United States
Environmental Protection
Agency

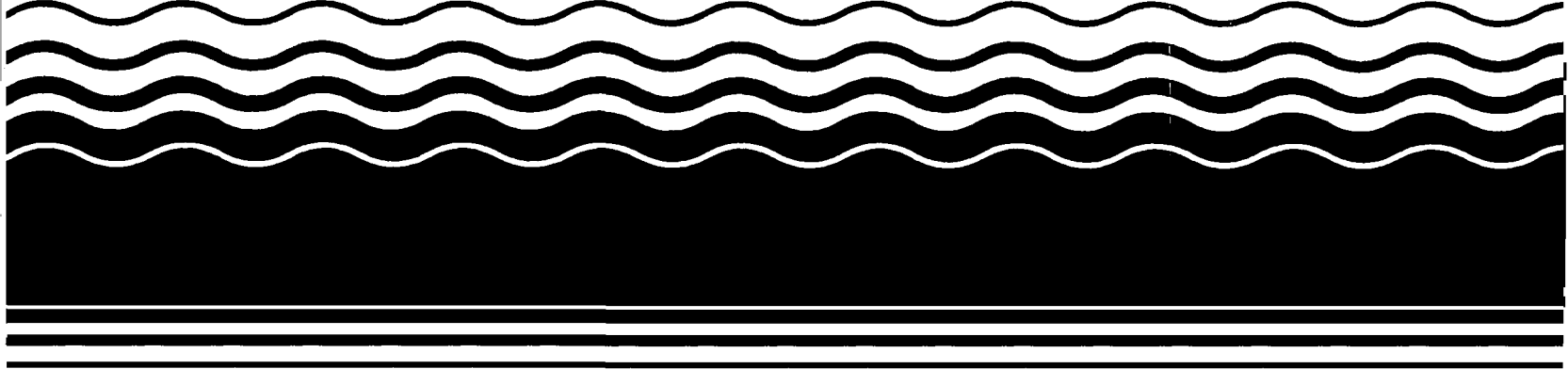
Office of
Emergency and
Remedial Response

EPA/ROD/R04-93/130
December 1992

EPA

Superfund Record of Decision:

Koppers (Morrisville Plant), NC



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REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R04-93/130	2.	3. Recipient's Accession No.

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SUPERFUND RECORD OF DECISION
Koppers (Morrisville Plant), NC
First Remedial Action - Final

5. Report Date 12/23/92

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800/800

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PB94-964026

16. Abstract (Limit: 200 words)

The 52-acre Koppers (Morrisville Plant) site is a wood laminating facility in Wake County, Morrisville, North Carolina. Land use in the area is predominantly a mixture of commercial, light industrial, and rural residential. Residents near the site currently use the public water lines to obtain their drinking water supply. The site contains several ponds and streams that drain eventually into Crabtree Lake. From 1896 to 1961, the site was owned by the Cary Lumber Company, then subsequently by Unit Structures. In 1962, Koppers purchased the site and began treating wood onsite using a process known as CELLON. In this process, solvents, including PCP and isopropyl ether, were injected into the wood, and the rinsate from this process was pumped directly into two unlined lagoons at the site. In 1975, Koppers discontinued use of the CELLON process and began receiving pretreated wood for their operations. As a direct result of these past wood treatment processes and associated improper disposal activities, the site has been contaminated with organics, including pentachlorophenol, dioxins and isopropyl ether. In 1976, Koppers voluntarily began to conduct environmental studies at the site focusing on the CELLON process area and the lagoon area. Based on these studies, it was recommended that the two lagoons should be reclaimed by land treatment, and the liquid contents of the lagoons subsequently were pumped out and land farmed, or

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Koppers (Morrisville Plant), NC
First Remedial Action - Final
Contaminated Media: soil, gw, sw
Key Contaminants: organics (dioxins, phenols)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

