a more detailed vicinity map in Figure 2.

The site itself is situated on a level parcel slightly less than one acre in size immediately west of the south extension of Webster street as it enters Manners Park. Three sides of the site are currently secured by a six-foot high chain-link fence, with access from the west being limited by an active rail line. This site is basically located on a topographic high, with terrain generally sloping to the south as a series of ravines empty into an intermittent creek section leading to the South Fork of the Sangamon River approximately one-half mile away.

The history of site manufacturing activities is more fully explained in the next section. However, it is worthy to note here that an immediate removal action taken by the responsible party in 1987 has resulted in demolition of all former gas plant structures above and below ground, excavation and off-site disposal of contaminated source materials and backfilling of affected areas with clean soils. The surface of the former plant site has been covered with a foot thick course of gravel and is currently used as a storage yard by the utility. The on-site immediate removal work limits are shown in Figure 3.

The surrounding residential and recreational land uses can be seen in Figure 4. It is evident from these figures that there is substantial human activity immediately adjacent to the secured site. Manners Park is the main multi-use facility for Taylorville, a community of approximately 11,000 people. Typical residential block arrangements border the site to the north and further west. In contrast, the Seaman Estate subdivision directly to the south consists of eight larger wooded tracts, with single family residences on several. CIPS owns the three tracts closest to the site, as shown in Figure 5. The intermittent drainageway leading south away from the site to the Seaman Estate pond, as well as its extension from the pond to the South Fork of the Sangamon River, is on property controlled by CIPS. Use of natural resources on CIPS' property has been voluntarily curtailed through deed restrictions. The responsible party has provided alternative public water supply to potentially affected residents surrounding the site. This includes those in the Seaman Estate subdivison, whose landowners have also signed groundwater use restriction agreements with CIPS, and have had their private wells plugged and abandoned on a voluntary basis. IEPA will review these agreements and modify if necessary during the course of signing of the Consent Decree, to ensure that the residents are protected from any potential contaminants. Therefore, all residences south and southwest of the site in the immediate vicinity of

the potential groundwater contaminant plume's path have been supplied with municipal potable city water, and the uppermost groundwater resource is not being used for human consumption.

The only other potentially affected natural resource being used at this time is the Seaman Estate pond. This private pond is used recreationally for swimming and fishing. An annual surface water, sediment and fish monitoring program has been conducted by the responsible party since 1989 to assess health risks and provide data to support development of the final remedy for the site. Minimal effects have been recorded in the pond water and fish presently. These levels do not require remediation of the pond currently, for reasons stated later in this document. The ponds' monitoring will continue throughout the remediation process and site monitoring. The pond will have further work performed if deemed necessary later.

II. Site History and Enforcement Activities

The CIPS/Taylorville Manufactured Gas Plant (MGP) was constructed in 1892 and was operated by the Taylorville Gas and Electric Company until it was purchased in 1912 by CIPS. CIPS operated the MGP from 1912 until 1932. The plant produced a low quality gas from coal, which was used for lighting and heating. The coal gasification process that was used at the plant produced a byproduct known as coal tar. Coal tar is a mixture of volatile compounds such as benzene and toluene, heavier compounds such as naphthalene and a class of compounds known as polynuclear aromatic hydrocarbon (PAHs). Certain of these compounds have been shown, or are suspected to cause cancer in people. The actual disposal method for the coal tar generated by the Taylorville MGP is not known, but typically coal tar was disposed of off-site, sold or given away for use as roofing material, weed killer, etc.

The plant was closed in 1932 when higher quality natural gas became available in the area. When the plant was closed, most of the above ground structures were torn down, and below ground tanks were apparently filled with soil and miscellaneous materials and left in place.

Environmental contamination was discovered in October 1985 when a plumbing contractor, making repairs to a septic tank on the property, dug a trench and found coal tar in the subsurface soils. When the coal tar was discovered, work on the septic tank was halted and CIPS was notified. Recognizing its legal liabilities for the site and in order to protect public health and the environment, CIPS notified the IEPA and immediately began an on-site investigation to determine the nature and extent of coal tar contamination.

The IEPA issued a Notice pursuant to Section 4(q) of the Illinois Environmental Protection Act (the Act) on July 2, 1986. This Notice explained the Agency's concerns regarding the potential contamination and set forth those steps CIPS was required to take to address the situation.

The first response required in the Notice was an Immediate Removal Action (IRA) (or Operable Unit) to locate and remove all buried tanks and pits at the site which contained coal tar or other wastes. Work plans to guide the construction work and health and safety plans to

protect on-site workers, as well as the community as a whole, were required to be reviewed and approved by the IEPA Immediate Removal Unit before the IRA could begin. The IRA was initiated in January 1987 and completed in March 1987. The excavation was left open for approximately two years after the completion of the IRA because the Agency and CIPS were discussing the necessary remedial actions to address soil and groundwater contamination that remained. These and other completed actions, including provision of an alternative water supply and institutional controls, are discussed in greater detail in the Description of Alternatives section of this decision summary.

The "Phase II Site Investigation and Remedial Alternative Development Report, CIPS Gas Plant Site - Taylorville, Illinois" was completed by Hanson Engineers, Inc. for CIPS and submitted to the Agency in December, 1986. This report summarized all of the investigative activities up to that date and recommended very limited remedial action besides that completed under the IRA.

CIPS submitted four addenda to the original Phase II report. After several months of discussion and review of the Phase II report and its addenda, the Agency and CIPS reached an impasse. CIPS was not willing to undertake additional remedial action to address contamination that remains at the site. The IEPA, in an effort to secure private party funding of a final remedial action, sponsored the site for scoring under USEPA's Hazard Ranking System (HRS). The CIPS/Taylorville site initially carried a score of 48.91 when it was proposed to the National Priorities List on June 27, 1988.

The history of CERCLA enforcement activities for the CIPS/Taylorville site is an outgrowth of the state superfund actions conducted prior to NPL listing. The Region originally sent a CERCLA 104(e) information request to CIPS ahead of proposal to the NPL on January 13, 1988. CIPS submitted responses to this request on January 27th, April 19th and June 22nd, 1988. After proposal to the NPL, the site was designated as a "State-Lead" enforcement case through negotiations between IEPA and USEPA Region V.

IEPA held discussions with CIPS, and the Region as necessary, during the Spring of 1990 to explain the CERCLA process to the responsible party and the technical ramifications of compliance with the NCP. It was determined that any necessary study work could be completed under the terms of the existing State 4q Notice and that a Consent Order would not be required. Technical staff met in July 1990 and established the Scope of Work for supplemental field work, refinement of the risk assessment and development of the feasibility study to meet current USEPA program guidance. The RA/FS Update was finalized in May, 1991, and those findings are discussed throughout this decision summary.

The state had basically suspended Consent Order negotiations with the responsibile party during the fall of 1988 after the site's proposal for the NPL. The parties agreed that negotiations toward a Remedial Design/Remedial Action (RD/RA) Consent Order would resume once the

Proposed Plan/ROD had been finalized by the Agency and reviewed and accepted by USEPA and the public. No formal Special Notice Letter was issued by the State during the public comment period because CIPS, as the only potentially responsible party, has voluntarily cooperated to date and has expressed a willingness to implement the final remedy being selected in this decision summary. A draft RD/RA Consent Order will be given to the company in May, 1992 and it is expected to be finalized and entered by the court during this winter. This enforcement Agreement will cover construction of the final remedy and its long-term operation, maintenance and monitoring.

III. Community Relations Activities

CIPS and IEPA have been conducting community relations activities at this site since late 1986, more than four years before the site was added to the NPL. The early stages of investigation and the 1987 removal action were carried out by CIPS as a private party action, with IEPA oversight. At that time no formal Community Relations Plan (CRP) had been developed for the site, and public participation activities were planned and carried out on an ad hoc basis.

During 1986 and 1987, contacts with the public were primarily limited to local officials, nearby residents, and the press. CIPS representatives went door-to-door and met with nearby neighbors before the removal action took place. IEPA representatives were not involved with this process. An early informational public meeting planned by CIPS without IEPA input drew very low attendance, possibly due to an error in the announced date for the meeting.

During the removal action in early 1987, CIPS offered to relocate the nearest residents to a motel temporarily, because unseasonably warm weather had resulted in some odors near the site, and the increased truck traffic was an annoyance.

During the same period IEPA staff met with downgradient (Seaman Estate) property owners at their request to discuss IEPA's stand on whether it would be safe to construct and use homes and private wells, and whether they could proceed with planned reconstruction work on the potentially contaminated pond shared by their properties. Residents were informed that IEPA would not recommend installing new drinking water wells in the former Seaman Estate area. The residents had proposed to deepen the pond by dredging and spreading the dredged sediments on the banks. IEPA responded that such sediments had a high likelihood of containing significant coal-tar related contamination; and dredging might 1) deposit PAH-contaminated sediments on the shoreline, where people (and animals) would be more likely to contact them, 2) mobilize existing contamination by stirring up sediments in the pond, and 3) possibly alow any spring-fed sources of PAH contamination to flow more freely into the pond.

In March 1987, staff from IEPA and the Illinois Department of Public Health met with a nearby resident to discuss her belief that she had suffered health effects due to odors emanating from the excavation during the removal action. Over the following months IEPA Community Relations staff provided copies of site air-monitoring reports and provided answers in response to calls from this individual.

In August 1987, CIPS proposed an experimental remedial method for the contamination remaining in the groundwater at the site, but the trade secret, proprietary nature of the proposal led to bench-scale tests and lengthy closed-door discussions that took the site out of the public eye for more than a year. CIPS withdrew its proposal for the novel remedy roughly a year after it was introduced. From the completion of the removal action in early 1987 to April 1989, the excavated area remained open, but access was restricted.

CIPS met with IEPA Community Relations (CR) staff in October 1988 (after the site's proposal for the NPL) and stated the company's intention to develop and carry out a CRP compatible with Superfund guidance. In February 1989, CIPS produced a draft Community Relations Plan, a fact sheet, and a press release covering only the current project of backfilling the area excavated in the early-1987 removal action. IEPA's CR staff reviewed the draft CRP and met with company representatives in March 1989, informing them that the CRP would require major broadening of scope and modifications of form before it would satisfy CR guidance. At that time, IEPA supplied CIPS with a sample CRP meeting the guidance.

CIPS followed through on a number of Agency CR recommendations prior to the April 1989 backfilling of the excavation, notably the distribution of a fact sheet (the first to be prepared regarding the site) to all residents near the site and along the route to be followed by the trucks carrying fill material to the site, as well as meeting with local officials, press, and nearby neighbors to discuss planned activities. At this time, CIPS left the draft CRP in its incomplete form, stating that it was an interim version for the purpose of the backfilling operation only.

In July 1989, IEPA's CR staff recontacted CIPS' public relations section to request a revised CRP for the site. In February 1990, IEPA's CR coordinator sent a letter to CIPS underlining the need for an acceptable CR Plan. In a meeting with the company, IEPA CR staff emphasized that the long delays between the various phases of the project had left major gaps in the community's understanding of the situation. At the very least, CIPS needed to produce a comprehensive CRP to address the community's need to be brought up-to-date on the technical findings of the completed Remedial Investigation (RI) and the forthcoming update of the Risk Assessment and Feasibility Study. IEPA's CR Coordinator stressed that a fact sheet on the RI findings was long overdue, and that citizens should not be asked to assimilate in too short a period of time the results of both the RI and the FS. CIPS was urged to obtain the services of an experienced CR consultant in order to carry out these needed actions in an expeditious manner.

During the ensuing months, CIPS indicated in contacts with IEPA that it was considering the action of engaging an outside CR contractor. Late in June 1990, controversy erupted in the community as three area children were found to have been diagnosed with neuroblastoma, a rare childhood cancer, within about a year's time. An ad hoc citizens group formed and successfully sought widespread media attention to this medical problem. In public meetings and the frequent media interviews that followed, CIPS's former manufactured gas plant was suggested by some citizens as a possible cause of these cancers.

In the absence of a CRP, available fact sheets describing the prior and existing environmental situation, or even an established site information repository, IEPA, the Illinois Department of Public Health, and CIPS initially had difficulty conveying to concerned citizens and the media in a clear and convincing manner that the project to date had been handled in such a way that the public had not been exposed to site contaminants. At this time, CIPS public relations staff informed IEPA CR staff that high-level corporate approval was being sought to hire an outside CR consultant.

In addition to CIPS representatives, IEPA technical and CR staff and an IDPH toxicologist attended a July 18, 1991 public meeting in Taylorville, called by the local citizens group, and kept in close touch with the group's leaders by phone and in face-to-face meetings over the next several months. Both CIPS and the State Agencies also responded to numerous contacts from local, regional, and national media regarding speculation of a connection between the CIPS site and the neuroblastoma cases.

CIPS established a site information repository in the Taylorville Public Library in late July 1990. On August 21, 1990 IEPA's technical staff and CR coordinator met with CIPS staff and their newly hired outside CR-consultant to discuss the urgent CR needs required to meet the then-contemplated schedule for an RI meeting, an FS-hearing, a public comment period, and the subsequent record of decision for this site.

On August 28, 1990 the national and local media were informed of the CIPS site's final listing on the NPL, engendering numerous media calls to IEPA, and adding further urgency to the need for a CRP and fact sheets to inform the community of the facts regarding the site, past and present. Because the company had already begun (at IEPA's urging) a formal CR effort, the IEPA made the decision to leave primary responsibility for CR activities in the hands of CIPS, with full IEPA oversight. In October, IEPA's CR coordinator provided information to assist U.S. EPA's TAG staff in publicizing the availability of Technical Assistance Grants regarding the site.

In late December 1990, CIPS provided a draft CRP and draft RI fact sheet to IEPA for review and comment. IEPA CR staff provided verbal comments on both documents in a meeting two days later. IEPA's CR coordinator circulated the draft CRP to IEPA staff for further written comments and suggested revisions in late January; and several rounds of in-house review resulted in formal written comments being sent to CIPS in mid-March, 1991.

Late in January 1991, IEPA's CR coordinator contacted U.S. EPA's TAG program coordinator to ask the status of the local citizen group's effort to apply for a grant. Finding that the group's application had not been received, the IEPA's CR coordinator and Project Manager called the local group's leader to discuss what sort of consultants the group could fund with a TAG, and conveyed U.S. EPA's suggestion that the group submit even a partial application, so that TAG program staff could advise and assist the group in completing a successful application. In a March 12th call to U.S. EPA's TAG officer, IEPA's CR coordinator

learned that the local group had sent a letter stating that they would not be applying for a grant, citing as reasons difficulties in completing the application and their view that IEPA staff were providing their group with adequate information on the site.

During the first quarter of 1991, IEPA CR staff had numerous phone contacts and several meetings with CIPS public relations staff and its CR consultant in preparation for the RI-meeting in late March. The revised RI fact sheet was mailed to the site contact list and made available in the repository in March, and the RI meeting took place on March 26, 1991, in Taylorville. CIPS set the agenda for the meeting and made presentations outlining the methodology and results of the removal action and the RI. IEPA and Illinois Department of Public Health staff took an active part in the meeting, answering questions and clarifying the State's oversight role.

During May and June, 1991 IEPA's CR staff reviewed the RA/FS Update report for the site and commented on several drafts of the RA/FS fact sheet from CIPS's CR consultant. The final version of the fact sheet was released to the public in early June 1991. CIPS submitted a final, revised CRP to the IEPA in May, and IEPA provided its final review and written comments in the first week of June 1991. The CRP was added to the site repository in June, at the same time that the final version of the RA/FS fact sheet was sent to the site contact list.

In July 1991, IEPA sent (to the entire site mailing list) individual copies of the public notice of an informational public meeting and the formal FS public hearing for the site. In addition, IEPA published the complete public notice as a display ad three weeks in succession in late July and early August, in the Taylorville Breeze - Courier, the local daily newspaper. The public notice described the background of the site, past remedial activities, and its status as a Superfund site, with IEPA providing oversight for CIPS activities. The notice announced that the Proposed Plan and the complete Administrative Record for the site would be available at the Taylorville Public Library, starting August 5, 1991, including the recently completed Risk Assessment/Feasibility Study Update for the site. The notice summarized the basic features of the three alternatives evaluated by the FS, as discussed fully in Section VII of this decision summary.

The public notice announced the place and time for both an informational meeting and a formal FS public hearing, both in Taylorville and both events scheduled with afternoon and evening sessions. The notice announced a 45-day public comment period, commencing August 5 andcontinuing through September 19, 1991. An IEPA mailing address for comments and contact person for more information were also provided. The IEPA responded to numerous media and citizen calls.

In July IEPA's technical and CR staff also responded to numerous detailed technical questions from representatives of the local citizen group, which was once again discussing a possible TAG application with U.S. EPA staff.

On August 5, 1991, IEPA staff placed the Proposed Plan and the Administrative Record, with its associated Index, in the Taylorville Public Library. On August 8, IEPA mailed complete copies of the Proposed Plan to the entire site mailing list, again emphasizing the public comment period, informational meeting, and FS public hearing for the project.

IEPA held the informational meeting (availability session) on the afternoon and evening of August 12, 1991. About a dozen members of the general public attended, along with several local officials and a number of media reporters. IEPA held the formal FS Public Hearing on the afternoon and evening of August 27, 1991. U.S. EPA technical and CR staff were also present, and State Public Health Department personnel were in attendance in case their input was requested. Attendance was about 30 in the afternoon and about 40 in the evening session. IEPA prepared an official transcript of the hearing and placed it in the Administrative Record at the library, on September 5, 1991.

In late November, 1991, two of the Taylorville area mothers of children with neuroblastoma, who were among the founders and prime movers of the local citizen group ("Taylorville Awareness Group"), filed suit against CIPS and its contractor for the removal action, alleging that they were responsible for the children's cancers. These suits are still pending.

IV. Scope and Role of Operable Unit

As discussed in detail within Section VII of this decision summary, an operable unit addressing excavation and off-site disposal of source materials, provision of an alternate water supply and implementation of partial land use/deed restrictions has been voluntarily completed by the responsible party under notice and direct supervision of the Agency.

The response action contemplated by this decision summary to address the remaining principal threat posed by groundwater contamination is considered to be the final remedy for the CIPS/Taylorville MGP site. Therefore, no additional operable units are envisioned at this time.

V. Site Characteristics

The Risk Assessment and Feasibility Study (RA/FS) Update, John Mathes and Associates, Inc., May, 1991 was basically required for this NPL site to bring decision-making documents into compliance with the NCP. The other equally important purpose of this update, which became Addendum 5 to the Phase II study, was to account for supplemental data generated since the 1987 removal action and accurately assess existing site conditions. The reader is therefore encouraged to consult the Phase I and II documents by Hanson Engineers, Inc. on initial environmental conditions after site discovery.

This section is devoted to establishing the nature and extent of residual contamination associated with both the former plant site and off-site areas where contamination has come to rest. The media-specific information provided here was concisely summarized in the RA/FS Update,

and therefore is directly reprinted. This presentation assumes the reader is familiar with the former plant site's configuration and the removal action as detailed in Section VII of this decision summary.

Nine additional data-collection activities have been performed and reported to the IEPA regarding the site since the December 1986 submittal of the Phase II report. The activities include:

- collection of sediment samples December 10, 1987, from the Seaman Estate Pond (submitted January 4, 1988);
- collection of 1988 groundwater data (submitted November 30, 1988);
- ambient air monitoring around the perimeter of the site in 1987, 1988, and 1989;
- biological sampling on the South Fork of the Sangamon River near CIPS site (October '89)
- collection of 1989 sediment, surface water, and fish tissue samples (1989 Seaman Estate Pond Study)
- collection of 1989 groundwater monitoring data (submitted January 26, 1990);
- collection of 1990 sediment, surface water, and fish tissue samples (1990 Seaman Estate Pond Study, Appendix C of the RA/FS Update);
- collection of groundwater samples for cyanide analysis on January 25, 1991;
- collection of on-site soil samples from borehole locations B-10, B-11, and B-14 on March 4, 1991; and
- collection of 1991 sediment, surface water, and fish tissue samples (1991 Final Annual Report, Seaman Estate Pond Study).

Post-removal sampling generated data on five off-site media that could have been affected by historical site activities and the removal action. These media included sediment, surface water, fish tissue (each in the downgradient receptor-Seaman Estate Pond), groundwater, and air. In addition, soil samples were collected and analyzed for VOCs at on-site locations where soils had not been excavated during removal activities.

Sediment

On December 10, 1987, sediment sampling was performed at the northern end of Seaman Estate Pond. Three sediment samples were collected along each of four separate transects. At each location, sediment samples were collected from three separate depth intervals (0 to 0.5 foot, 0.5 to 2 feet, and 2 to 4 feet). Samples collected along the same transect and at the same depth interval were composited to form a single sample. The locations of the four transect lines and corresponding boreholes are

shown in Figure 6. Evaluation of analytical results indicates that PAHs were present in the top six inches of every transect composite, with concentrations ranging from 680 to 2,600 ug/kg. The only other sample from this series that contained PAHs was the 0.5- to 2-foot interval for Transect 3, which contained 460 ug/kg.

Sediment data for the 1989, 1990, and 1991 Seaman Estate Pond sampling efforts are summarized in Table 1. These sediment samples were collected with a standard ponar dredge and represent materials approximately zero to six inches below the top of the sediment layer. One of nine sediment samples (CS4-B) in the 1989 sampling effort contained detectable concentrations of PAHs. The highest concentration detected was 1,570 µg/kg fluoranthene. Eight of nine sediment samples collected in the 1990 sampling effort contained detectable concentrations of PAHs. However, detection limits reported were lower than those for the previous sampling effort. The highest concentration detected in 1990 was 1489 µg/kg dibenzo(a,h)anthracene.

Surface Water

A comparison of the concentrations of detected PAH compounds found in the surface water samples collected from Seaman Estate Pond for the 1989, 1990, and 1991 sampling efforts is presented in Table 2. One PAH (fluoranthene) was detected in the 1989 sampling effort. Fluoranthene, acenaphthene, and naphthalene were detected in both surface water samples collected in 1990. One PAH (fluoranthene) was detected in both the sediment samples and surface water samples. No PAHs were detected in the 1991 surface water samples.

Fish Tissue

A comparison of the concentrations of detected PAH compounds detected in the fish tissue samples collected from Seaman Estate Pond during the 1989, 1990, and 1991 sampling efforts is presented in Table 3. Whereas one PAH was detected in the tissue of a largemouth bass in 1989, seven PAHs were detected in the fish tissue samples of bluegill or channel catfish in 1990. Acenaphthene was detected at concentrations of 440 ug/kg and 1,000 ug/kg in bluegill and channel catfish tissue samples, respectively. Fluoranthene and naphthalene were also detected in the catfish tissue samples at low concentrations. Fluoranthene was detected in the bluegill tissue samples at low concentrations. No PAHs were detected in 1991 fish samples, though some detection limits were above those for earlier years. For comparative purposes, Table 4 presents typical concentrations of PAHs detected in smoked and nonsmoked fish tissue.

Off-Site Groundwater

A summary of post-removal groundwater monitoring data is contained in Table 5. Evaluation of these data indicates that an organic compound was detected in an off-site monitoring well on two occasions. In 1988, benzene was detected at a concentration of 0.7 ug/L in Well GW-9D. In 1989, acenaphthene was detected at a concentration of 2.4 ug/L in Well GW-13d. Both of these compounds were detected at concentrations just

above the method detection limit. Acenaphthene was not detected in any other on-site or off-site groundwater samples collected during these three sampling events. In 1990, no compounds were detected above the method detection limit in any off-site groundwater samples.

Air

Ambient air monitoring along the site fenceline using a portable photoionization detector continued after removal activities were completed (until the excavations were backfilled). This monitoring was performed to assess whether or not these activities had lasting air quality impacts on the surrounding public. Post-removal air monitoring results are summarized in Table 6.

On-Site Soils

A summary of post-removal on-site soil analytical results is contained in Table 7. These samples were collected in March of 1991 to assess whether or not residual VOCs were present in site soils (outside of the original limits of excavation). An evaluation of these data indicates that the concentrations of VOCs in borehole samples B-10, B-11, and B-14 are insignificant.

On-Site Groundwater

Groundwater under the CIPS site does have contaminants remaining. Those compounds that have been found on-site are listed in Table 5.

VI. Summary of Site Risks

The Risk Assessment and Feasibility Study (RA/FS) Update, John Mathes and Associates, Inc., May, 1991 characterizes existing and future health and environmental risks posed by residual contamination associated with current, post-removal site conditions. This baseline risk assessment evaluates risks presented by impacted soil/sediment, surface water and groundwater media both on and off of the manufactured gas plant site.

This risk assessment was performed by the responsible party under the close technical supervision of IEPA and IDPH, with input from USEPA, using the current methodology and techniques described in the Interim Final Risk Assessment Guidance for Superfund - Human Health Evaluation Manual, Part A, USEPA, 1989 and the Risk Assessment Guidance for Superfund - Environmental Evaluation Manual, USEPA, 1989. The reader is referred to the RA Update itself for discussion of the hazard identification, exposure assessment and toxicity evaluation leading up to the current risk characterization for the CIPS/Taylorville site.

What follows is the risk characterization and impact evaluation directly taken from the RA/FS Update. This analysis attempts to quantify chronic human health exposures and carcinogenic risks while qualitatively evaluating environmental impacts. The exposure scenarios, human health/environmental factors and risk calculations used were approved by the interagency reviewers through a series of information exchanges and scoping meetings/calls. Human health risks are characterized first by

looking at potential on-site (former MGP area) and off-site use, followed by the assessment of environmental concerns and a discussion of sources of uncertainty.

Human Health

To evaluate the endangerment, if any, that is created (currently or in the future) by the site, risk estimates (hazard and carcinogenic) were developed for the following human exposure scenarios:

- dermal contact during bathing with site groundwater by future hypothetical on-site residents;
- ingestion of site groundwater by future hypothetical on-site residents;
- ingestion of fish caught in Seaman Estate Pond by local residents;
- inhalation of volatile contaminants from Area A and on-site subsurface soils by local residents;
- dermal contact with site-impacted sediments at Seaman Estate Pond, Area A, and Area B by local residents;
- inadvertent ingestion of Seaman Estate Pond water by local residents during swimming; and
- dermal contact with Seaman Estate Pond water by local residents during swimming.

In the risk characterization for the scenarios listed above, the risks of exposure to chemicals resulting in carcinogenic (nonthreshold) and noncarcinogenic (threshold) effects were assessed separately. The carcinogenic risk values for dermal exposure to site groundwater by future hypothetical residents exceeded 10^{-2}. According to the USEPA guidance, carcinogenic risks above this level are nonlinear with respect to dose (USEPA, 1989). The guidance recommends that an alternate risk calculation be used in these circumstances. Table 8 is a list of the original and adjusted risk values for this pathway. The cancer risk level and total hazard index estimates calculated from these values for each pathway are presented in Table 9. A qualitative evaluation of the risks associated with the inhalation of volatile contaminants from Area A and on-site subsurface soils can be found in Appendix E of the RA/FA Update.

Future Hypothetical On-Site Residents

Incremental cancer risk levels (CRLs) for ingestion of site-impacted groundwater by future hypothetical on-site residents range from 1.23×10^{-2} for the Upper Bound Exposure (UBE) for adults using the one-to-one potency method to 9.01×10^{-4} for Average Exposure (AE) to children using the relative potency method. All of the carcinogenic risk estimates for this pathway exceed the USEPA's range of acceptable risk, which is defined as 10^{-6} to 10^{-4} (USEPA, 1990).

The total hazard index for the groundwater ingestion scenario is calculated to be 17.2 for children and 17.3 for adults under AE conditions, which indicates that noncarcinogenic health effects may result from chronic ingestion of site-groundwater by future hypothetical on-site residents.

The carcinogenic risks associated with dermal exposures during bathing represent the greatest potential risk to future hypothetical on-site residents. The carcinogenic risk estimates range from 9.53×10^{-1} for adults using the one-to-one potency approach under UBE conditions to 5.01×10^{-2} for adults under AE conditions using the relative potency approach. As with the groundwater ingestion scenario, all of the carcinogenic risk estimates exceed USEPA's range of acceptable risk. The total hazard index for dermal contact with site groundwater is calculated to be 39.4 for children and 25.8 for adults under AE conditions, which indicates that noncarcinogenic health effects may result from chronic dermal exposure to site groundwater by future hypothetical on-site residents.

Seaman Estate Residents

The carcinogenic risks to Seaman Estate residents who may inadvertently ingest surface water in Seaman Estate Pond during swimming ranged from 3.55×10^{-8} for adults under UBE conditions using the one-to-one potency approach to 1.95×10^{-10} for adults under AE conditions using the relative potency approach. All of the carcinogenic risk estimates for this pathway are less than USEPA's point of departure risk level of 10^{-6}. The hazard indexes for this pathway are all well below unity (one), which indicated that noncarcinogenic health effects are not anticipated.

The carcinogenic risks to Seaman Estate residents through dermal contact with surface water in Seaman Estate Pond during swimming ranged from 4.29×10^{-4} for adults under UBE conditions using the one-to-one potency approach to 2.36×10^{-6} for adults under AE conditions using the relative potency approach. All of the carcinogenic risk estimates for this pathway except for the UBE and Reasonable Maximum Exposure (RME) estimates for adults and RME conditions for children using the one-to-one potency approach are within USEPA's acceptable risk range. The hazard indexes for this pathway are all below unity, which indicates that noncarcinogenic health effects are not anticipated.

The carcinogenic risks to Seaman Estate residents who may ingest contaminated fish caught in Seaman Estate Pond range from 2.72×10^{-5} for adults under UBE conditions using the one-to-one potency approach to 2.16×10^{-8} for adults under AE conditions using the relative potency approach. All of the carcinogenic risk estimates for this pathway are either within USEPA's acceptable risk range or less than USEPA's point of departure risk level of 10^{-6}. The hazard indexes for this pathway are all below unity, which indicates that noncarcinogenic health effects are not anticipated.

Additional calculations were performed using the fish tissue results to provide more information pertaining to the potential carcinogenic risks to Seaman Estate residents from the ingestion of contaminated fish caught in the Seaman Estate Pond. The results of the Seaman Estate Pond Study indicate that the contaminant levels detected varied considerably by species. The highest contaminant concentration (1.0 mg/kg acenaphthene) was found in a channel catfish sample. The highest carcinogenic PAH concentration detected in any fish tissue sample was 0.009 mg/kg of benzo(a)anthracene, also in a channel catfish sample. In contrast, none of the PAHs analyzed for were detected at quantifiable levels in largemouth bass tissue samples during the 1990 investigation.

Therefore, to provide more information regarding the relative risk associated with the ingestion of individual species, carcinogenic risk estimates were calculated using the total concentration of the two carcinogenic PAHs, [benzo(a)anthracene and chrysene] for each species. These calculations are based on the assumption all of the fish from the Seaman Estate Pond consumed by an individual are the same species (for example, catfish).

The calculations used for this review are presented in Appendix E of the RA/FS Update. Both average and reasonable maximum exposure conditions were considered. The one-to-one potency approach was used in the calculations for conservatism. The results of this review are summarized below.

	Carcinogenic Risk	
Species	Average Exposure Conditions	Reasonable Maximum Exposure Conditions
Bluegill	7.56×10^{-7}	1.37×10^{-5}
Largemouth Bass	4.20×10^{-8}	7.60×10^{-7}
Channel Catfish	9.24×10^{-7}	1.67×10^{-5}

As suspected, the highest estimated carcinogenic risk is associated with the ingestion of channel catfish caught in Seaman Estate Pond, followed by bluegill, then largemouth bass.

Another series of calculations was performed to calculate the concentration of carcinogenic PAHs that corresponds to a carcinogenic risk estimate of 1.0×10^{-5}. The calculations used for this analysis are presented in Appendix E of the RA/FS Update. The exposure assumptions used for this analysis are presented in the RA/FS Update for fish ingestion. The concentrations used in the calculations were the sum of all the carcinogenic PAHs. The PAH concentration calculated under average exposure conditions that corresponds to a carcinogenic risk of 1.0×10^{-5} is 0.119 mg/kg. The PAH concentration calculated under reasonable maximum exposure conditions that corresponds to a carcinogenic risk of 1.0×10^{-5} is 6.60×10^{-3} mg/kg.

Local Residents

The exposure pathways considered for this potential receptor group involved dermal contact with sediments at Seaman Estate Pond, Area A, and Area B. In addition, a qualitative evaluation of the potential impact associated with the inhalation of VOCs from the subsurface soil in the excavated portions of the site and Area A was also performed. All of the carcinogenic risk estimates, for the pathways that involve dermal contact with sediments, are less than USEPA's target risk range of 10^{-6} to 10^{-4}. None of the carcinogenic risk estimates for this pathway exceed USEPA's point of departure risk level of 10^{-6} under AE conditions. Seven of the 30 carcinogenic risk values calculated for this pathway are within the same order of magnitude as USEPA's point of departure risk level. However, it should be noted that these slightly higher risk estimates are calculated using the overly conservative one-to-one potency approach. The hazard indexes for the dermal contact pathway are all below unity, which indicates that noncarcinogenic health effects are not anticipated. The results of the qualitative evaluation of the potential risks associated with the inhalation of VOCs from the subsurface soils, described in Appendix E of the RA/FS Update, indicate that adverse health effects are not anticipated.

Environmental

The National Wetlands Inventory map (produced jointly by the Illinois Department of Conservation and the U.S. Fish and Wildlife Service) classifies the majority of Area B as a palustrine forested wetland. This wetlands classification is characterized by deciduous trees that experience brief periods of flooding during the growing season according to the publication, A Field Guide to the Wetlands of Illinois (Willman and Frye, 1979). This particular wetlands classification is not unique in Illinois. A letter to the Rock Island U.S. Army Engineer District from the U.S. Department of the Interior (USDOI, 1989) states that, of the 5,000 acres of wetlands in the Sangamon River Basin, 4,900 acres have been classified as palustrine forested .

Only two federally listed endangered species have been historically listed in Christian County: the Indiana bat and the bald eagle. There is no critical habitat for either species in Christian County (USDOI, 1989). Of the four state endangered species listed for Christian County, two are not native to wetlands and include buffalo clover and the upland sandpiper. The remaining species on the state list are American ginseng, typically found in cool, moist woodlands, and heart-leaved plantain. Both species are extremely rare and are reportedly not found in the Area B wetlands.

The most plausible potential risk to environmental receptors are the aquatic species in the South Fork and Seaman Estate Pond. PAH contamination was detected in the fish tissue of largemouth bass, bluegill, and channel catfish caught in Seaman Estate Pond. Even though the potential risks associated with the ingestion of fish by local residents was found to be within acceptable limits, the potential adverse impacts of the contamination on aquatic species in the pond cannot be dismissed.

The only direct comparison that can be made between monitoring results and environmental criteria indicates that the concentrations of contamination detected in the surface water are well below applicable AWQC concentrations for the protection of aquatic life. For example, the highest concentration of acenaphthene detected in Seaman Estate Pond was 0.000553 mg/L while the AWQC for fresh water chronic effects is 0.52 mg/L. Likewise, the maximum level of naphthalene detected in the pond was 0.000132 mg/L, while the AWQC for naphthalene is 0.62 mg/L. However, bottom-dwelling species, such as channel catfish, may be more susceptible to contaminants that tend to bind to sediments, such as PAHs. The analysis of the fish tissue samples tends to support this view. The highest contaminant concentrations were found in the channel catfish tissue samples.

A review of information obtained from the U.S. Department of Interior (USDOI, 1989) does not provide an indication that sensitive environmental habitats or endangered species are being threatened by site-related contamination.

Sources of Uncertainty

The procedures used to assess potential human health risks are subject to a number of uncertainties. There are four sources of uncertainty in this RA:

- selection of chemicals of interest;
- estimation of exposure-point concentrations;
- exposure parameters used to characterize frequency, duration, and mode of exposure; and
- toxicological data.

Selection of a subset of all the chemicals detected for quantitative analysis in the RA is a potential source of uncertainty in the final risk estimates. Although use of a subset of chemicals for detailed evaluation may result in an under-estimation of risk, it is anticipated that this underestimation is small.

The models employed in this RA are conservative in approach, meaning that they tend to overestimate the exposure-point concentrations. Because these models are simplified representations of complex phenomena, it is not possible to provide an absolute description of model conservatism. As reasonably conservative assumptions are employed in the modeling, the bias would be in the direction of overestimating exposure-point concentrations, and consequently the associated risks.

There are inherent uncertainties in determining the exposure parameters that are combined with toxicological information to assess risks. Assumptions regarding current and future land use are believed to be reasonably accurate. No significant alterations in land use are anticipated in the foreseeable future. Exposure scenarios associated with anticipated land use are based on a number of assumptions about

exposure frequency, duration, and mode. Of particular note in this assessment are assumptions about average body weight and surface area and average inhalation rate, as well as drinking water, surface water, and fish ingestion rates and absorption rates. The parameters employed may underestimate or overestimate exposure depending on the actual characteristics of the exposed populations. To mitigate this source of uncertainty , all parameter values employed are based on standard USEPA assumptions, where available, and reliable reference materials.

Toxicological data are a primary source of uncertainty in this and all RAs. For example, this uncertainty is reflected in the extrapolation from animals to humans and from high to low doses. There are also considerations made concerning uptake, metabolism, distribution, species and strain differences in susceptibility, and variability in the individual response to a toxic agent. In accounting for these uncertainties, RfDs and CSFs are derived by the USEPA in a conservative fashion. RfDs are based on NOAEL reduced by generally consistent application of order-of-magnitude uncertainty factors. In general, the RFD is an estimate of a daily exposure of a human population, including sensitive subgroups, that is likely to be without an appreciable risks of deleterious effects. CSFs are 95 percent upper-bound statistical estimates of carcinogenic potency. For these reasons, actual risks of health effects are not likely to be higher than these estimates indicate, but could be considerably lower.

Conclusions

Based on the information collected during the site investigations and post-removal activities, the site, in its current condition, does not present a short-term hazard to human health.

Health risks for future hypothetical on-site residents, Seaman Estate residents, and local residents that may trespass at the site are summarized in the following subsections.

Potential long-term risks can be postulated based on the current condition of the site associated with the ingestion of groundwater.

Future Hypothetical On-Site Residents

The most significant long-term risk can be postulated for this hypothetical receptor group based on the evaluation of potential exposures through ingestion and dermal contact with on-site groundwater. All the calculated carcinogenic risk values associated with exposures to on-site groundwater exceed USEPA's target risk range under all of the exposure conditions considered. Likewise, all the hazard indexes calculated for these exposure pathways exceed unity (a value of one), which indicates that noncarcinogenic effects are also possible.

Seaman Estate Residents

The pathways evaluated for this receptor group involved potential recreational exposures to Seaman Estate Pond that included: inadvertent ingestion/dermal contact during swimming and ingestion of contaminated fish.

None of the calculated hazard indexes exceed unity for this receptor group, which indicates that noncarcinogenic effects are unlikely. All of the calculated carcinogenic risk values for the inadvertent ingestion exposure pathway were less than USEPA's point of departure risk level. However, the carcinogenic risks through dermal contact with the surface water during swimming slightly exceed USEPA's target risk range under RME conditions for children and UBE/RME conditions for adults. The potential carcinogenic risk to children was calculated by assuming that a child could swim in the pond 53 times per year for an average of two hours per event. This risk value was calculated using the one-to-one potency approach for carcinogenic PAHs, which is widely recognized as providing overly conservative estimates. The carcinogenic risk to adults swimming in Seaman Estate Pond was calculated based on an individual swimming 47 times per year for 32 years under RME conditions, and 52 years under UBE conditions. The carcinogenic risks calculated for the ingestion of contaminated fish caught in Seaman Estate Pond were less than USEPA's point of departure risk level under all exposure conditions when the relative potency approach was used. The three carcinogenic risk values that exceeded the USEPA's point of departure risk level were still within USEPA's target risk range.

Local Residents Who May Trespass on the Site

The potential exposure evaluated for local residents who may trespass on the site included dermal contact with the sediments at Seaman Estate Pond, Area A, and Area B. None of the calculated hazard indexes exceed unity for this receptor group, which indicates that noncarcinogenic effects are not likely.

All of the carcinogenic risk estimates, for the pathways that involved dermal contact with sediments, were less than USEPA's target risk range. None of the carcinogenic risk estimates for this pathway exceeded USEPA's point of departure risk level under AE conditions. Seven of the 30 carcinogenic risk values calculated for this pathway were within the same order of magnitude as USEPA's point of departure risk level. However, it should be noted that these slightly higher risk estimates were calculated using the overly conservative one-to-one potency approach.

VII. Description of Alternatives

As discussed earlier in this decision summary, the PRP's have completed several phased studies on the CIPS/Taylorville site under the direction of IEPA to assess the nature and extent of contamination present. The results of initial investigative efforts can be found in the: Phase I Site Investigation Report, Gas Plant Site, Taylorville, Illinois (Hanson, March, 1986) and the Phase II Site Investigation and Remedial Alternative Development Report, CIPS Gas Plant Site, Taylorville, Illinois (Hanson, December, 1986). These documents reflect site conditions prior to the implementation of the "source control" operable unit discussed in detail later in this Section. Additional groundwater, surface water, sediment and fish data have been collected since 1987 to assess remaining risks posed by the site. These data have been incorporated into the technical document driving the remedy selection

process; that being the Risk Assessment and Feasibility Study Update, Addendum 5 to the Phase II Site Investigation and Remedial Alternatives Development Report, CIPS Gas Plant Site, Taylorville, Illinois (John Mathes and Associates, May 1991). The RA/FS Update summarizes site risks using current risk assessment guidance and then assembles, screens and evaluates remedial technologies and subsequent alternatives in accordance with Section 121 of CERCLA/SARA, the NCP (40 CFR 300.430) and USEPA Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, (October, 1988).

From the beginning of response activities on this project in 1985, the responsible party has maintained that their general remedial action objective for this site has been to minimize threats to, and provide adequate protection of, public health, welfare, and the environment.