19. Security Class (This Report) None

20. Security Class (This Page) None

21. No. of Pages 118

22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

Abstract (Continued)

sprayed. In 1980, Koppers conducted additional studies of the onsite ground water and soil, which prompted three private removals between 1980 and 1986, in which a total of 1,560 yd^3 of contaminated soil were removed from the lagoon area and 150 yd^3 were removed from other site areas, with offsite disposal at a permitted facility. In 1980, EPA evaluated two of the onsite ponds and several private wells, and documented that no further action was considered necessary at the time. In 1986, Beazer and the State investigated the ground water to determine if any of the contamination at the site had migrated into private wells in the immediate vicinity of the site. In 1989, based on study results, the State required Beazer to extend the public water supply lines to affected residences; to conduct ground water sampling at the site on a quarterly basis; and to provide bottled water to those residences who were not connected to the water line extension. In 1990, EPA required extensive studies of the soil, ground water, drainage pathways, and ponds, and also has determined that additional studies were needed to further assess contamination of the surface soil in the lagoon and CELLON process areas. This ROD addresses contamination of onsite soil, ground water, and surface water, as the final action for this site. The primary contaminants of concern affecting the soil, ground water, and surface water are organics, including dioxins and phenols.

The selected remedial action for this site includes excavating and mobilizing approximately 2,930 yd^3 of soil from the lagoon and process areas to an offsite incineration facility for treatment, with offsite disposal of the resultant ash at a permitted landfilling facility; backfilling any excavated areas with clean fill, with regrading and revegetation; extracting and treating contaminated ground water onsite using equalization and filtration to remove solids, followed by carbon adsorption to remove organics, with discharge of the treated effluent onsite to surface water, or offsite, if no viable surface water discharge point exists onsite; dewatering and backfilling the onsite ponds with clean fill; treating the pond water onsite using carbon adsorption, with discharge of the treated effluent onsite to the surface water, or offsite if no viable surface water discharge point exists onsite; regrading the site areas to promote proper drainage flow, and mitigating any affected wetlands; conducting treatability studies to determine the effectiveness of treating the soil onsite using dechlorination, as a contingency remedy; and fencing of the pond, lagoon, and CELLON process areas. The estimated present worth cost for this remedial action is $11,500,000, which includes an annual O&M cost of $3,612,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS:

All soils contaminated with greater than 95 mg/kg PCP and/or 7 ug/kg dioxins/furans will be excavated and removed offsite for treatment. Chemical-specific soil cleanup goals are based on RCRA Land Disposal Requirements (LDRs) and a risk factor of 10^{-3}.
Chemical-specific ground water cleanup goals are based on SDWA MCLs and a risk level of 10^{-6} and include PCP 1 ug/l; 2,4-dichlorophenol 20 ug/l; and dioxins/furans 0.00003 ug/l.

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

KOPPERS CO., INC. (MORRISVILLE PLANT) SITE

MORRISVILLE, WAKE COUNTY
NORTH CAROLINA

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV
ATLANTA, GEORGIA

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Koppers Co., Inc. (Morrisville Plant) Site
Morrisville, North Carolina

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Koppers Co., Inc. (Morrisville Plant) Superfund Site in Morrisville, North Carolina chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of North Carolina conditionally concurs with the selected remedy. EPA Headquarters concurs with the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy addresses the current and future unacceptable risks posed by the Site to human health and the environment.

A primary remedy and a contingency remedy have been selected for soils. The primary selection for soils, alternative S-9, will permanently remove and destroy contamination in the soil through treatment. This alternative involves off-site incineration of the soils at a permanent permitted facility, to include:

- Excavation of contaminated soils from the lagoon and process areas onsite to meet cleanup standards,
- Transportation of soils to an offsite permitted incineration facility,
- Backfilling of excavation areas with clean fill,

- Final regrading and revegetation of the excavated areas.

Dechlorination Treatability Studies will be conducted on soils. Based upon the results, the contingency remedy unitlizing the dechlorination process known as Base Catalyzed Dehalogenation, may be selected as the contingency remedy for soils. The contingency remedy would be required to permanently remove and destroy contamination in the soil. If selected, would include:

- Excavation of contaminated soils from the lagoon and process areas onsite to meet cleanup standards,
- Mobilization of soils to an onsite dechlorination treatment system,
- Backfilling of excavation areas with clean, treated soils,
- Final regrading and revegetation of the excavated areas.