Remedial action objectives were refined in the RA/FS to address the principal remaining threat at the site posed by groundwater contamination. The analysis concluded that, "site-related constituents contained in the groundwater should be treated to applicable ARAR's [or to-be-considered (TBC) levels where ARAR's are not available] to protect future hypothetical residential users of this groundwater. Residual subsurface site-related constituents should be prevented from migrating off-site. Access to the site and performance of intrusive work on site should be restricted."

To accomplish these objectives, the responsible party was directed by the Agency to revisit the nine remedial alternatives evaluated in the Phase II report. The three alternatives listed below emerged from this focussed re-analysis:

Alternative 3 -- Soil/Sediment removal and institutional controls

Alternative 5 -- Soil/sediment removal, institutional controls and groundwater treatment

Alternative 10 -- No action (renamed from original alternative 1 -- baseline)

Descriptions of the components of each of these remedial alternatives follows:

Alternative 3 -- Soil/sediment removal and institutional controls

This alternative has been implemented by the responsible party as an immediate response action, or operable unit, to limit potential exposure of the public to site contaminants and minimize the spread of groundwater contamination, as a source control measure. This work was completed by the RP's during 1987 under the technical guidance and direction of IEPA's state hazardous waste remediation unit, in response to a notice pursuant to the Illinois Environmental Protection Act.

Environmental problems were encountered on the site during the fall of 1985. The investigations referenced above were completed over the next year. Samples of contaminated soil/sludges were determined to be

characteristically non-hazardous under the Resource Conservation and Recovery Act (RCRA) criteria in effect at the time. Finally, the responsible party completed repurchasing of the site, as well as affected parcels immediately to the south, in November of 1986.

Starting in mid-January of 1987 "structures associated with the original gas plant were removed and properly disposed of off-site. These structures included the gas holder, the two separators, the septic tank, the sidewalk and the brick building (as shown in Figure 7)".

This was followed by excavation of approximately 9,000 cubic yards of visibly contaminated soil down to the seasonal groundwater table level. The average depth of excavation was ten feet and as deep as twelve feet below the original ground surface in the grossly contaminated area occupied by the gas holder and separators. The excavation zone is shown in Figure 7 along with approximate locations of post-removal grab samples. The sample results from the bottom of the excavation area are given in Table 10; followed by soil sample results from site areas outside of the limits of excavation in Table 7 which were collected in the Spring of 1991.

The main surface drainageway leading away from the site to the south was also identified as a source "hotspot" during early investigative work. Approximately 3,000 cubic yards of contaminated soil and sediment were removed from a 50 foot wide by 600 foot long drainageway section leading to the Seaman Estate Pond, known as "Area A". The Area A excavation zone is shown in Figure 8 along with approximate locations of post-removal grab samples. The sample results from the bottom of the excavated drainageway are given in Table 11.

All contaminated soils excavated from the gas plant site and the Area A drainageway were loaded in licensed trucks and transported in bulk as "special wastes" to Peoria Disposal Company Landfill, an Illinois permitted facility for disposal of Illinois Special Waste.

Following removal activities in Area A, the excavated drainageway section was backfilled with clean off-site soils, graded for proper drainage and revegetated for erosion control. On the gas plant site, chain link fencing was installed along portions of the perimeter to limit access. The main excavation area, however, remained open from March of 1987 onward while the responsible party and the state were negotiating the details of a second operable unit to address remaining environmental concerns. The decision was subsequently made to backfill this area with clean off-site soils to surrounding grade, and this work was accomplished during April/May of 1989. The entire surface of the former gas plant site was then covered with a layer of gravel and currently serves as a utility pole and equipment storage yard.

In conjunction with the removal action, several institutional controls were implemented by the responsible party to "further protect the public health and the environment until a long-term remedy can be selected and executed."

A watermain loop was constructed and connections made during September/October of 1987 to supply municipal potable water from Taylorville to potentially affected residents within approximately one-half mile of the site in the general southerly direction of groundwater flow.

In addition to the repurchasing of the gas plant site and three parcels of land immediately south to facilitate the Area A removal, two parcels from the Seaman Estate pond downstream to the Sangamon River (which have come to be known as "Area B" throughout the investigations) were bought by the responsible party to restrict development or other land uses. All of these controlled parcels were fenced with woven wire and posted with "No Trespassing" signs. The responsible party has voluntarily placed deed restrictions on the use of groundwater for consumption on the site and all of these downgradient parcels. They have also obtained agreements with the five existing property owners in the Seaman Estate development prohibiting the use of groundwater for consumption and have properly plugged and abandoned resident's private wells if they so desired when connections were made to the public water supply. The scope of these institutional controls is graphically depicted in Figure 5.

Finally, to assess the protectiveness of Alternative 3 and provide additional data for the design of a final remedy, the responsible party has implemented an annual monitoring program since 1989 focussing on a subset of existing groundwater wells and surface water, sediment and fish tissues from the Seaman Estate pond.

The capital costs for construction of the remedial elements described under Alternative 3, as well as the engineering design and oversight costs and institutional control transaction and legal costs have been reported to total $3,404,071. The annual operation, maintenance and monitoring costs for Alternative 3 are reported to be $67,200. The total present worth costs for this alternative over the chosen common life of the project, in this case 30 years at a discount rate of ten percent, is $4,037,560.

With all this said and done, guidance requires an analysis of the major applicable or relevant and appropriate requirements (ARAR's), risk-based levels, and other "to-be-considered" (TBC) factors being met/utilized for the specific components of this remedial alternative.

The Resource Conservation and Recovery Act (RCRA) and its amendments normally provide a complex set of action-specific requirements for consideration within Superfund projects. Determinations must be made to classify various contaminated media as "listed" or "characteristically" hazardous waste to evaluate various transport, storage, treatment and/or disposal requirements and their applicability or relevance.

For this particular case, the range of RCRA requirements is narrowed because of completion of the source removal activities as part of the operable unit. Significantly contaminated sludges, soils and sediment have been excavated and properly tested, shipped and disposed of in a permitted off-site landfill in accordance with the regulations and

remedial philosophies in place at the time of the removal in 1987. The excavated area within the former coal gas plant site was backfilled with a minimum of ten feet of clean off-site fill and surfaced with gravel. Post-operable unit soil sampling in on-site areas where excavation did not take place indicated that volatile contamination is not present above detection limits in the unsaturated zone above the groundwater table. Residual contamination below the groundwater table is the subject of the groundwater remedy proposed in Alternative 5; RCRA action-specific ARAR's for groundwater are appropriately left for discussion within the description of that alternative.

Since residual contamination remains in the saturated zone are above the state's drinking water standards, the facility has not been clean closed according to RCRA regulations 35 IAC: Subtitle G, Section 724. Post-closure care and monitoring of this unit will therefore be required.

Analyses have not been performed to determine if solid waste residual materials would qualify as RCRA characteristically hazardous waste under the toxicity characteristics leaching procedure (TCLP) currently in use. Testing of highly contaminated coal tar sludges during 1987 using the extraction procedure (EP) toxicity test required at that time indicated the material was not hazardous by characteristic. Regardless, the responsible party has acknowledged the same position the Agency holds on this matter in their RA/FS update. That is, that RCRA closure, post-closure care and monitoring requirements are certainly relevant to the constituents remaining in site soils (and groundwater) in the saturated zone.

In focusing on the appropriateness of these requirements, consensus has been reached by both the Agency and the responsible party that substantive post-closure care and monitoring requirements would be fully considered/attained if Alternative 3 (or for that matter Alternative 5) were to become the final remedy for the site.

However, closure "cover" requirements have been determined to be technically inappropriate for this site given the current environmental conditions and the disposition of remaining contamination. "Capping" in the context of a RCRA cover meeting minimum technology requirements, is normally utilized to contain source material in cells, limiting its impact on groundwater and also serving to prevent direct contact with wastes on the surface. At this site the source material has already been removed and replaced by clean fill, thereby eliminating the necessity for a low permeable cover. In fact, given the groundwater remedial action proposed in Alternative 5, a low permeable cover over the site would inhibit the progress of a pump and treat system by minimizing rainfall/run on percolation through residual subsurface material directly below the former "unit". For these reasons closure cover requirements are deemed relevant but inappropriate for this site.

It is at this point in the discussion that it becomes apparent in the Agency's opinion that further remedial work is necessary beyond what was accomplished under the "source control" operable unit, to address the remaining principal threat from this site posed by existing groundwater contamination. It is therefore important to discuss Alternative 3 in relation to various environmental requirements associated with the groundwater impacted by the site.

This boils down to an evaluation of the chemical-specific ARAR's for the site, as well as consideration of aquifer protection and restoration goals associated with the Illinois Groundwater Protection Act and the USEPA Groundwater Protection Strategy and guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (USEPA, 1988).

The ARAR's associated with the groundwater medium are outlined within the description of Alternative 5. Compliance with ARAR's as discussed in the summary of the comparative analysis of alternatives section is a threshold criterion which must be met (or waivers invoked) for an alternative to be considered for selection as a final remedy. In this case, a suite of chemicals have consistently been detected in the groundwater above chemical-specific ARAR and to-be-considered (TBC) concentrations. In the Agency's opinion, this warrants attention in the form of a groundwater remedial component to address this potential human health/environmental threat. This becomes the central focus of Alternative 5 discussed next in this section.

Finally, it should be noted for the record that no location-specific ARAR's or TBC's were identified for the site or for the actions taken in Alternative 3 (or those proposed next under Alternative 5).

Alternative 5 -- Soil/Sediment Removal, Institutional Controls and Groundwater Treatment

This alternative supplements operable unit source control work already taken to form a final remedy for this site by addressing the remaining principal threat posed by groundwater contamination. Alternative 5 includes all actions implemented under Alternative 3 plus the collection, on-site treatment and local discharge of groundwater contaminated by the site above clean-up objectives. Additional institutional controls include complete fencing of the collection/storage/treatment facility and the former gas plant site in general; and acknowledgement on the former gas plant site deed of the site listing on the NPL and details of the on-going environmental remediation work.

Preliminary design work on the groundwater extraction and treatment system has been completed by the responsible party; detailed information can be found in the Work Plan to Provide a Groundwater Pump and Treat System CIPS-Gas Plant Site Taylorville, Illinois (Hanson, June, 1989) and Groundwater Pump and Treat System Basis of Design Report Volumes I and II (Hanson, November, 1989). As stated in the later reference, "The primary objectives of the groundwater pump and treat system are to prevent contaminants at the site from migrating off-site; to remove contaminants from the site groundwater such that it is suitable for discharge to public surface waters; and to eventually cleanse the aquifer such that the site no longer presents a threat to public health."

The basic components of this "groundwater operable unit" have been conceptually designed using available data as presented below. It must be noted that system specifics may change, as detailed engineering work and supplemental hydrogeological and plume definition work are completed, to efficiently achieve the stated system objectives.

The aquifer impacted by the site is considered Class I, Potable Resource Groundwater, as defined by the Illinois Groundwater Protection Act. To prevent contaminant plume migration to potential users during the groundwater long-term remedial action (LTRA), the groundwater table will be locally depressed by withdrawing between 200 gallons per minute (GPM) and 500 GPM of contaminated water from a twelve inch diameter extraction well located near the former tar holder in the center of the site. This extraction well would be screened the full depth of the aquifer, from approximately 15 feet below the surface (5 foot above the water table) to bedrock at 90 feet. It is anticipated that a similarly constructed backup well would be located approximately 50 feet west of the primary well to allow for alternating extraction cycles. The exact configuration of the pumping system will be refined, based on plume data collected during the design, to hydraulically capture contaminated groundwater from the site.

Preliminary treatability studies were performed in 1989 to identify technologies to effectively treat the primary contaminants of concern: volatiles (benzene, toluene, ethylbenzene and xylene (BTEX) were focussed on) semi-volatiles (polynuclear aromatic hydrocarbons (PNA's) were focussed on) and various inorganics (such as iron). System influent concentrations were based on actual worst-case contaminants levels found in groundwater monitoring wells at the time of the study. It was determined that adequate removal of the contaminants of concern could be achieved with activated carbon in a single (approximately 10 foot diameter) liquid phase carbon adsorption column. It is anticipated that influent groundwater will require pH adjustment downward prior to carbon treatment to remove solids and prevent scaling of process equipment and "fouling" of the carbon bed in the treatment column. The carbon adsorption column will be backwashed periodically to remove those solids that accumulate on top of the carbon bed. Solids resulting from this process will be periodically removed, tested and disposed of properly in a permitted landfill. Analytical work will be completed on these solids to determine their characteristics for manifesting and disposal purposes. The type of landfill will be determined by the analytical data required prior to disposal of the pollution control equipment. Failure to pass Method 1311 of SW-846 third edition for TCLP organics and metals will require all materials being disposed of to be taken to a hazardous waste landfill. All others will go to a special waste landfill. The preliminary treatability studies indicate the initial carbon supply schedule will be every two months. Actual carbon usage will be confirmed through the effluent monitoring program discussed below. The treatment system will be shut down for changeout of used to regenerated carbon via a tank truck pumping system. Contaminated carbon will be properly transported to a licensed treatment facility where the material will be recycled and adsorbed contaminants will be permanently and irreversibly destroyed through thermal treatment.

This pump and treat system will be designed for continuous (24 hr./day; seven days a week) operation. Automatic telephone dialing alarm systems will monitor significant operational parameters which will be recorded. It is anticipated that an attendant will visit the facility daily to make operational adjustments, maintain equipment and perform routine monitoring/testing and reporting as required.

Preliminary designs anticipate that treated groundwater will be discharged by gravity in a controlled manner to the stream section below the Seaman Estate Pond dam via a buried eight-inch PVC line which will be approximately 1,200 feet long. Erosion control measures will be implemented to ensure this surface water discharge does not significantly erode the stream section as it makes its way to the South Fork of the Sangamon River. Schematic diagrams of the preliminary extraction well locations, extraction well design and pump and treat process are attached as Figures 9, 10, and 11, respectively. Groundwater modeling and the system's design indicate that the remedial action process should not have any impact on the level of water in the downgradient Seaman Estate pond. However, CIPS and the Agency have assured the pond's owners and users that, if an unexpected reduction in the pond's level were to occur due to the remedial activity, necessary steps would be taken to restore the pond's level.

The components of the groundwater pump and treat system have been effectively used to remove contaminants reported in site groundwater at other hazardous waste and industrial sites. Equipment to be utilized is common to those applications; and the extraction wells, treatment system and discharge line can be constructed concurrently if so desired using standard construction methods. No long lead times will be required for procurement or fabrication of the treatment system components. Therefore, it is estimated that following approval of the remedial design package, this alternative could be bid within two months and be constructed and "on-line" within a subsequent 10 to 12 month period. Operation and monitoring of the system is discussed later in this section as the groundwater clean-up objectives are described.

The capital costs for construction of the components of Alternative 5, which essentially adds a groundwater remedial program to source control work already accomplished under Alternative 3, is estimated as $5,562,071. This figure also includes engineering design and construction oversight costs and institutional control transaction and legal costs. The estimated annual operation, maintenance and monitoring costs for the groundwater pump and treat system is $401,400. The total present worth cost for comparison purposes, using the chosen 30 year project life at a discount rate of ten percent, is $9,346,034. As discussed next in this section, actual operation, maintenance and long-term remedial action (LTRA) and post-LTRA monitoring will be revisited regularly and adjusted based on the actual field performance of the groundwater remedy.

The following discussion of major ARAR's, risk-based levels and TBC factors associated with Alternative 5 will serve to tie together the components of the groundwater remedy as proposed and the regulatory requirements surrounding its implementation and performance.

The aquifer which has been impacted by contaminants from the former gas plant site is a potential drinking water resource. Steps were taken during the implementation of the operable unit by the responsible party to protect public health and minimize further degradation of this aquifer. The Agency has maintained the position throughout this project

that, with the given site conditions, it is both feasible and beneficial to restore this groundwater resource to acceptable health based contaminant levels.

The new changes to the IEPA groundwater regulations have been included in the ROD since these regulations are an ARAR for this site. These requirements are listed in Table 12. Surface water discharge levels have also been revisited in light of current National Pollutant Discharge Elimination System (NPDES) program requirements and are set as given in Table 13. It is appropriate to note here that remediation goals will be regularly revisited as part of the Superfund five-year review process to ensure they remain protective to human health and the environment.

In addition to chemical-specific requirements, the Resource Conservation and Recovery Act (RCRA) program has substantive requirements for design, operation, maintenance and monitoring of remedial components involving RCRA "hazardous wastes". In September of 1990, new regulations were adopted to determine if a waste is "characteristically" RCRA hazardous using the toxicity characteristics leaching procedure or TCLP. Testing on representative site groundwater has not been completed to date to determine if it should be classified as "TCLP hazardous". This analysis would be performed during the remedial design phase. It is the Agency's position that substantive RCRA action-specific requirements will be incorporated into the design, operation, maintenance and monitoring of the remedial action if the groundwater is found to be characteristically hazardous. This includes compliance with all handling, transportation and regeneration or disposal requirements associated with the used carbon and solids from the treatment process.

Whether or not contaminated groundwater is determined to be characteristically hazardous, RCRA design, post-closure care and groundwater monitoring requirements are certainly relevant. Appropriate 40 CFR 264 and/or 35 IAC Subtitle G requirements will be incorporated into the remedial design operation and maintenance (O&M) documents to assess the effectiveness of contaminant plume capture, compliance with the treatment/discharge objectives and progress being achieved toward aquifer restoration.

For sites such as this where remedial actions are being undertaken in cooperation with the Agency, the Illinois Groundwater Protection Act requires the establishment of a groundwater management zone (GMZ). It is anticipated that the GMZ would formally be defined as supplemental plume analyses are completed during the remedial design phase. It would initially encompass the area impacted by groundwater contamination above remediation goals. The groundwater remedial goal is to actively restore quality within that zone for groundwaters downgradient of the "point of compliance". The point of compliance is defined in 35 IAC Subtitle G 724.195 as the vertical physical boundary of the waste management unit/area. In this case, given the small size of the former gas plant site and close proximity of the system of waste disposal tar holders, tanks and piping network, the downgradient point of compliance can effectively be established as the southern perimeter of this waste management area. Although not specifically developed within the RA/FS

Update, a nested network of existing (as appropriate) and new stainless steel groundwater monitoring wells will be designed and constructed as necessary during the remedial design phase to assess the quality of background water, groundwater passing the unit's "point of compliance" and groundwater within and at the perimeter of the management zone. The design, construction and sampling and analysis program for this long-term monitoring effort will be consistent with CERCLA, RCRA and IGPA requirements. The remediation levels are required to be obtained throughout the affected area since the source material has been removed, as required by 40 CFR 300. Defining the boundaries of the plume will be established from the remediation design.

Additionally, the Agency will require a representative groundwater solute and transport computer model, based on current site conditions, to be developed during the remedial design. This has not been completed to date. However, once in place it will allow for analyses of the effectiveness of the pump and treat system over time, based on comparisons of modeling to actual performance. Given the part per billion clean-up objectives for PAH's, which are as a class difficult to remove from saturated soils within the aquifer of concern (rendering them less mobile than volatile contaminants); the groundwater restoration time could span several decades. The computer modeling of this dynamic situation and evaluation within the five-year mandatory review increments will provide opportunities to modify the system to restore groundwater quality in a "reasonable timeframe" as USEPA Groundwater Protection Strategy guidance suggests. Once groundwater cleanup objectives have been reached within the management zone, and statistically confirmed over a defined period, the pump and treat system will be allowed to be shut down. It is the Agency's position that an appropriate post-LTRA groundwater monitoring program will continue for a period yet to be determined, to insure that restoration is complete before a proposal to delist the site from the NPL is supported. That "post-closure" monitoring program could be shortened in conjunction with a site-wide boring plan to confirm that no residuals remain on-site above water quality contaminant levels.

Alternative 10 -- No Action

The no action alternative is required by feasibility study guidance as a baseline against which to compare "action" alternatives. Within the RA/FS Update, Alternative 10 assumes site conditions to be those prior to operable unit work in 1987 to allow for comparative analysis of Alternative 3. That is, conditions were deemed to be similar to those when environmental problems were discovered in 1985. Near surface soils/sediments were highly contaminated with volatiles and PAH compounds posing potential direct contact and inhalation threats and, most significantly, a continuous source for groundwater contamination which, if unremedied, posed a threat through ingestion/inhalation.

However, the responsible party chose to include the current, ongoing groundwater and Seaman Estate Pond annual monitoring program within the "no action" alternative outlined in the FS.

Therefore, with the groundwater monitoring wells being used (four on-site and six off-site) already in-place, there are no estimated capital construction costs for this alternative. However, there are lump sum engineering and legal fees specified, presumably for plan implementation and and/liability assessment purposes, which total $230,630. The estimated annual monitoring cost is $67,200. The total present worth cost, using the 30 year project life at a discount rate of ten percent, becomes $864,119.

VIII. Summary of the Comparative Analysis of Alternatives

The Illinois Environmental Protection Agency's state superfund program has fully utilized its technical oversight authorities under a voluntary agreement with the responsible party to develop and implement the operable unit, Alternative 3. Furthermore, IEPA, as the designated "lead" Agency for the CIPS/Taylorville site after listing on the NPL, has overseen the refinement of the Risk Assessment and Feasibility Study Update to comply with CERCLA/SARA, the NCP and associated guidance. The Agency has therefore been directly involved in the formulation and streamlining of remedial alternatives for this site and has formally solicited input from the community on completed studies through the mandated public comment process.

The NCP currently requires that alternatives be evaluated and compared in relation to the established "nine criteria". These criteria are commonly categorized in three groups which are briefly referenced below:

The two threshold criteria must be satisfied for an alternative to be eligible for selection. These are:

-- Overall protection of human health and the environment
-- Compliance with applicable or relevant and appropriate requirements (ARAR's) (unless a specific ARAR is waived)

The five primary balancing criteria are used to weigh major tradeoffs among alternatives. These are:

-- Long term effectiveness and permanence
-- Reduction of toxicity, mobility or volume through treatment
-- Short-term effectiveness
-- Implementability
-- Cost

The two modifying criteria are solicited through the public comment/ROD process. These are:

-- Government (support agency) acceptance
-- Community acceptance

Detailed information on the nine criteria and the alternative evaluation process can be found in Section 300.430 of the NCP (March 8, 1990) and the USEPA Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, (October, 1988).

What follows is a summary of the comparison of Alternative 3, Alternative 5 and the No Action Alternative (10), developed for the CIPS/Taylorville site, in terms of the nine criteria.

By design, the development of remedial alternatives and this ensuing evaluation has been greatly simplified by the completion of operable unit work, addressing the source component for this site. The responsible party, under the direction of the Agency, has systematically studied and addressed potential human health and environmental problems for the CIPS/Taylorville site as they have been identified. The responsible party had early on expressed the opinion that Alternative 3, as implemented, was protective of human health and the environment. The Agency has, since site discovery and initial investigation, maintained that a groundwater remedial component would be necessary to ensure continued protection of human health, as well as to restore and preserve the local groundwater resource. The summary of the Superfund evaluation process utilizing the nine criteria clearly confirms the necessity of an additional groundwater response action to address remaining risks associated with this site.

Threshold Criteria

Upon examination of the limited alternatives under consideration it becomes apparent that Alternative 5 -- Soil/sediment removal, institutional controls and groundwater treatment is the only one which offers short and long-term protection of human health and the environment through an active containment and treatment program to permanently eliminate unacceptable risks posed by contaminated groundwater. The groundwater remedial component proposed in Alternative 5 would be operated using the present cleanup objectives listed in Table 12. Similarly, all action-specific requirements associated with the design, operation, maintenance and monitoring of the proposed groundwater remedy would be met under the direction of the Agency.

In contrast, Alternative 3 -- Soil/sediment removal and institutional controls, and likewise Alternative 10 -- No action, do not propose to aggressively treat risks associated with groundwater contamination from the site. Protection from potential human exposure rests solely on the voluntary compliance with land use and deed restrictions set up as institutional controls. The present levels of contaminants in groundwater are above regulatory and risk based chemical-specific ARAR's and TBC's established by the Agency for this site. Through risk analysis it has been shown that any future users of site groundwater, and possibly those downgradient of the site, would not be adequately protected in the absence of a groundwater remedy. Instead of an active groundwater component, Alternative 3 (and Alternative 10) would rely on the natural processes of contaminant dilution, attenuation and biodegradation over time to achieve some unknown degree of aquifer restoration. For these reasons the Agency believes Alternative 3 and Alternative 10 do not meet either of the required threshold criteria for serious consideration as a final remedy for the CIPS/Taylorville site.

Primary Balancing Criteria

The primary balancing criteria are normally utilized to draw out the strengths and weaknesses of remedial alternatives that meet the threshold criteria to allow the decision-maker to identify the alternative that provides the best balance of tradeoffs among them. For this focussed effort only three alternatives have been carried through the evaluation process and it has been shown that only Alternative 5 complies with the threshold criteria. However, in order to emphasize the appropriateness of Alternative 5, it will be compared here to Alternative 3 on a criterion by criterion basis.

Long-Term Effectiveness and Permanence

Actions were taken under the operable unit, Alternative 3, to eliminate the potential for direct contact, inhalation and ingestion risks associated with grossly contaminated source material. However, Alternative 3 stopped short of effectively seeking to eliminate or minimize risks associated with current or future use of contaminated groundwater. The groundwater component added to Alternative 5 would be designed to first, arrest the contaminant plume, and then remove contaminants over time through a treatment process until remediation goals are met and confirmed. The proposed pump and treat system therefore affords reliable protection of human health and the environment with proper operation, maintenance and monitoring. It offers a sense of permanence, in effect, by operating until aquifer restoration or "clean closure" is achieved and the site requires no further special attention.

Reduction of Toxicity, Mobility or Volume Through Treatment

Through implementation of Alternative 3, the statement can be made that the volume of the site's overall contaminant mass was significantly reduced, which in turn reduces potential contaminant mobility, through the removal action and subsequent placement of source material in a secure landfill. This accomplishment can be viewed as an integral component in mitigating environmental concerns at this site, though these reductions were not treatment oriented (which was not a high program priority at the time) and residual source/groundwater contamination was not addressed.

The groundwater pump and treat system proposed in Alternative 5 then becomes the missing element in the remedial program for this site to actively reduce both contaminant mobility and volume through the plume capture, extraction and treatment/removal processes. Contaminant volume and toxicity are permanently and irreversibly eliminated in the incineration process used to regenerate the used granular activated carbon materials.

Short-Term Effectiveness

Source removal activities were completed by the responsible party in accordance with approved workplans and under the direct supervision of the Agency. It is anticipated that any future construction, operation,

maintenance and monitoring work such as that proposed in Alternative 5 would be performed through an enforcement agreement. This includes compliance with health and safety and contingency measures designed to ensure pubic and worker protection during and after remedial construction.

The actual installation of the groundwater extraction system is relatively nonintrusive activity, which should take less than a month to complete. Because of concerns expressed by one of the nearby neighbors to the north of the site, who was particularly sensitive to the odors emanating from the site during the excavation, CIPS has expressed a willingness to relocate the neighbors in the four homes immediately north of the site during the installation of the pumping wells, if they so wish. Installation of the pumping system, treatment facility and discharge lines will take several months, but will not disturb site residuals until process startup. Air and water quality monitoring and contingency measures will be included in the operation and maintenance plan to insure there continue to be no adverse impacts on human health and the environment during the extended long-term remedial action period until remediation goals are attained and confirmed and the system is shutdown and decomissioned.

Implementability

The equipment proposed for the groundwater pump and treat system in Alternative 5 is common to the environmental industry. Site-specific application will require only proper design, procurement, fabrication and then construction of the customized facility. Construction techniques employed will involve standard civil/geotechnical and mechanical methods with attention to normal operating procedures for hazardous waste sites. The exchange, transport and regeneration of carbon materials will be performed respectively by a permitted waste hauler and treatment facility.

Cost

The construction costs of Alternative 3 have already been borne by the responsible party. The operation and maintenance costs for the current program are being similarly funded. The cost estimate for design and implementation of the groundwater remedy proposed in Alternative 5 has been updated to reflect 1991 prices for the fairly detailed preliminary design completed in 1989. These present worth capital costs should therefore be accurate, in contrast to the usual uncertainities associated with excavation work. The present worth cost for long-term system operation, maintenance and upgraded monitoring is an estimate because of the unknowns associated with actual site conditions and aquifer response.

Modifying Criteria

Government (Support Agency) Acceptance

USEPA Region V, as the designated support agency for this site, has been technically involved in this project since its proposal to the NPL. In

that role they initially received copies of all project documentation prior to their involvement and were given the opportunity to comment on that material. Since that time the region has been involved in the development of the RA/FS Update, the Proposed Plan and the Agency sponsored public comment period. Region V has indicated it supports Alternative 5 as a final remedy for the CIPS/Taylorville site for the same reasons as the Agency. Regional staff have expressed technical concerns about: 1) the ability of the groundwater containment system to capture shallow contamination; and 2) the ability of the groundwater treatment system to remediate cyanide as detected in some groundwater monitoring work. Commitments have been made to address both of these concerns during the remedial design phase.

Community Acceptance

As detailed elsewhere in this decision summary, the public has been given extensive opportunities to interact with the responsible party, their engineering consultants and the Agency during the development of this project. A public meeting to discuss the removal action and the findings of the RI was held in Taylorville about six months before the FS hearing. The formal hearing on the RA/FS and Proposed Plan was preceded by an availability session involving Agency staff. In general, the community, including the responsible party, was supportive of the preferred alternative (5). Several public comments that were received will allow the IEPA and CIPS to "fine-tune" the remedy, within the basic framework of Alternative 5. Community input received during the public comment period is contained in the Responsiveness Summary, which is attached to this decision summary as Appendix B.

IX. The Selected Remedy

Based on information gathered from studies, implementation of the operable unit, and the focussed comparative analysis of alternatives described in the previous section, IEPA, in consultation with USEPA Region V, has selected Alternative 5 -- Soil/Sediment removal, institutional controls and groundwater treatment -- as the appropriate final remedy for the CIPS/Taylorville Manufactured Gas Plant site. The components of this remedial action are briefly reiterated below.

The selected final remedy for this site is the same preferred alternative presented in the Proposed Plan developed and issued by the Agency. Preliminary engineering work has been completed for the groundwater component as outlined below, but it must be stressed that these system details may be altered as a result of the remedial design and field conditions encountered during construction and facility startup. It is anticipated, however, that the Agency will continue to provide direct oversight of the design, construction and long-term groundwater remedial action phases and any modifications therein.

As noted throughout this decision summary, the source remedial component of the selected remedy has already been implemented by the responsible party under the direction of IEPA. It basically 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 a drainageway serving the site; disposal of those 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 above measures effectively serve to mitigate potential human health threats from the site in the absence of a permanent remedy to address residual contamination.

Toward this goal, the selected remedy includes a groundwater component which complements and builds upon operable unit work to address the remaining principal threat posed by groundwater contamination through an active treatment program.

This groundwater component has been the focus of supplemental study since implementation of the operable unit. Preliminary engineering and treatability work indicate that the existing contaminant plume can be contained and extracted over time by one pumping well (and its backup) screened over the entire depth of the aquifer to bedrock, operating at a rate of approximately 200 gallons per minute. The main extraction well would be located at the downgradient edge of the small area of former tar holders and tanks comprising the "waste management unit", which is also the designated point of compliance for this long-term remedial action.

Conceptual designs project that contaminants of concern are best treated by pH adjustment to remove solids, followed by carbon adsorption. There will be no expected cross-media impacts associated with this closed treatment process. Treated groundwater will be piped by gravity flow and discharged in a controlled manner to the drainageway downgradient of the Seaman Estate Pond. Analyses will be completed during the remedial design to insure that there are no negative impacts on pond recharge capacity. Precipitated solids from the treatment process will be periodically removed, tested, treated if necessary and appropriately landfilled. Spent carbon will be changed out as necessary through routine operation, maintenance and monitoring of the system, and properly transported to a licensed off-site facility for regeneration through incineration.

The quantity of residuals to be removed through the groundwater treatment process has not been estimated. As further plume characterization and groundwater contaminant flow modeling are completed during the remedial design, and refined based on actual system performance, these data will be collected and continually re-evaluated. In a similar manner, the aquifer restoration timeframe, which has not been accurately estimated to date, will be modeled during the RD/RA and tracked against actual pump and treat system effectiveness. Adjustments to the groundwater remedial components can thereby be made and evaluated accordingly. The present worth costs for the design, construction and operation and maintenance of the entire selected remedy, including the

completed operable unit, are broken out in Table 14 for the estimated 30 year project lifespan.

Through risk analyses it has been shown that the dominant potential human health risk associated with this site would come from residential use of contaminated groundwater for drinking or bathing purposes. Calculated lifetime intake levels exceeded the established USEPA range of 10^{-4} to 10^{-6} excess cumulative carcinogenic risk. Calculated hazard indices also indicated the potential for noncarcinogenic health effects exists for these exposures. Lesser carcinogenic risks were calculated for dermal contact with Seaman Estate Pond water and ingestion of pond fish. However, dredging of the sediments in the pond might mobilize existing contamination by stirring up sediments in the pond and possibly allow any spring-fed sources of PAH contamination to flow freely into the pond. Therefore, the excavation and removal of the sediments would likely create greater risks than the sediments currently pose. Continued monitoring of the sediments and water quality in the pond will identify the need for any future actions.

As this project has evolved, IEPA has internally set groundwater treatment and surface water discharge objectives for this site through its COT/CPRC process. These objectives, based on a combination of ARAR's/TBC's or risk calculations to the 10^{-6} risk target level, were last revisited in July, 1992 and are referenced in Table 12. They consist of a combination of ARAR's and TBC's for contaminants of concern in a drinking water class aquifer, based on the regulatory status of each chemical-specific criterion at that time.

The NCP calls for use of MCL's and non-zero MCLG's for setting aquifer restoration objectives, except where attainment of MCL's would result in a cumulative carcinogenic risk outside of the established 10^{-4} to 10^{-6} excess risk range. This evaluation has been complicated by the recent promulgation of Illinois groundwater quality standards and criteria as part of the Illinois Groundwater Protection Act, (Part 620 of Subtitle F of Title 35 of the Illinois Administrative Code). The present list of chemical-specific ARAR's and TBC's are those that apprear in Table 12.

In a similar fashion, surface water quality objectives have been internally derived and re-evaluated based on recent regulatory changes. ARAR's and TBC's for discharge of contaminants of concern to the receiving intermittent stream have been set by the Agency in accordance with applicable objectives established from the general use water quality standards found in Subpart B of 35 IAC Subtitle C, or appropriate federal ambient water quality criteria where standards are not available. The Bureau of Water within the Agency has reviewed the site surface water objectives in light of the adoption of new Illinois water quality standards and in relation to applicable NPDES regulations. A listing of the final chemical-specific ARAR's and TBC's for surface water appears in Table 13.

In conclusion, based on the technical information currently available, the Agency believes the selected remedy -- Soil/Sediment removal,

institutional controls and groundwater treatment -- offers an environmentally sound solution to the problems posed by the CIPS/Taylorville Manufactured Gas Plant site.

X. Statutory Determinations

Protection of Human Health and the Environment

The source control component of the selected remedy has already been implemented by the responsible party. It has essentially eliminated dermal contact and inhalation risks associated with contaminated materials on the former gas plant site. The operable unit has also served to limit potential ingestion and inhalation risks associated with the groundwater medium by removing and properly disposing of highly contaminated wastes off-site; thereby drastically decreasing the contaminant mass available for continual leakage to the aquifer. In addition, short-term measures have been taken to insure protection of human health until a final remedy can be implemented for this site. These include hook-up of potentially affected residences to the public water supply and voluntary imposition of land use restrictions by the responsible party for the former plant site and downgradient properties under their control.

The groundwater component of the selected remedy will be designed and implemented following finalization of the ROD and a comprehensive enforcement agreement between the State and the responsible party. It will reduce carcinogenic risks to within the 10^{-4} to 10^{-6} range and non-carcinogenic risks to less than the established hazard index of one for contaminants of concern. This will be achieved through a long-term groundwater extraction, treatment and surface water discharge program. This will be accompanied by appropriate monitoring and contingency plans as overseen by the Agency to ensure protection of human health and the environment and restoration of the affected aquifer in a timely manner. There are no unacceptable short-term risks or cross-media impacts foreseen from construction or long-term operation of this groundwater remedy.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will meet all identified applicable or relevant and appropriate federal and state/local requirements. A summary of ARARs (and TBCs) are listed below:

Chemical-Specific (As identified elsewhere for each Water contaminant of concern for in-situ groundwater restoration and for surface water discharge following extraction and treatment)

-- SDWA National Primary Drinking Water Standards (40 CFR 141), MCLS-Applicable

-- CWA Ambient Water Quality Criteria, AWQC-Applicable (40 CFR 122) and NPDES Requirements - Applicable (40 CFR 125)

-- Illinois Environmental Protection Act (35 IAC Para. 1001 et. seq.) - General

-- Illinois Groundwater Quality Standards (35 IAC Subtitle F); Surface Water Quality Standards (35 IAC Subtitles B & C) - Applicable or relevant and appropriate on contaminant basis

Air

-- CAA National Ambient Air Quality Standards (40 CFR 50) - Applicable and National Emissions Standards for Hazardous Air Pollutants (40 CFR 61) - Applicable

Soil

Not established due to completion of source component in 1987.

Action-Specific

-- RCRA definition and identification of hazardous wastes (40 CFR 261) and (IAC, Subtitle G)

-- RCRA requirements for generators of hazardous wastes IAC; Subtitle G, Section 722

-- RCRA requirements for transporters of hazardous wastes IAC; Subtitle G, Section 723

-- RCRA requirements for owners and operators of hazardous waste treatment, storage and disposal facilities IAC; Subtitle G, Section 724 (for design, operation, maintenance and monitoring of groundwater remedy)

-- OSHA regulations for workers involved in hazardous waste operations (29 CFR 1910) and general construction regulations (29 CFR 1926)

-- Illinois requirements for NPDES discharges IAC, Subtitle B, Chapter I

-- Illinois requirements for air pollution prevention -- organic and fugitive/particulate emissions IAC Subtitle B

Location-Specific

-- None identified

To Be Considered Criteria

-- SDWA proposed maximum contaminant levels (pMCL's) and final and proposed goals (MCLG's and pMCLG's) (40 CFR 141)

-- Risk-derived levels for drinking water or discharge exposures for contaminants with no ARARs or TBCs

Cost Effectiveness

Within the normal remedy selection process, where a range of alternatives have been developed, the relative relationships between cost and effectiveness are normally explored between the selected remedy and the other alternatives. However, this site has already seen the implementation of the source control operable unit, and the actual costs and perceived benefits have been outlined in this decision summary. The groundwater component of the selected remedy has been streamlined through the preliminary design process, as performed by the responsible party and directed by this Agency. This groundwater remedy was the only one designated to accomplish the remedial objectives that have been set for this site. It is therefore implied that the monies to be spent on implementation of the groundwater remedy are considered reasonable to achieve the required restoration benefits.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The Agency believes that the selected remedy -- Soil/sediment removal, institutional controls and groundwater treatment -- meets the statutory preference to utilize permanent solutions and treatment technologies to the maximum extent practicable at the CIPS/Taylorville site. The source removal component of the remedy was implemented before this site was placed on the NPL. This removal action was carried out under state superfund authorities in 1987, with no emphasis placed on use of innovative treatment technologies or resource recovery technologies. However, the groundwater remedial component employs a treatment technology which addresses residual contamination in a permanent, cost-effective manner. Although not considered innovative, the groundwater remedy, as enhanced with institutional controls, becomes the logical solution to remaining environmental concerns, and is the only alternative focussed on that has been determined to meet threshold criteria and compare favorably when judged against each of the balancing criteria. Finally, the selected remedy appears to have been endorsed by the community and local government, USEPA Region V and the responsible party itself.

In summary, the selected remedy, by design, has been developed and refined to satisfy the statutory preferences for utilization of permanent solutions and alternative treatment technologies to the maximum extent practicable. It is simply the right solution; to permanently restore the affected aquifer to a useable resource within a reasonable timeframe.

Preference for Treatment as a Principal Element

The selected remedy includes a groundwater component that addresses the remaining principal threat posed by existing site conditions through treatment. The statutory preference for a treatment oriented solution is satisfied by the extraction of contaminated groundwater, its treatment through carbon adsorption and ultimate contaminant destruction

via the carbon regeneration/incineration process. This long-term groundwater remedial action will continue until water quality objectives are met and confirmed, completing restoration of the aquifer.

XI. Documentation of Significant Changes

The Risk Assessment/Feasibility Study Update for public comment was made available to the community by the responsible party in late June of 1991. The Proposed Plan for the CIPS/Taylorville Manufactured Gas Plant site was issued for public comment by the Agency on August 5, 1991. That Proposed Plan identified Alternative 5 -- Soil/sediment removal, institutional controls and groundwater treatment -- as the preferred alternative. The public comment period ended on September 19, 1991.

The Agency has reviewed all written and oral hearing comments submitted during the public comment period as discussed elsewhere in this decision summary and the attached responsiveness summary (Appendix B). Upon review of these comments, it was determined that no significant changes to the remedy as it was identified in the Proposed Plan were necessary.

CIPS/Taylorville Manufactured Gas Plant Site

Decision Summary

Appendix A

Tables and Figures

TABLE 1 Comparison of Concentrations (μg/kg-dry) of Detected Priority PAHs Found in Sediment Samples Collected from the Seaman Estate Pond August 1989, August 1990, and August 1991*

Parameter	Year	CS1-A	CS1-B	CS1-C	CS4-A	CS4-B	CS4-C	CS6-A	CS6-B	CS6-C
Acenaphthene†	1989	<325	<815	<795	<658	<279	<445	<667	<294	<819
	1990	2461	5752	11353J	11717J	DJ	2462	3725	2180	3936
	1991	1191J	5900	3288	5468J	DJ	13853J	13945J	QJ	20457J
Anthracene	1989	<532	<1340	<1300	<1080	<457	<795	<1080	<482	<1340
	1990	28J	15J	25J	22B	12B	14J	22J	47J	30B
	1991	QJ	20J	25J	12	22	QJ	QJ	25	QJ
Benzo(a)anthracene	1989	<380	<955	<929	<771	498	<568	<770	<344	<959
	1990	17J	44J	33J	26J	66B	47J	25J	55J	52J
	1991	QJ	50	50	49	87	26	QJ	81	42
Benzo(a)pyrene	1989	<330	<830	<807	<670	<286	<494	<669	<299	<834
	1990	46J	97J	53S	44J	9B	71J	53J	81J	28B
	1991	QJ	90	81	83	150	44	20J	110	72
Benzo(b)fluoranthene	1989	<605	<1520	<1480	<1230	<522	<905	<1230	<548	<1530
	1990	42J	93J	41J	67J	13B	14J	54J	13A	106J
	1991	23J	170	190	120	200	91	QJ	180	220
Benzo(g,h,i)perylene	1989	<599	<1510	<1460	<1220	<518	<896	<1210	<543	<1510
	1990	29J	58J	9J	21J	5B	44J	31J	29J	101J
	1991	QJ	140	100	72	87	30	QJ	99	51
Benzo(k)fluoranthene	1989	<541	<1360	<1320	<1100	<464	<808	<1100	<490	<1370
	1990	23J	58J	26J	38J	7B	63J	32J	73J	69B
	1991	QJ	45	43	39	48	25	QJ	59	41
Chrysene	1989	<494	<1240	<1210	<1000	585	<739	<1000	<448	<1250
	1990	19J	58J	24J	53J	8A	66J	42J	73J	90J
	1991	QJ	60	58	56	85	44	QJ	79	47
Dibenzo(a,h)anthracene	1989	<608	<1530	<1490	<1230	<522	<909	<1230	<551	<1530
	1990	QJ	QJ	QJ	91J	19B	19S	35S	18B	148B
	1991	QJ	QJ	QJ	QJ	QJ	QJ	QJ	QJ	QJ
Fluoranthene	1989	<301	<1280	<1230	<1020	1578	<749	<1020	<454	<1270
	1990	77J	155	278	195J	26A	187	190S	247	367
	1991	33	220	260	250	400	200	41	360	240
Indeno(1,2,3-cd)pyrene	1989	<702	<1760	<1710	<1420	<602	<1050	<1420	<636	<1770
	1990	58J	128J	QJ	9J	12B	12B	QJ	64J	112J
	1991	QJ	160	170	150	240	94	QJ	210	140
Phenanthrene	1989	<418	<1050	<1020	<848	735	<625	<847	<379	<1060
	1990	47J	66J	86J	QJ	12A	110	26A	131	383
	1991	QJ	31J	43	60	99	50	QJ	86	36
Pyrene	1989	<564	<1420	<1380	<1140	746	<843	<1140	<511	<1420
	1990	60J	124J	168J	116J	18B	121	137J	157	298
	1991	17J	120	120	140	220	69	16J	210	110

* For the sediment analyses, the PQL has been used as the reporting limit for 1989, 1990, and 1991. In 1989 J values were not calculated, therefore, values are presented as values below the quantitation limit calculated from the PQL. In all study years after 1989, J values are reported for all concentrations below the reporting limit.

† In 1989, the analysis was performed using the GC/MS which has higher detection limits but confirms the identity of the compound. In 1990, the analysis was performed using HPLC and a UV confirmation; the acenaphthene confirmed not to be present. The originally detected concentrations are, however, included in the table based upon results of the 1991 analyses. In 1991, the HPLC was used but peaks were insufficient to confirm or deny identity as acenaphthene.

Source: ESE, 1991.

TABLE 2 Comparison of Concentrations (μg/L) of Detected Priority PAHs Found in Water Samples Collected from the Seaman Estate Pond August 1989, August 1990, and August 1991

Parameter	CS1-B			CS4-B		
	1989	1990	1991	1989	1990	1991
Acenaphthene	<0.6444	0.553	<10	<0.644	0.547	<10
Fluoranthene	0.915	0.039	<0.1	0.315	0.023	<0.1
Naphthalene	<0.254	0.097	<10	<0.254	0.132	<10

Source: ESE, 1991.

Table 3 Comparison of Concentrations (μg/kg-wet) of Detected Priority PAHs and Pesticides Found in Fish Tissue Samples Collected from the Seaman Estate Pond August 1989, August 1990, and August 1991*

Parameter	Largemouth Bass			Bluegill			Channel Catfish		
	1989	1990	1991	1989	1990	1991	1989	1990	1991
Acenaphthene	<60	0J	0J	<60	440	0J	<60	1000	0J
Anthracene	<1	0J	0J	<1	0J	0J	<1	3	0J
Benzo(a)anthracene	<20	0J	0J	<20	7	0J	<20	9	0J
Chrysene	<3	0J	0J	<3	2	0J	<3	2	0J
Fluoranthene	<8	0J	0J	<8	40	0J	<8	90	0J
Fluorene	6	0J	0J	<6	30	0J	<6	0J	0J
Naphthalene	<30	0J	0J	<30	0J	0J	<30	40	0J
Phenanthrene	<2	2J	2J	<2	0J	0J	<2	10	0J
Dieldrin	--	239	0J	--	0J	10J	--	0J	0J
A-Chlordane	--	8J	88	--	0J	60J	--	0J	36J

* In 1989 J values were not calculated, therefore, values are presented as values below the quantitation limit calculated from the low standard. In all study years after 1989, J values are reported for all concentrations below the reporting limit.

Source: ESE, 1991.

TABLE 4

PAH CONCENTRATIONS IN SMOKED AND NONSMOKED FISH

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Fish	Concentration (µg/kg)									
	Fluorene	Anthracene	Phenanthrene	Fluoranthene	Pyrene	Benzo(a) anthracene	Benzo(e) pyrene	Benzo(a) pyrene	Perylene	Benzo (g,h,i) perylene
Smoked eel[a]	9.0	4.0	37.0	4.0	6.0		t[b]	1.0		
Smoked lumpfish[a]	5.0	t	10.0	2.0	1.0	t	t	0		
Smoked trout[a]	67.0	26.0	52.0	12.0	5.0		t	t		
Smoked herring[b]	-	-	-	3.0	2.2		-	-		
Smoked herring[b] (dried)	-	-	-	1.8	1.8	1.7	1.2	1.0		1.0
Smoked salmon[b]	-	-	-	3.2	2.0	0.5	0.4	-		-
Smoked sturgeon[b]	-	-	-	2.4	4.4	-	-	0.8		
Smoked whitefish[b]	-	-	-	4.6	4.0		-	4.3		
Smoked whiting[c]	-	-	-	-	0.5	-	-	6.6	0.7	2.4
Smoked redfish[d]	-	1.5	4.1	4.0	3.0		0.3	0.3	-	-
Smoked cod[d]	-	-	-	-	0.6	-	-	4.0	0.4	2.2
Electric smoked mackerel[d]	2.6	1.9	9.0	5.2	3.6	1.2	0.5	0.2	t	0.2
Gas-smoked mackerel[d]	8.2	2.3	11.0	2.6	4.0	0.6	0.2	0.3	t	0.3
Nonsmoked haddock[b]	-	-	-	1.6	0.8	-	-	-	-	-
Nonsmoked herring[b] (salted)	-	-	-	0.8	1.0	-	-			
Nonsmoked salmon	-	-	-	1.8	1.4	-	-			

[a] Thorsteinsson, 1969; Dungal, 1961.
[b] Howard, et al. 1966a.
[c] Malanoski, et al. 1968.
[d] Masuda and Kuratsune, 1971.
PAH Polynuclear aromatic hydrocarbons.
t Trace.
µg/kg Micrograms per kilogram.

Table 5

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Total Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene
GW-1	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-2	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-3	1988	290	3,700	730	8,900	3,700	ND(200)	ND(20)	45	7.8
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-4	1988	60,000	20,000	1,200	7,400	8,600	ND(200)	190	100	18
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-5	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
GW-6d	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-6s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-7	1988	4.5	7.4	17	46	930	ND(200)	80	59	9.8
	1989	2.7	2	2.2	NT	160	79	13	29	4.5
	1990	2.9	1	2.2	6.2	72	ND(50)	ND(50)	21	4.2
GW-8D	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT

Table 5 Continued

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Total Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene
GW-8s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
GW-9d	1988	0.7	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(5.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
GW-9s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	NT	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
GW-11	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
GW-12	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
GW-13d	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	NT	NT	NT	NT	NT
GW-13s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
G-101s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
G-102d	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
G-102s	1989	ND(0.5)	ND(0.5)	ND(0.5)	NT	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1990	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)

Table 5, Continued

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Total Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene
G-103d	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT
G-103s	1988	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)	ND(2.0)	ND(0.2)	ND(0.6)	ND(0.7)
	1989	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT	NT

IRA Immediate removal action.

ND Not detected above method detection limit indicated in parentheses.

NT Not tested.

µg/L Micrograms per liter.

Table 5 , Continued

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a) pyrene	Acenaphthene
GW-1	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-2	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-3	1988	3.1	3.1	ND(0.8)	ND(2.0)	ND(0.2)	ND(0.2)	ND(0.5)	ND(200)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-4	1988	14	16	5.1	4.3	1.6	1.2	4.5	ND(200)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-5	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
GW-6d	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-6s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-7	1988	3.5	3.7	ND(0.8)	ND(2.0)	ND(0.2)	ND(0.2)	ND(0.5)	ND(200)
	1989	3.5	5.4	ND(0.5)	0.22	ND(0.02)	ND(0.02)	ND(0.05)	ND(120)
	1990	2.2	2.7	0.18	ND(0.5)	ND(0.02)	ND(0.02)	ND(0.05)	ND(100)
GW-8D	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT

Table 5, Continued

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a) pyrene	Acenaphthene
GW-8s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-9d	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
GW-9s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
GW-11	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
GW-12	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
GW-13d	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	2.4
	1990	NT	NT	NT	NT	NT	NT	NT	NT
GW-13s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
G-101s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(10)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(10)
G-102d	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
G-102s	1989	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1990	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)

Table 5, Continued

GROUNDWATER ANALYTICAL RESULTS - POST-IRA MONITORING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Sample Number	Year	Concentration (µg/L) Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a) pyrene	Acenaphthene
G-103d	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT
G-103s	1988	ND(0.2)	ND(0.3)	ND(0.08)	ND(0.2)	ND(0.02)	ND(0.02)	ND(0.05)	ND(2.0)
	1989	NT	NT	NT	NT	NT	NT	NT	NT
	1990	NT	NT	NT	NT	NT	NT	NT	NT

IRA Immediate removal action.

ND Not detected above method detection limit indicated in parentheses.

NT Not tested.

µg/L Micrograms per liter.

TABLE 6

POST-IMMEDIATE RESPONSE ACTION AMBIENT
AIR PHOTOIONIZATION DETECTOR (PID) RESULTS

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Date	Maximum Result (ppm)	Date	Maximum Result (ppm)	Date	Maximum Result (ppm)
1987		1988		1989	
08/20	0.1	01/22	0.2	01/20	0.2
09/11	0.2	02/12	0.2	03/03	0.2
09/18	0.0	03/04	0.4	03/23	0.3
09/24	0.0	03/18	0.3	Undated	0.2
10/02	0.1	03/31	0.2		
10/14	0.4	04/22	0.2		
10/23	0.3	05/12	0.4		
10/29	0.2	06/02	0.2		
11/05	0.0	06/24	0.2		
11/13	0.2	07/14	0.2		
11/25	0.3	08/05	0.1		
12/03	0.3	08/25	0.2		
12/11	0.2	09/16	0.2		
12/21	0.2	10/07	0.6		
12/29	0.3	11/04	0.2		
		11/23	0.3		
		12/19	0.2		

Note: Six parts per million was established as the level of concern using the portable PID at the fenceline.

ppm Parts per million.

TABLE 7

POST-IMMEDIATE RESPONSE ACTION
VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

MARCH 4, 1991

Borehole Number	Depth (Feet)	Concentration (µg/kg)				Number of Tentatively Identified Compounds*
		Methylene Chloride	Acetone	2-Butanone	Xylene	
B-10	5	4 JB	5 JB	ND(13)	ND(6)	1
	10	7 B	59 B	5 JB	ND(6)	10
	15	7 B	120 B	4 JB	ND(6)	0
B-11	5	5 B	100 B	2 J	5 J	0
	10	4 JB	30 B	ND(11)	ND(6)	0
	10 (Field duplicate)	4 JB	59 B	ND(12)	ND(6)	1
	15	3 JB	58 B	ND(11)	ND(6)	0
B-14	5	7 B	58 B	ND(13)	ND(7)	1
	10	3 JB	56 B	ND(12)	ND(6)	0
	15	3 JB	120 B	3 J	ND(6)	0

Source: Hanson, 1987a.

B Indicates the compound was detected in the blank and the sample.

J Indicates an estimated value that is less than the method detection limit.

ND Not detected at a concentration above the method detection limit shown in parentheses.

µg/kg Micrograms per kilogram.

* Tentatively identified compounds are those compounds identified by mass spectral library search that had concentrations greater than 10 percent of the nearest internal standard. This is exclusive of target compounds, surrogates, or internal standards.

TABLE 8

ADJUSTED CALCULATED INCREMENTAL LIFETIME CANCER RISK

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Receptor Group	Exposure Level	Original Cancer Risk Level: Relative Potency	Original Cancer Risk Level: One to One Potency	Adjusted Cancer Risk Level: Relative Potency	Adjusted Cancer Risk Level: One to One Potency
Future Hypothetical On Site Residents - Adult					
Dermal During Bathing	AE	5.08×10^{-2}	2.48×10^{-1}	5.01×10^{-2}	2.25×10^{-1}
	RME	2.21×10^{-1}	1.08	2.10×10^{-1}	7.24×10^{-1}
	UBE	3.60×10^{-1}	1.76	3.29×10^{-1}	9.53×10^{-1}
Total	AE	5.17×10^{-2}	2.50×10^{-1}	5.10×10^{-2}	2.26×10^{-1}
	RME	2.25×10^{-1}	1.09	2.13×10^{-1}	7.31×10^{-1}
	UBE	3.66×10^{-1}	1.77	3.34×10^{-1}	9.65×10^{-1}
Future Hypothetical On Site Residents - Child					
Dermal During Bathing	AE	7.75×10^{-2}	3.79×10^{-1}	7.61×10^{-2}	5.26×10^{-1}
	RME	1.90×10^{-1}	9.31×10^{-1}	1.82×10^{-1}	6.55×10^{-1}
Total	AE	7.85×10^{-2}	3.81×10^{-1}	7.70×10^{-2}	5.28×10^{-1}
	RME	1.93×10^{-1}	9.35×10^{-1}	1.84×10^{-1}	6.59×10^{-1}

AE Average exposure.
RME Reasonable maximum exposure.
UBE Upper bound exposure.
Original Use of equation to calculate risk level that are linear with respect to dose.
Adjusted Use of one-hit equation to calculate cancer risk levels that are within the range of values that are nonlinear with respect to dose.

Table 9

CALCULATED INCREMENTAL LIFETIME CANCER RISK AND HAZARD INDEXES

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Receptor Group	Exposure Level	Cancer Risk Level - Adult: Relative Potency	Cancer Risk Level - Adult: One-to-One Potency	Adult Hazard Index	Cancer Risk Level - Child: Relative Potency	Cancer Risk Level - Child: One-to-One Potency	Child Hazard Index
Future Hypothetical On Site Residents							
Ingestion of On-Site Groundwater	AE	9.04×10^{-4}	1.82×10^{-3}	17.5	9.01×10^{-4}	1.81×10^{-3}	1.72×10^{1}
	RME	3.76×10^{-3}	7.56×10^{-3}	2.47×10^{1}	2.23×10^{-3}	4.50×10^{-3}	2.61×10^{1}
	UBE	6.10×10^{-3}	1.23×10^{-2}	2.47×10^{1}			
Dermal Exposure to On Site Groundwater During Bathing	AE	5.01×10^{-4}	2.25×10^{-3}	2.58×10^{1}	7.61×10^{-4}	3.26×10^{-3}	3.96×10^{1}
	RME	2.10×10^{-3}	7.24×10^{-3}	3.87×10^{1}	1.82×10^{-3}	6.55×10^{-3}	5.91×10^{1}
	UBE	3.29×10^{-3}	9.53×10^{-3}	3.87×10^{1}			
Total	AE	5.10×10^{-4}	2.26×10^{-3}	4.31×10^{1}	7.70×10^{-4}	3.28×10^{-3}	5.66×10^{1}
	RME	2.13×10^{-3}	7.31×10^{-3}	6.34×10^{1}	1.84×10^{-3}	6.59×10^{-3}	8.52×10^{1}
	UBE	3.34×10^{-3}	9.65×10^{-3}	6.34×10^{1}			
Seaman Estate Residents							
Inadvertent Ingestion of Seaman Estate Pond Surface Water While Swimming	AE	1.95×10^{-10}	7.56×10^{-10}	7.08×10^{-7}	5.50×10^{-10}	2.13×10^{-9}	2.00×10^{-6}
	RME	5.64×10^{-9}	2.18×10^{-8}	6.21×10^{-6}	1.01×10^{-8}	3.90×10^{-8}	1.97×10^{-5}
	UBE	9.17×10^{-9}	3.55×10^{-8}	6.21×10^{-6}			
Dermal Exposure to Chemicals in Seaman Estate Pond Surface Water While Swimming	AE	2.36×10^{-8}	9.14×10^{-8}	7.25×10^{-4}	4.80×10^{-8}	1.86×10^{-7}	1.48×10^{-3}
	RME	6.82×10^{-8}	2.64×10^{-7}	7.14×10^{-3}	8.81×10^{-8}	3.41×10^{-7}	1.64×10^{-2}
	UBE	1.11×10^{-7}	4.29×10^{-7}	7.14×10^{-3}			
Ingestion of Contaminated Fish From Seaman Estate Pond	AE	2.16×10^{-11}	6.73×10^{-7}	7.47×10^{-4}	2.30×10^{-11}	7.18×10^{-7}	7.97×10^{-4}
	RME	5.59×10^{-7}	1.68×10^{-5}	8.78×10^{-3}	2.65×10^{-7}	7.93×10^{-6}	7.39×10^{-3}
	UBE	9.08×10^{-7}	2.72×10^{-5}	8.78×10^{-3}			
Total	AE	2.38×10^{-8}	9.82×10^{-8}	1.47×10^{-3}	4.85×10^{-8}	1.95×10^{-7}	2.28×10^{-3}
	RME	6.87×10^{-6}	2.80×10^{-4}	1.59×10^{-2}	8.84×10^{-6}	3.49×10^{-4}	2.38×10^{-2}
	UBE	1.12×10^{-4}	4.56×10^{-4}	1.59×10^{-2}			

Table 9, Continued

CALCULATED INCREMENTAL LIFETIME CANCER RISK AND HAZARD INDEXES

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

Receptor Group	Exposure Level	Cancer Risk Level - Adult Relative Potency	Cancer Risk Level - Adult One-to-One Potency	Adult Hazard Index	Cancer Risk Level - Child Relative Potency	Cancer Risk Level - Child One to One Potency	Child Hazard Index
Local Residents:							
Dermal Exposure To Sediment While Trespassing at Seaman Estate Pond	AE	3.12×10^{-6}	1.74×10^{-6}	5.26×10^{-1}	1.29×10^{-6}	7.18×10^{-7}	2.17×10^{-1}
	RME	1.75×10^{-7}	8.39×10^{-7}	7.85×10^{-1}	2.71×10^{-7}	1.30×10^{-6}	3.24×10^{-1}
	UBE	2.85×10^{-7}	1.36×10^{-6}	7.85×10^{-1}			
Dermal Exposure To Sediments While Trespassing at Area A	AE	4.08×10^{-7}	4.75×10^{-7}	2.01×10^{-1}	1.68×10^{-7}	1.95×10^{-7}	8.29×10^{-2}
	RME	2.14×10^{-7}	2.01×10^{-6}	2.47×10^{-1}	3.31×10^{-7}	3.11×10^{-6}	1.02×10^{-1}
	UBE	3.47×10^{-7}	3.26×10^{-6}	2.47×10^{-1}			
Dermal Exposure to Sediments While Trespassing at Area B	AE	7.04×10^{-6}	4.85×10^{-6}	2.75×10^{-1}	2.91×10^{-6}	2.01×10^{-6}	1.13×10^{-1}
	RME	2.86×10^{-7}	2.02×10^{-6}	3.74×10^{-1}	4.42×10^{-7}	3.13×10^{-6}	1.54×10^{-1}
	UBE	4.64×10^{-7}	3.28×10^{-6}	3.74×10^{-1}			
Total	AE	1.42×10^{-5}	1.13×10^{-5}	5.29×10^{-1}	5.88×10^{-6}	4.68×10^{-6}	2.18×10^{-1}
	RME	6.75×10^{-7}	4.87×10^{-6}	7.00×10^{-1}	1.04×10^{-6}	7.53×10^{-6}	5.80×10^{-1}
	UBE	1.10×10^{-6}	7.91×10^{-6}	7.00×10^{-1}			

AE Average exposure.

RME Reasonable maximum exposure.

UBE Upper bound exposure.

TABLE 10

ON-SITE BOREHOLE SOIL ANALYSIS RESULTS - POST-1987 REMEDIATION SAMPLING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

March 1987

Parameter	Concentration (µg/kg) R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8
Volatile Organic Compounds								
Benzene	120,000	ND(50)	ND(50)	790	ND(50)	1,200	150	ND(50)
Chlorobenzene	ND(5,000)	ND(50)	ND(50)	ND(200)	ND(50)	ND(50)	ND(50)	ND(50)
Dichlorobenzene (total)	ND(5,000)	ND(50)	ND(50)	ND(200)	ND(50)	ND(50)	ND(50)	ND(50)
Ethylbenzene	7,600	ND(50)	ND(50)	690	ND(50)	1,100	290	ND(50)
Toluene	190,000	ND(50)	ND(50)	5,500	ND(50)	1,200	220	ND(50)
Xylene (total)	107,000	ND(50)	ND(50)	12,500	ND(50)	1,540	1,230	ND(50)
Polycyclic Aromatic Hydrocarbons								
Acenaphthylene	ND(400,000)	ND(100)	ND(100)	ND(40,000)	ND(100)	ND(40,000)	ND(4,000)	ND(400)
Acenaphthene	ND(400,000)	ND(200)	ND(200)	ND(40,000)	ND(200)	ND(40,000)	ND(4,000)	ND(400)
Anthracene	33,000	ND(4)	35	4,500	ND(4)	2,800	3,700	100
Benzo(a)anthracene	23,000	ND(10)	71	5,800	ND(10)	2,000	820	65
Benzo(b)fluoranthene	7,800	ND(5)	31	1,900	ND(5)	7,800	36	31
Benzo(k)fluoranthene	5,000	ND(5)	20	1,200	ND(5)	380	220	22
Benzo(g,h,i)perylene	5,100	ND(20)	20	ND(1,600)	ND(20)	ND(1,600)	380	29
Benzo(a)pyrene	17,000	ND(10)	57	5,300	ND(10)	1,600	760	72
Chrysene	ND(40,000)	ND(10)	ND(100)	4,100	ND(10)	1,400	110	ND(400)
Dibenzo(a,h)anthracene	ND(40,000)	ND(40)	ND(40)	ND(4,000)	ND(40)	ND(4,000)	ND(400)	ND(40)
Fluoranthene	34,000	ND(10)	120	9,200	ND(10)	3,300	1,500	200
Fluorene	89,000	ND(20)	180	23,000	ND(20)	5,800	1,400	80
Indeno(1,2,3-c,d)pyrene	5,600	ND(10)	35	ND(4000)	ND(10)	ND(4,000)	460	ND(40)
Naphthalene	400,000	ND(100)	150	100,000	ND(100)	19,000	1,600	ND(400)
Phenanthrene	110,000	ND(8)	140	16,000	ND(8)	11,000	2,900	520
Pyrene	56,000	ND(20)	160	15,000	ND(20)	5,200	2,100	280

Source: Hanson, 1987.
ND Not detected at a concentration above the method detection limit shown in parentheses.
µg/kg Micrograms per kilogram.

Table 11

OFF-SITE BOREHOLE (0 to 1 FOOT) SOIL ANALYSIS RESULTS -
POST-1987 REMEDIATION SAMPLING

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

March 1987

Parameter	Concentration (µg/kg) A-1	A-2	A-3
Volatile Organic Compounds			
Benzene	ND(50)	ND(50)	ND(50)
Chlorobenzene	ND(50)	ND(50)	ND(50)
Dichlorobenzene (total)	ND(50)	ND(50)	ND(50)
Ethylbenzene	ND(50)	ND(50)	ND(50)
Toluene	ND(50)	ND(50)	ND(50)
Xylene (total)	ND(50)	ND(50)	330
Polycyclic Aromatic Hydrocarbons			
Acenaphthylene	ND(400)	ND(400)	ND(400)
Acenaphthene	ND(400)	ND(400)	ND(400)
Anthracene	ND(140)	ND(140)	ND(140)
Benzo(a)anthracene	ND(16)	ND(160)	ND(160)
Benzo(b)fluoranthene	ND(4)	240	240
Benzo(k)fluoranthene	ND(4)	110	110
Benzo(g,h,i)perylene	ND(16)	480	480
Benzo(a)pyrene	ND(10)	490	490
Chrysene	ND(40)	130	130
Dibenzo(a,h)anthracene	ND(40)	ND(400)	ND(400)
Fluoranthene	ND(40)	130	130
Fluorene	ND(40)	ND(40)	ND(40)
Indeno(1,2,3-c,d)pyrene	ND(40)	ND(400)	ND(400)
Naphthalene	ND(400)	120	120
Phenanthrene	ND(120)	76	76
Pyrene	ND(60)	300	300

Source: Hanson, 1987.

ND Not detected at a concentration above the method detection limit indicated in parentheses.

µg/kg Micrograms per kilogram.

Table 12. Cleanup Objectives for Class I Groundwater
for CIPS - Taylorville
July 14, 1992

Parameter	Class I Groundwater Objective (mg/l)	ADL (mg/l)
Acenaphthene	0.42, & Mixture 1	0.01
Anthracene	2.1	0.0066
Benzo(a)anthracene	0.00013	0.00013
Benzo(a)pyrene	0.00023	0.00023
Benzo(b)fluoranthene	0.00018	0.00018
Benzo(k)fluoranthene	0.00017	0.00017
Chrysene	0.0015	0.0015
Dibenzo(a,h)anthracene	0.0003	0.0003
Fluoranthene	0.28, & Mixture 1	0.0021
Fluorene	0.28, & Mixture 1	0.0021
Indeno(1,2,3-c,d)pyrene	0.00043	0.00043
Naphthalene	0.025	0.0006
Pyrene	0.21, & Mixture 1	0.0027

Parameter	Class I Standard (mg/l)	ADL (mg/l)
Benzene	0.005	.002
Toluene	1.0	.002
Ethylbenzene	0.7	.002
Xylenes	10	.002
trans-1,2-dichloroethylene	0.1	.005

Parameter	Class I Groundwater Objective mg/l	ADL (mg/l)
Other Non-Carcinogenic PNAs	0.21	
Acenaphthylene		0.01
Benzo(g,h,i)perylene		0.00076
Phenanthrene		0.0064
2-Methylphenol (1)	0.35	0.01
4-Methylphenol (1)	0.35	0.01
Dichloromethane	0.0002, & Mixture 2	0.0002
Bromoform	0.0002	0.0002
Di-n-butyl phthalate	0.7	0.0033
Bis(2-ethylhexyl)phthalate	0.0027, & Mixture 2	0.0027

ADL: Acceptable Detection Limit; lowest Practical Quantitation Limit (PQL) from SW846.

Objectives Basis: 35 IAC 620 Subpart F: Title 35 : Environmental Protection
Subpart F: Public Water Supplies
Subpart F: Health Advisories

(1) Sum of concentrations of 2-methylphenol plus 4-methylphenol is not to exceed 0.35 mg/l.

Mixture 1: In addition to meeting the individual Class I groundwater objectives indicated in Table 12 above, the following equation must be satisfied to protect against liver, kidney, and blood toxicity.

$$\frac{[\text{acenaphthene}]}{0.42\ \text{mg/l}} + \frac{[\text{fluoranthene}]}{0.28\ \text{mg/l}} + \frac{[\text{fluorene}]}{0.28\ \text{mg/l}} + \frac{[\text{pyrene}]}{0.21\ \text{mg/l}} \leq 1.0$$

Mixture 2: In addition to meeting the individual Class I groundwater objectives indicated in Table 12 above, the following equation must be satisfied to protect against liver tumors.

$$\frac{[\text{dichloromethane}]}{0.0002\ \text{mg/l}} + \frac{[\text{bis(2-ethylhexyl)phthalate}]}{0.0027\ \text{mg/l}} \leq 1.0$$

The Nondegradation Provisions of 35 IAC 620 Subpart C may also be applicable at this site.

TF:jab/1978r/1

Illinois Environmental Protection Agency P. O. Box 19276, Springfield, IL 62794-9276

Should CIPS choose to discharge treated groundwater to the South Fork of the Sangamon River as previously discussed, an NPDES permit will be required. The following NPDES discharge limits will apply.

Parameter	Limit* (ug/l)
Benzo(a)pyrene	0.5
Benzo(a)anthracene	1
Napnthalene	790
Phenanthrene	10
Acenapthene	60.8
Anthracene	2.3
Fluoranthene	398
Total Phenols	100
Toluene	2,400
Benzene	2,200
Ethylbenzene	3,200
t-1,2 Dichloroethene	14,000
Dichloromethane	19,300
Xylenes	2,090
2-Methyl phenol	1,900
4-Methyl phenol	1,900
Di-n-butyl phthalate	73
NOEC**	≥100% effluent

*Daily Maximum Concentration
**No Observable Effect Concentration based on chronic toxicity test.

The above limits assume no dilution is available in the receiving stream and that technology-based limits are less restrictive than water quality-based limits.

BM:jas/1956k,108-109

Table 10

Illinois Environmental Protection Agency · P. O. Box 19276, Springfield, IL 62794-9276

217/782-0610

CIPS -- Taylorville Gas Plant Site
Design Report Review Comments

January 24, 1992

Mr. Donald L. Richardson, P.E.
Environmental Affairs Department
Central Illinois Public Service Company
607 E. Adams Street
Springfield, Illinois 62739

Dear Mr. Richardson:

As discussed at the time of our September 17, 1991 meeting, this letter is to transmit review comments regarding the November 1989 Basis of Design report for the Taylorville Gas Plant site. These comments are as follows:

1. Since the surface water treatment objectives were developed for the site in 1988, the Pollution Control Board has adopted new water quality standards and water quality criteria have been developed under the standards for several parameters at the CIPS site. Also, USEPA has distributed a guidance manual addressing technology-based limits for UST cleanups which include the BTEX parameters at this site. Finally, reviews of effluent guidelines promulgated by USEPA and treatability information from other sources have resulted in changes to the PNA limits. Accordingly, the treatment objectives would be revised as follows:

Parameter	Avg./Max., mg/l	Basis
Total PNA's (exc. naphthalene)	-/0.1	BPJ determination of BAT
Naphthalene	0.053/0.67	W.Q. Criteria
Total phenols	0.1/0.2	304.124
Benzene	-/0.05	BPJ determination of BAT
Ethylbenzene	0.017/0.219	W.Q. Criteria
Toluene	0.07/0.74	W.Q. Criteria/BPJ ... of BAT
Xylenes	0.117/0.74	W.Q. Criteria/BPJ ... of BAT
Oil	5-3	304.125
Total Iron	2/1	304.124
Dissolved Iron	-/1	304.[illegible]

2. A portable water break tank should be employed instead of the proposed backflow preventer.

Illinois Environmental Protection Agency · P.O. Box 19276, Springfield, IL 62794-9276

3. Consider increasing the size of the sulfuric acid containment dike. While the volume is adequate to contain the contents of the tank, it would not allow for neutralization of a spill.

4. Sampling of data indicates that the discharge may exceed effluent or water quality standards for iron. CIPS should address whether the permit limits can be achieved.

If you have any questions regarding the above items, please feel free to contact me.

Very truly yours,

Timothy R. Kluge, P.E., Manager
Industrial Unit, Permit Section
Division of Water Pollution Control

TRK:dks/5jm, 05-5

cc: Records Unit, IWPC
Springfield Region/IEPA
RPPS/IEPA, Attn: K. Heidergott

TABLE 14

ALTERNATIVE 5 - SOIL/SEDIMENT REMOVAL,
INSTITUTIONAL CONTROLS, AND
GROUNDWATER TREATMENT COST ESTIMATE SUMMARY

CIPS GAS PLANT SITE
TAYLORVILLE, ILLINOIS

	Cost Component	Construction Costs	Annual O&M Costs	Present Worth
1.	Soil Removal, Disposal and Backfill	$1,406,016		
2.	Water Main Construction and Connection	$164,956		
3.	Seaman Estates Dam and Settlements	$249,779		
4.	Long Term Monitoring		$67,200	
5.	Extraction Wells and Discharge Piping	$393,400		
6.	Process Buildings	$192,900		
7.	Site Work	$69,000		
8.	Equipment	$265,300		
9.	Process Piping	$39,800		
10.	Instrumentation	$32,500		
11.	Observation and Startup	$133,100		
12.	Operating Personnel		$11,490	
13.	Operating Materials		$200,000	
14.	Maintenance		$12,600	
15.	Utilities		$34,830	
16.	Solids Disposal		$2,440	
17.	Quarterly and Annual Reporting		$60,000	
18.	Sampling and Analytical		$12,840	
19.	Additional Sampling and Analytical - 1st Year	$28,260		
Construction subtotal		$2,975,011		
	Mobilization, Bonds, Insurance (5%)	$148,750		
	Health and Safety (7%)	$208,250		
	Bid Contingency (15%)	$446,250		
	Scope Contingency (20%)	$595,000		
	Construction Management (5%)	$148,750		
Construction Total		$4,522,011		
	Engineering Fees (10%)	$452,200		
	Legal Fees (5%)	$226,100		
	Services During Construction (8%)	$361,760		
Total Capital and Implementation Cost		$5,562,071		
Annual O&M Cost			$401,400	
Present Worth				$3,783,963
Total Present Worth				$9,346,034

Note: The present worth calculation was performed according to the method shown in Appendix E at a discount rate of 10 percent over 30 years.

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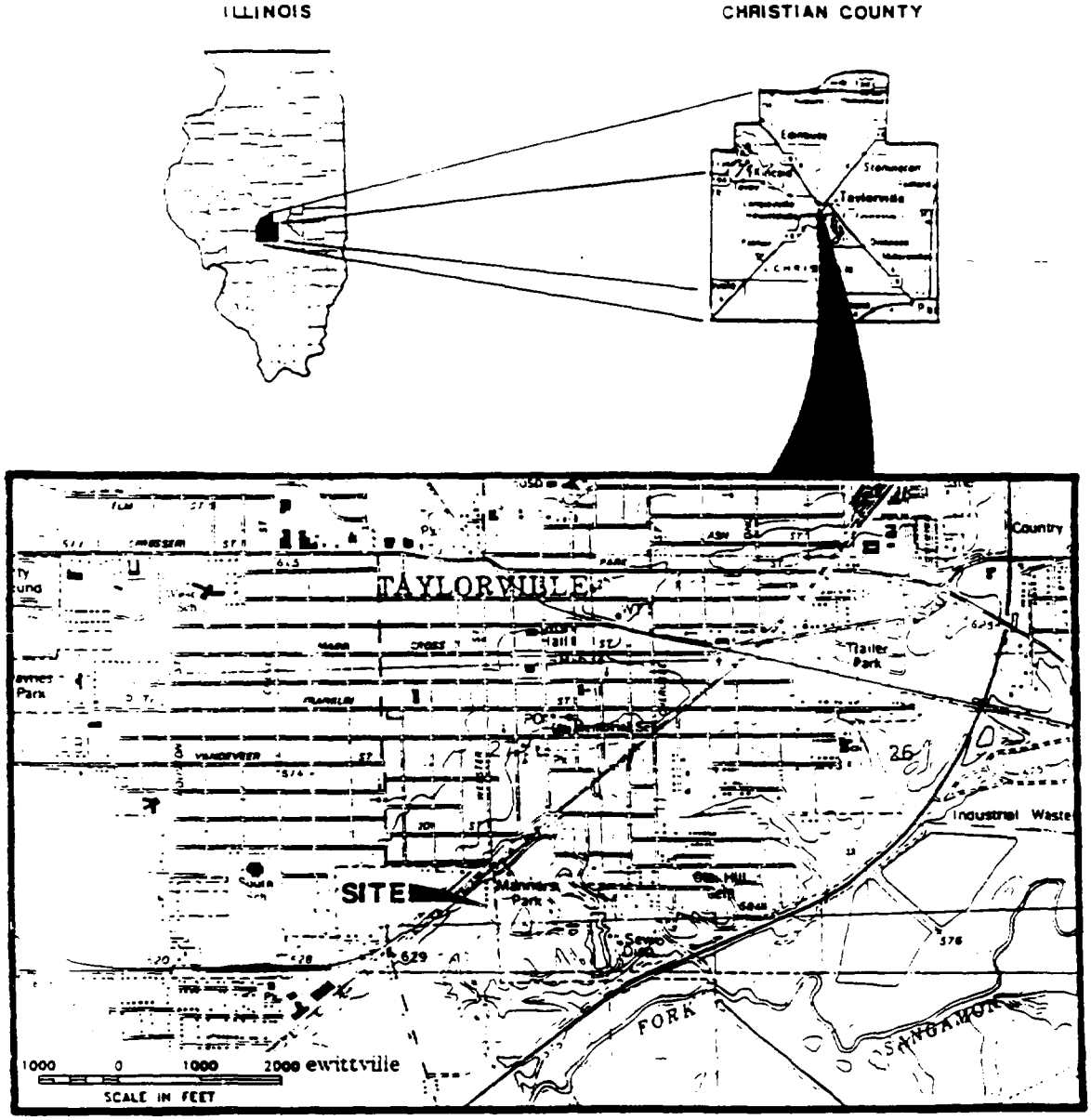


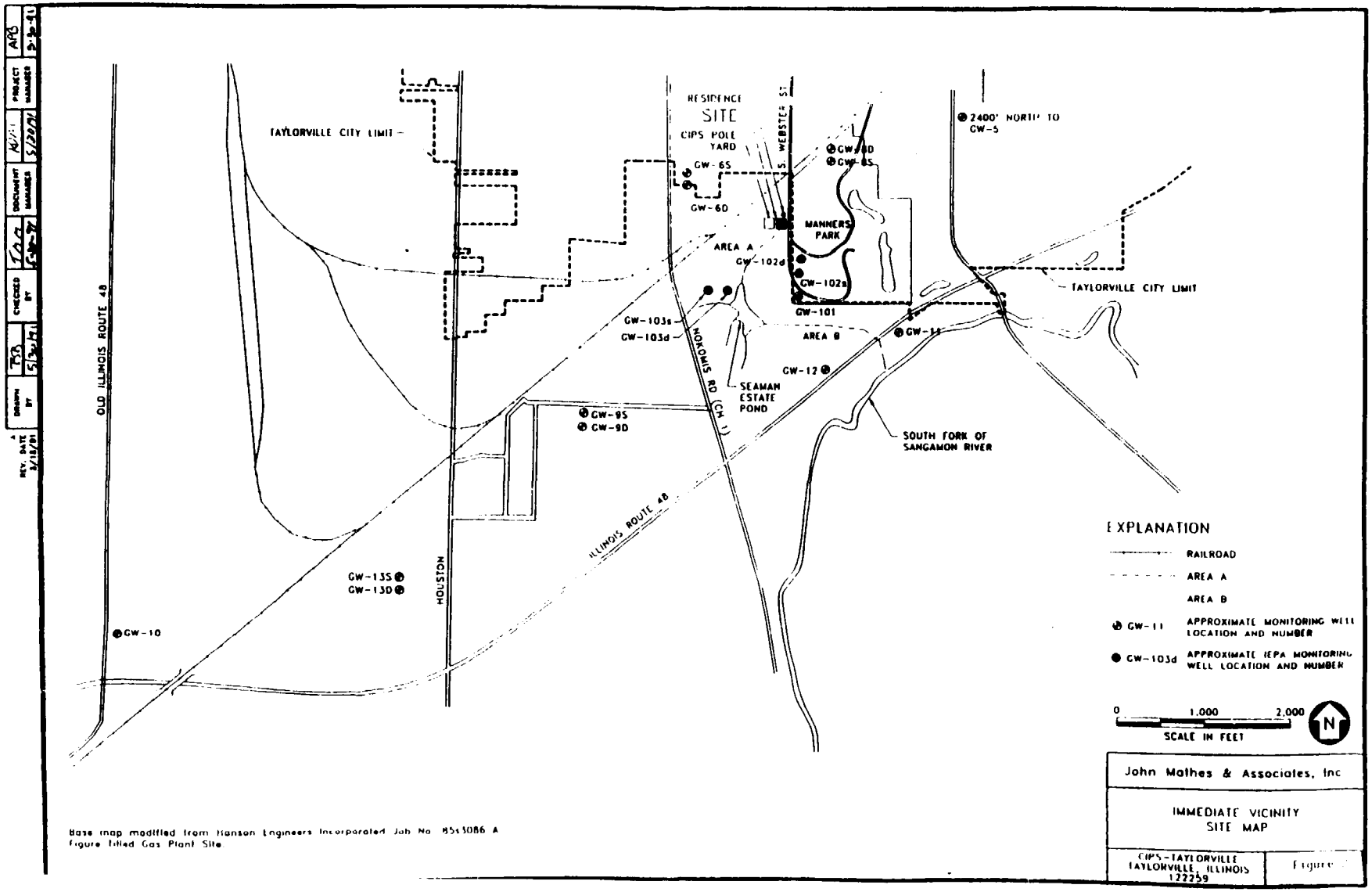
SCALE IS VARIABLE

N

POOR QUALITY ORIGINAL

Modified from U.S. Geological Survey Taylorville, Illinois, quadrangle, photorevised 1982.

John Mathes & Associates, Inc.	
SITE LOCATION MAP	
CIPS–TAYLORVILLE TAYLORVILLE, ILLINOIS 122259	Figure 1


TAYLORVILLE CITY LIMIT
RESIDENCE
SITE
CIPS POLE
YARD
GW-6S
GW-6D
S. WEBSTER ST.
GW-8D
GW-8S
2400' NORTH TO
GW-5
MANNERS
PARK
AREA A
GW-102d
GW-102s
GW-101
TAYLORVILLE CITY LIMIT
GW-103s
GW-103d
AREA B
GW-14
GW-12
SEAMAN
ESTATE
POND
MORRIS RD (CH 1)
GW-9S
GW-9D
SOUTH FORK OF
SANGAMON RIVER
OLD ILLINOIS ROUTE 48
ILLINOIS ROUTE 48
HOUSTON
GW-13S
GW-13D
GW-10
EXPLANATION
RAILROAD
AREA A
AREA B
GW-11 APPROXIMATE MONITORING WELL LOCATION AND NUMBER
GW-103d APPROXIMATE IEPA MONITORING WELL LOCATION AND NUMBER
0
1,000
2,000
SCALE IN FEET
N
John Mathes & Associates, Inc
IMMEDIATE VICINITY
SITE MAP
CIPS - TAYLORVILLE
TAYLORVILLE, ILLINOIS
122259
Figure
Base map modified from Hanson Engineers Incorporated Job No 85s3086 A
Figure Filled Gas Plant Site
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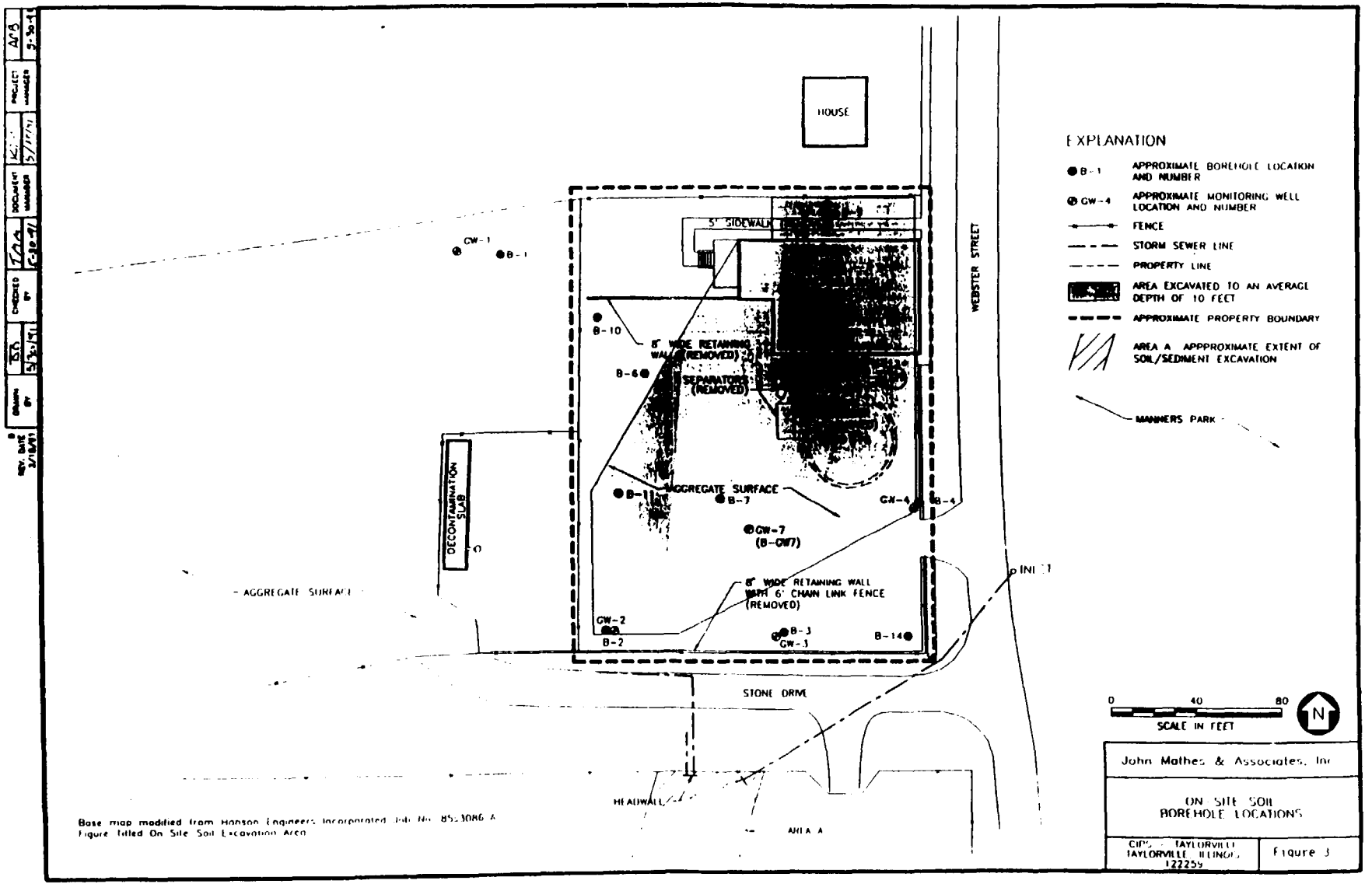
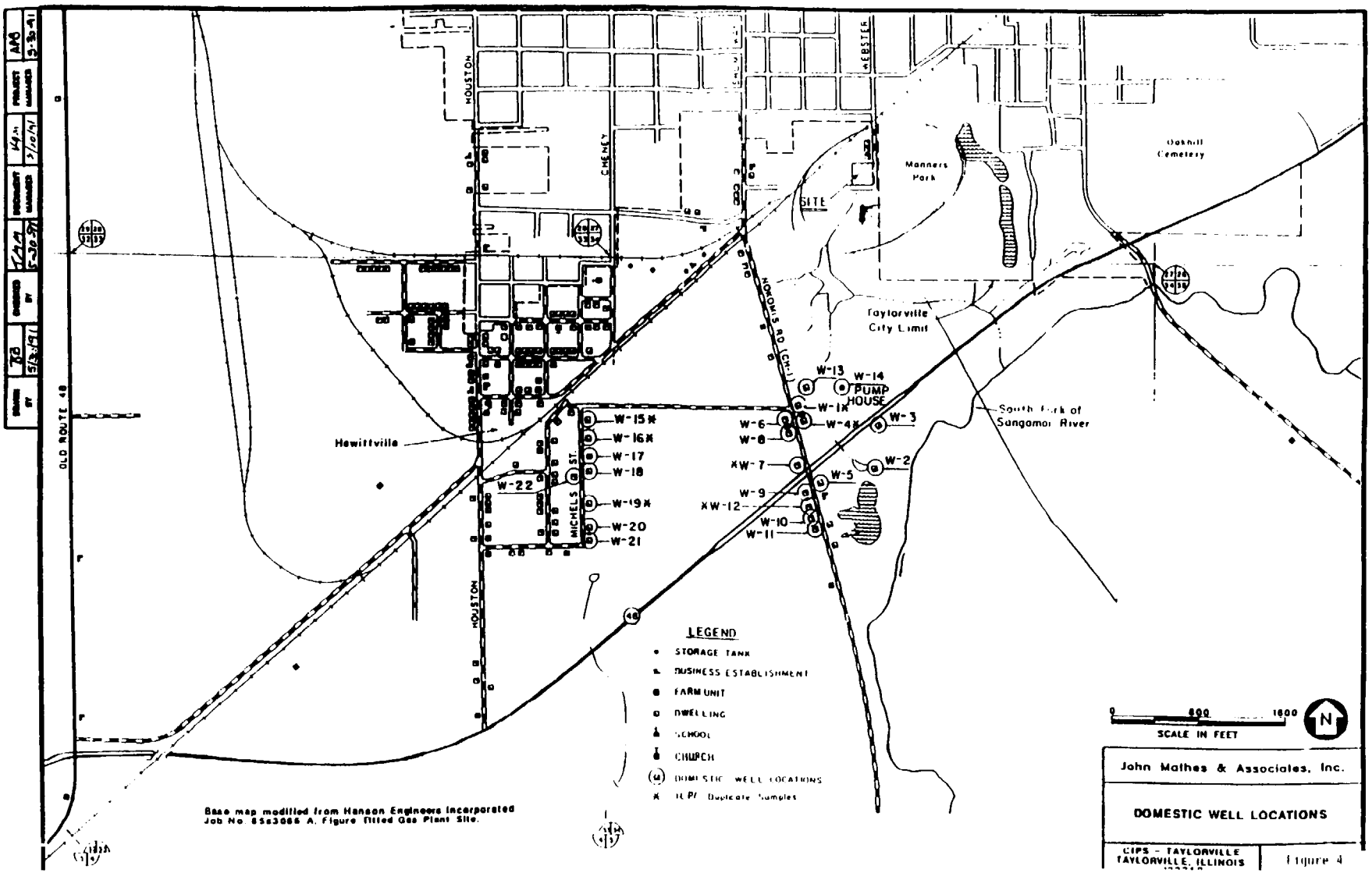
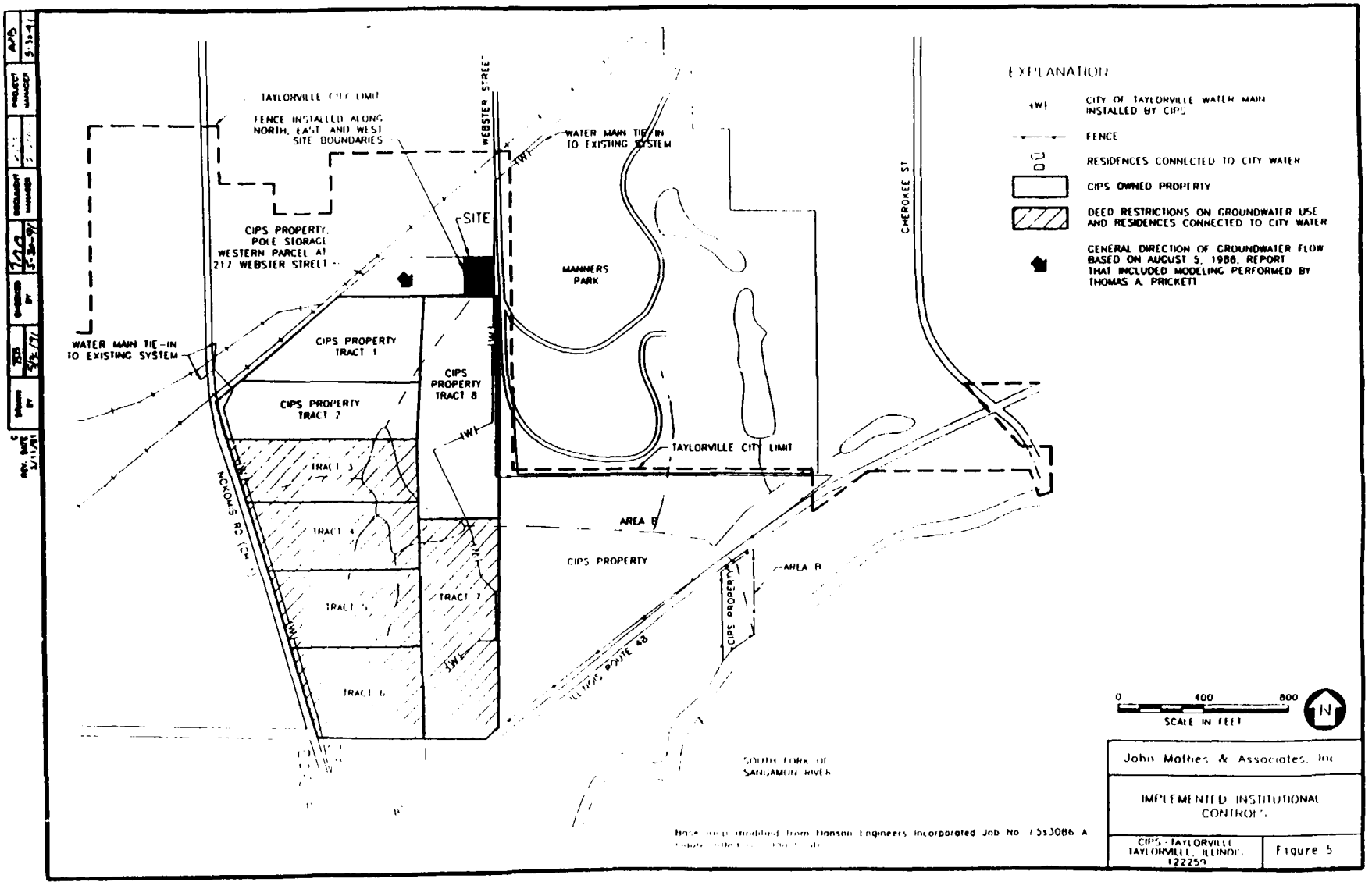
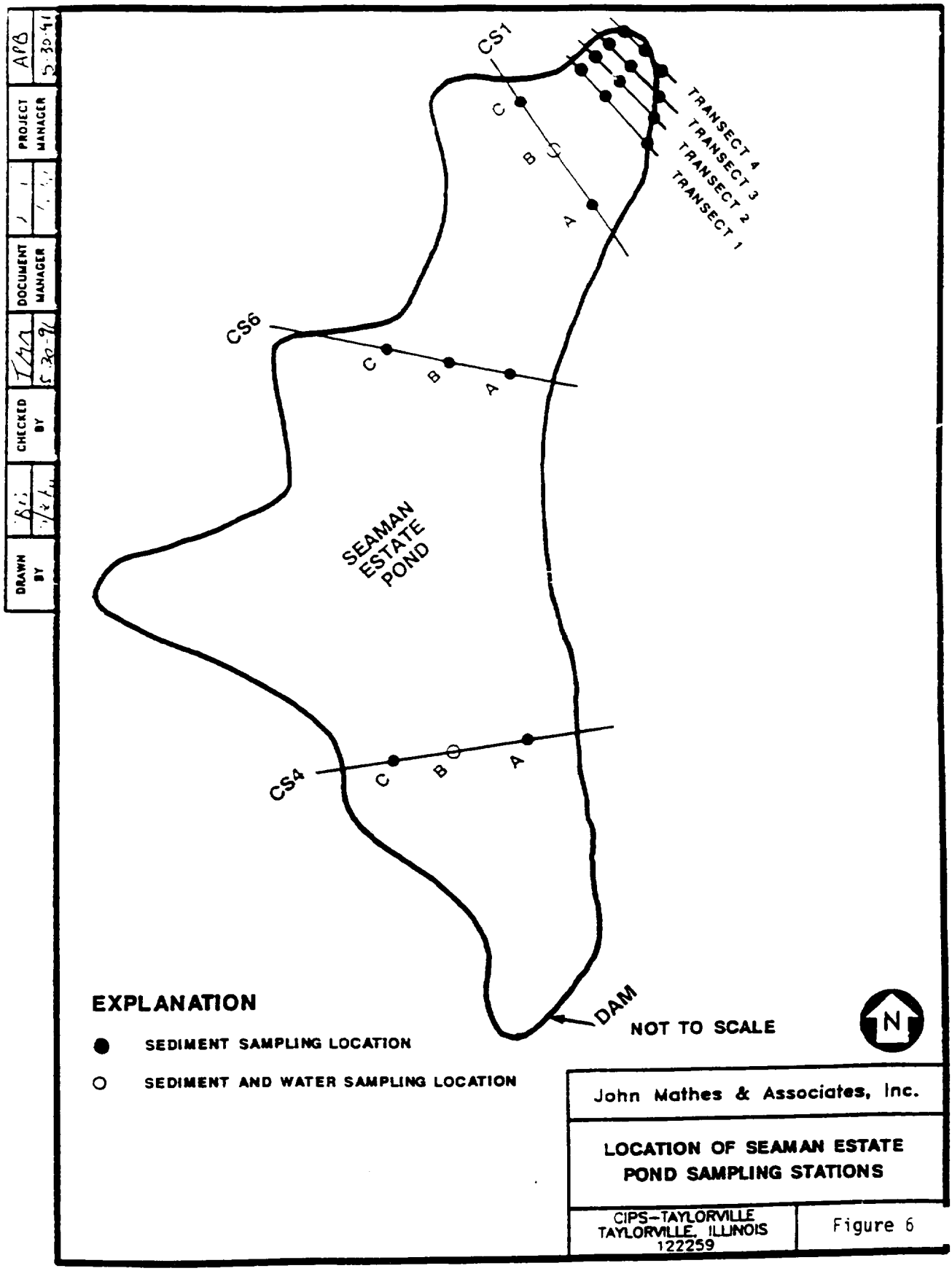
CHECKED BY
DOCUMENT MANAGER
PROJECT MANAGER
REV. DATE 5/15/91



Base map modified from Hanson Engineers Incorporated Job No. 85-3086 A Figure titled On Site Soil Excavation Area


HOUSTON
CHENEY
WEBSTER
Manners Park
Oakhill Cemetery
SITE
Taylorville City Limit
NOKOMIS RD (CH-1)
OLD ROUTE 48
Hewittville
MICHELS ST.
HOUSTON
W-13
W-14
PUMP HOUSE
W-1
W-3
W-6
W-4
W-8
W-7
W-2
W-5
W-9
W-12
W-10
W-11
W-15
W-16
W-17
W-18
W-22
W-19
W-20
W-21
South Fork of Sangamon River
LEGEND
STORAGE TANK
BUSINESS ESTABLISHMENT
FARM UNIT
DWELLING
SCHOOL
CHURCH
DOMESTIC WELL LOCATIONS
DUP/ Duplicate Samples
0
800
1600
SCALE IN FEET
N
Base map modified from Hanson Engineers Incorporated
Job No 85a3065 A, Figure Titled Gas Plant Site.
John Mathes & Associates, Inc.
DOMESTIC WELL LOCATIONS
CIPS - TAYLORVILLE
TAYLORVILLE, ILLINOIS
Figure 4


TAYLORVILLE CITY LIMIT
FENCE INSTALLED ALONG NORTH, EAST, AND WEST SITE BOUNDARIES
WEBSTER STREET
WATER MAIN TIE-IN TO EXISTING SYSTEM
SITE
CIPS PROPERTY, POLE STORAGE WESTERN PARCEL AT 217 WEBSTER STREET
MANNERS PARK
CHEROKEE ST
WATER MAIN TIE-IN TO EXISTING SYSTEM
CIPS PROPERTY TRACT 1
CIPS PROPERTY TRACT 2
CIPS PROPERTY TRACT 8
TRACT 3
TRACT 4
TRACT 5
TRACT 6
TRACT 7
NOKOMIS RD (CH
TAYLORVILLE CITY LIMIT
AREA B
CIPS PROPERTY
AREA B
CIPS PROPERTY
ILLINOIS ROUTE 48
SOUTH FORK OF SANGAMON RIVER
EXPLANATION
CITY OF TAYLORVILLE WATER MAIN INSTALLED BY CIPS
FENCE
RESIDENCES CONNECTED TO CITY WATER
CIPS OWNED PROPERTY
DEED RESTRICTIONS ON GROUNDWATER USE AND RESIDENCES CONNECTED TO CITY WATER
GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON AUGUST 5, 1988, REPORT THAT INCLUDED MODELING PERFORMED BY THOMAS A. PRICKETT
0
400
800
SCALE IN FEET
N
John Mathes & Associates, Inc
IMPLEMENTED INSTITUTIONAL CONTROLS
CIPS - TAYLORVILLE
TAYLORVILLE, ILLINOIS
122252
Figure 5

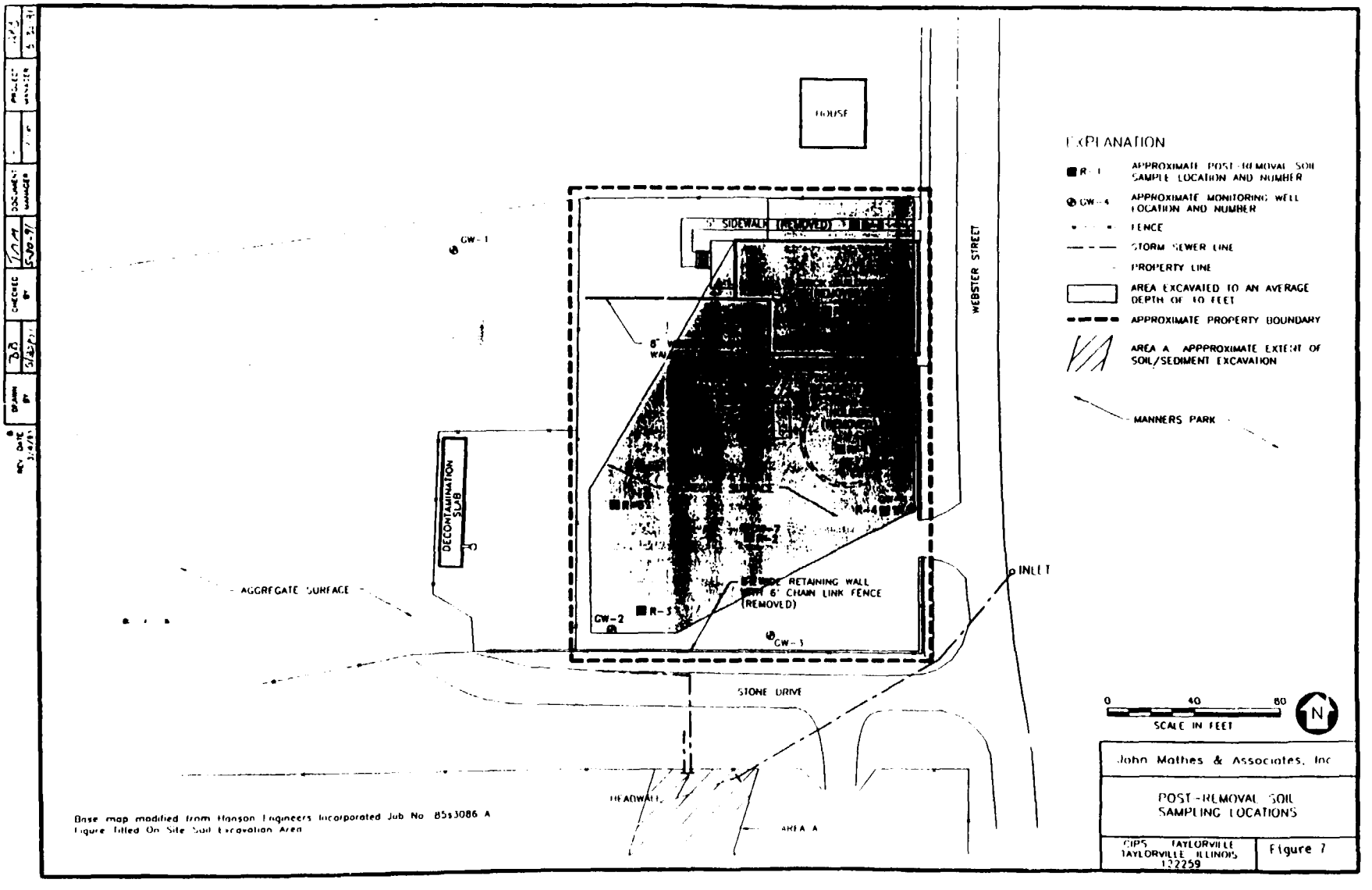


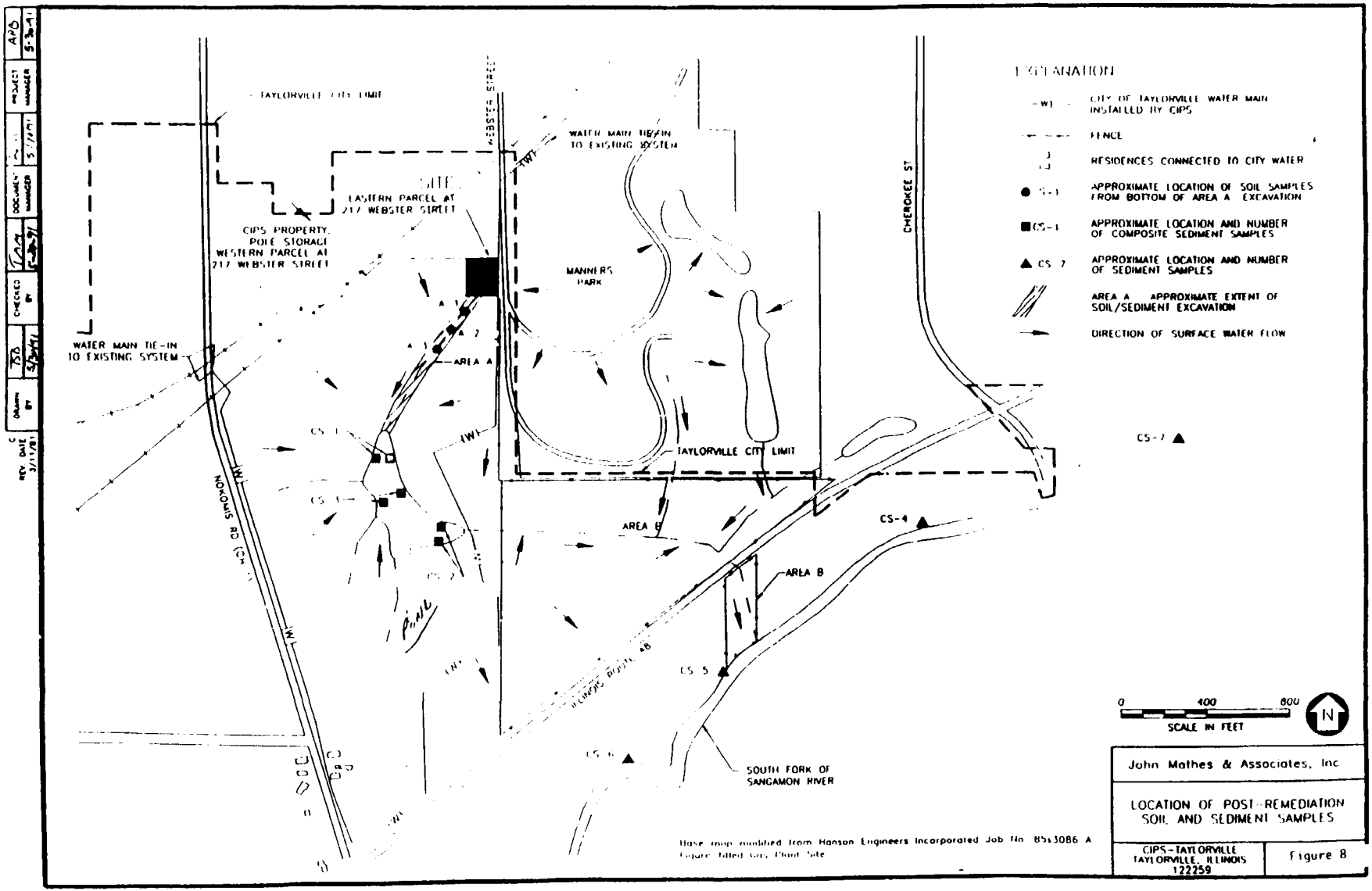
John Mathes & Associates, Inc.

LOCATION OF SEAMAN ESTATE POND SAMPLING STATIONS

CIPS–TAYLORVILLE
TAYLORVILLE, ILLINOIS
122259

Figure 6


HOUSE
SIDEWALK (REMOVED)
WEBSTER STREET
GW-1
8" WALL
DECONTAMINATION SUB
AGGREGATE SURFACE
RETAINING WALL
6' CHAIN LINK FENCE
(REMOVED)
R-3
GW-2
GW-3
INLET
STONE DRIVE
HEADWALL
AREA A
MANNERS PARK
EXPLANATION
APPROXIMATE POST-REMOVAL SOIL SAMPLE LOCATION AND NUMBER
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 APPPROXIMATE EXTENT OF SOIL/SEDIMENT EXCAVATION
0
40
80
SCALE IN FEET
N
John Mathes & Associates, Inc
POST-REMOVAL SOIL SAMPLING LOCATIONS
CIPS TAYLORVILLE
TAYLORVILLE ILLINOIS
122259
Figure 7
Base map modified from Hanson Engineers Incorporated Job No 85s3086 A
Figure Titled On Site Soil Excavation Area



Base map modified from Hanson Engineers Incorporated Job No. 85s3086 A
Figure Titled Gas Plant Site

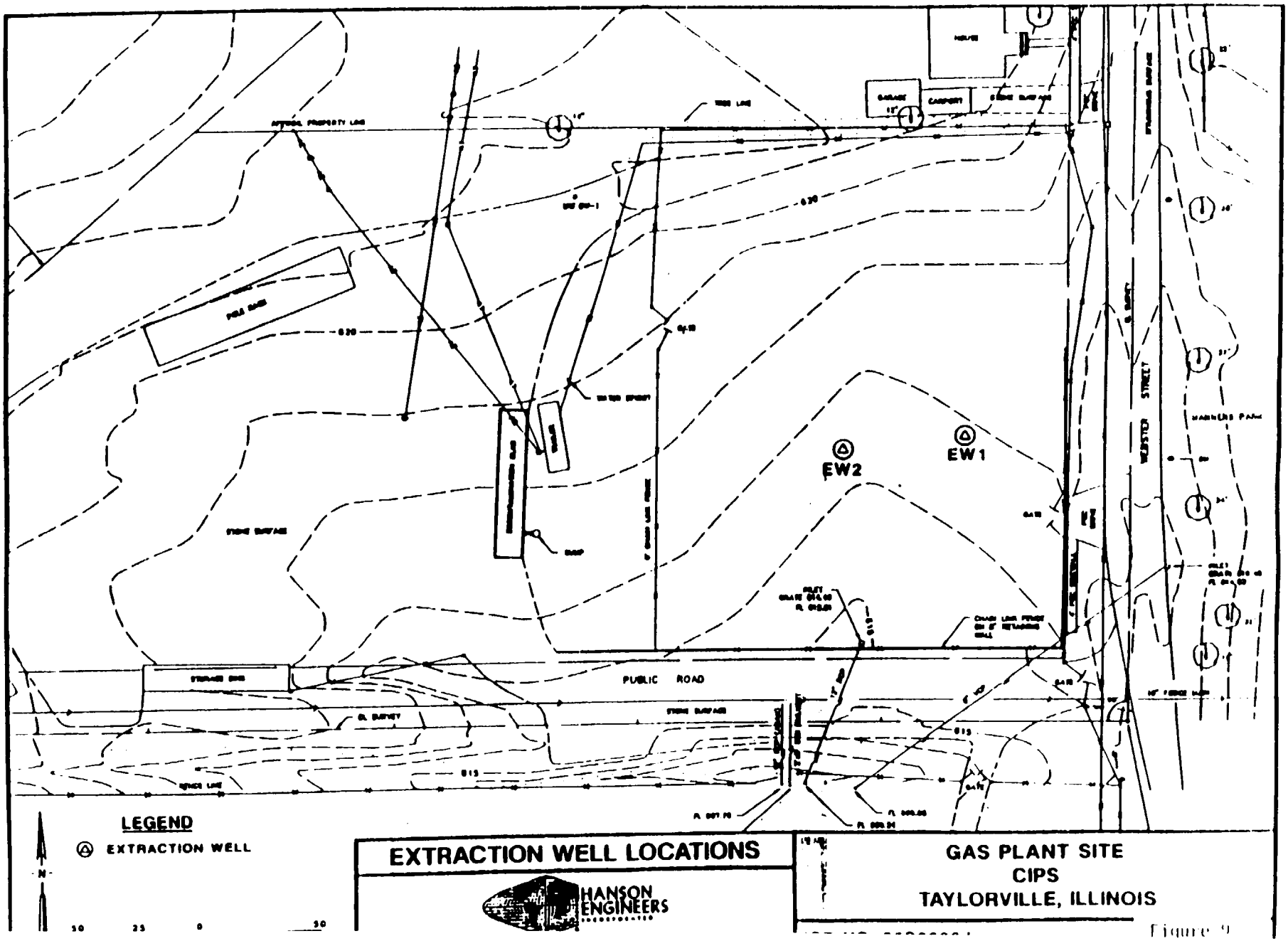
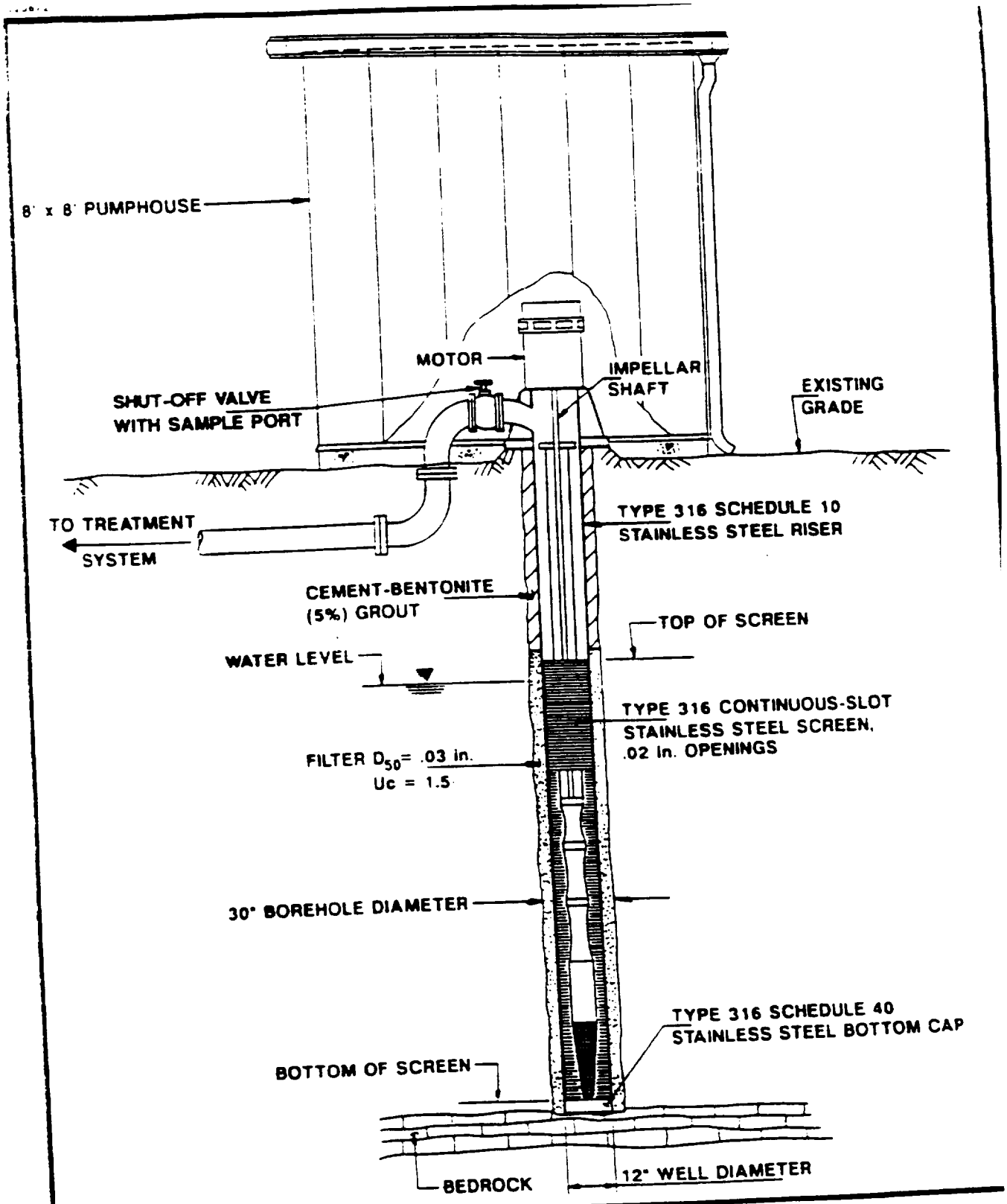

EW2
EW1
PUBLIC ROAD
WEBSTER STREET
LEGEND
EXTRACTION WELL
N
EXTRACTION WELL LOCATIONS
HANSON ENGINEERS
GAS PLANT SITE
CIPS
TAYLORVILLE, ILLINOIS

Figure 9



TYPICAL EXTRACTION WELL DESIGN

HANSON ENGINEERS

SPRINGFIELD, IL • PEORIA IL • ROCKFORD, IL

GAS PLANT SITE
CIPS
TAYLORVILLE, ILLINOIS

JOB NO. 85S3086J

Figure

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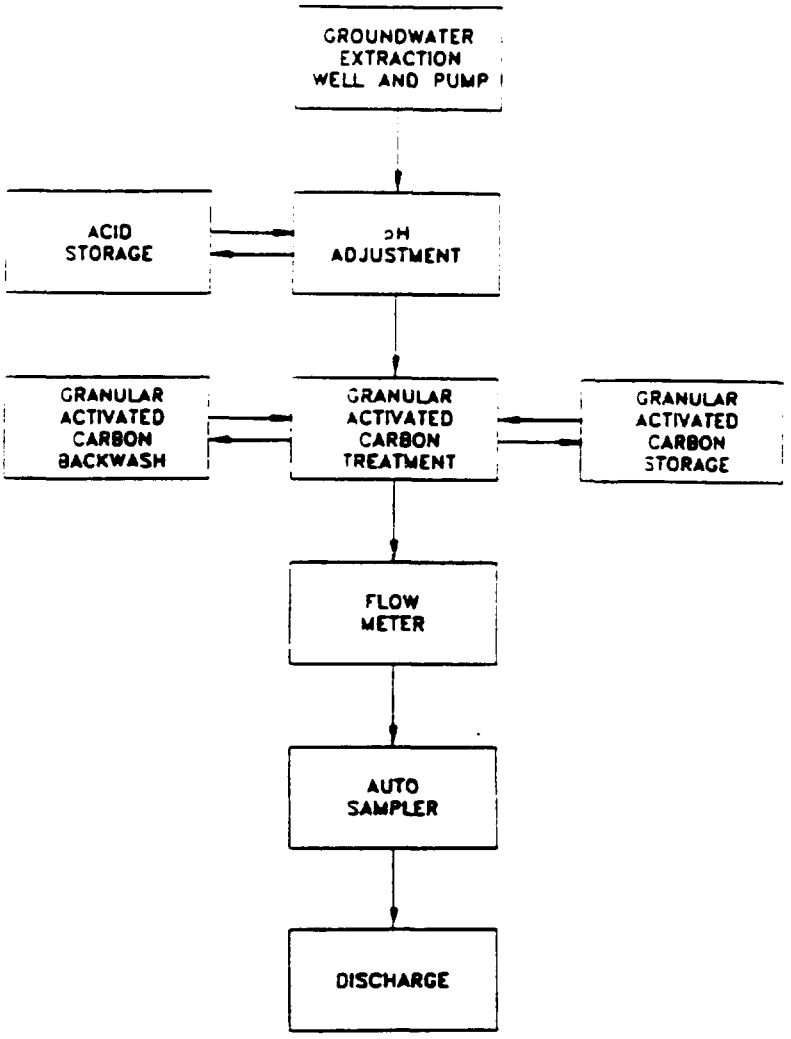
PROJECT MANAGER	APB	2-20-91
REV. DATE 9/28/90		

ALTERNATIVE 5



John Mathes & Associates, Inc.

GRANULAR ACTIVATED CARBON GROUNDWATER TREATMENT SYSTEM FLOW DIAGRAM

CIPS GAS PLANT
TAYLORVILLE, ILLINOIS
122259

Figure 11

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590
30 SEP 1992

REPLY TO THE ATTENTION OF:
R-19J

Ms. Mary A. Gade
Director
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL. 62706

Dear Ms. Gade:

The United States Environmental Protection Agency (U.S. EPA) is providing you with this letter to document U.S. EPA's concurrence with the final remedy selected for the Central Illinois Public Service Company (CIPS) Site in Taylorville, Illinois. The proposed remedy, as outlined in the August 1991 Proposed Plan, includes the following:

A. Construction of an on-site ground water pump and treat system.

B. Operation and maintenance of the system until Illinois Environmental Protection Agency (IEPA)'s cleanup objectives are met.

C. Expansion of the monitoring program for untreated ground water and treatment system effluent to supplement current monitoring efforts.

D. Complete fencing (with signs) of the site.

E. Land use and deed restrictions, to the extent possible, for the site and affected off-site areas.

In addition, an immediate removal action has already been completed by the responsible party under a state superfund notice. This action included the following:

1. Excavation of contaminated source materials above the water table (9,000 cubic yards of soil; 3,000 cubic yards of sediment; disposal of source materials off-site in a permitted landfill; and backfilling of excavation areas with clean materials.

2. Connection of potentially affected residents to the public water supply; and plugging and abandonment of associated private drinking water wells.

3. Monitoring of ground water, surface water, pond sediment, and fish downstream of the site.

The U.S. EPA concurs with the selection of the final remedy for the CIPS Site as described above and in the IEPA's Record of Decision Summary for the CIPS Site, a copy of which is enclosed and made part of this letter. Because this remedy will result in hazardous substances remaining on-site above health-based levels, U.S. EPA expects IEPA to conduct five-year reviews after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Thank you for your support and cooperation in addressing the contamination problem at the CIPS Site.

Sincerely yours,

David A. Ullrich

Valdas V. Adamkus
Regional Administrator

Enclosure