Alternative GW-4 for groundwater will remove site-related contaminants in the groundwater through groundwater extraction and on-site treatment by carbon adsorption. The following activities are involved in this alternative:

- Contaminated groundwater will be extracted from within the plume via extraction well(s) and piped to an onsite, above-ground treatment unit.
- Treatment will consist of carbon adsorption through a primary carbon adsorption unit and a secondary carbon polishing unit.
- Final discharge of the effluent will be to the surface water, stipulated by the substantive requirements of the National Pollutant Discharge Elimination System. If no viable surface water discharge point exists on the site, the discharge may be offsite, thereby requiring a permit under the National Pollutant Elimination System.
- Further delineation of the horizontal and vertical extent of groundwater contamination will be conducted.

Alternative SW-3 for surface water will remove site-related contaminants in the surface water by the dewatering of the ponds, backfilling with clean fill, and regrading the areas for proper drainage flow. Activities of the surface water component of the remedy consist of:

- The onsite Fire Pond and the Medlin Pond will be dewatered.
- The ponds will be backfilled with clean fill.

- The surface water will be treated by carbon adsorption.

- Final discharge of the effluent will be to the surface water, stipulated by the substantive requirements of the National Pollution Discharge Elimination System. If no viable surface water discharge point exists on the site, the discharge may be offsite, thereby requiring a permit under the National Pollution Elimination System.

- Final regrading and drainage control of the pond areas will be conducted.

- Wetlands will be destroyed under this portion of the remedy. Therefore wetlands mitigation will be required under this remedy. Final location and requirements of this mitigation will be decided during Remedial Design. Evaluation of the associated habitats will be conducted under a Habitat Restoration Plan.

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 alterative treatment and resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Since this remedy may result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Patrick M Tobin

Patrick M. Tobin
Acting Regional Administrator

12-23-92

Date

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Koppers Co., Inc. (Morrisville Plant) Site
Morrisville, North Carolina

1.0 Site Name, Location and Description

The Koppers Co., Inc. (Morrisville Plant) Site is located in Morrisville, North Carolina which is in Wake County. The 52 acre site is located at the intersection of Highway 54 and Koppers Road.

The property of the site is owned by two companies: Beazer East, Inc. ("Beazer") and Unit Structures, Inc. Beazer East is the successor to the Koppers Company. The Koppers Company had conducted wood treatment operations at the site. Unit Structures, Inc. purchased portions of the site property in 1986 and currently operates a wood laminating facility on approximately 80% of the original site property. The portion of the site currently owned by Beazer is inactive.

Figure 1.1 is a facility map which indicates the site features. The process area and the lagoon area are both located near the Fire Pond in the southeastern section of the site. The landfarm area is the northernmost section of the site proper. The surface drainage ditches on the eastern and western boundaries of the site are shown. The western ditch flows downstream in a southerly direction and merges with the outflow ditch of the Medlin Pond. The Fire Pond outflow ditch flows into the Medlin Pond. The confluence of these surface water features flows downstream and drains into Crabtree Creek and subsequently into Crabtree Lake.

Land use is the area is a mixture of commercial, light industrial and rural residential. Drinking water was obtained from private wells prior to 1989. Public water lines have been extended to the immediate area around the site by Beazer under an Administrative Order by Consent entered into with the Environmental Protection Agency in May of 1989.

2.0 Site History and Enforcement Activities

History of the site ownership dates back to 1896. Cary Lumber Company occupied the site and sold the property to a company known as Unit Structures, Inc., in 1961. The original Unit Structures company is unrelated to the present company at the site today. Only the name is the same. The following year, in 1962, Unit Structures sold the property to Koppers Company, Inc., ("Koppers").

At that time, Koppers began treating wood using a process known as CELLON. CELLON treatment consisted of injection of pentachlorophenol into the wood. Pentachlorophenol is a main contaminant at the site. Isopropyl ether (IPE) was used as a co-solvent in the process to increase the solubility of

Figure 1.1

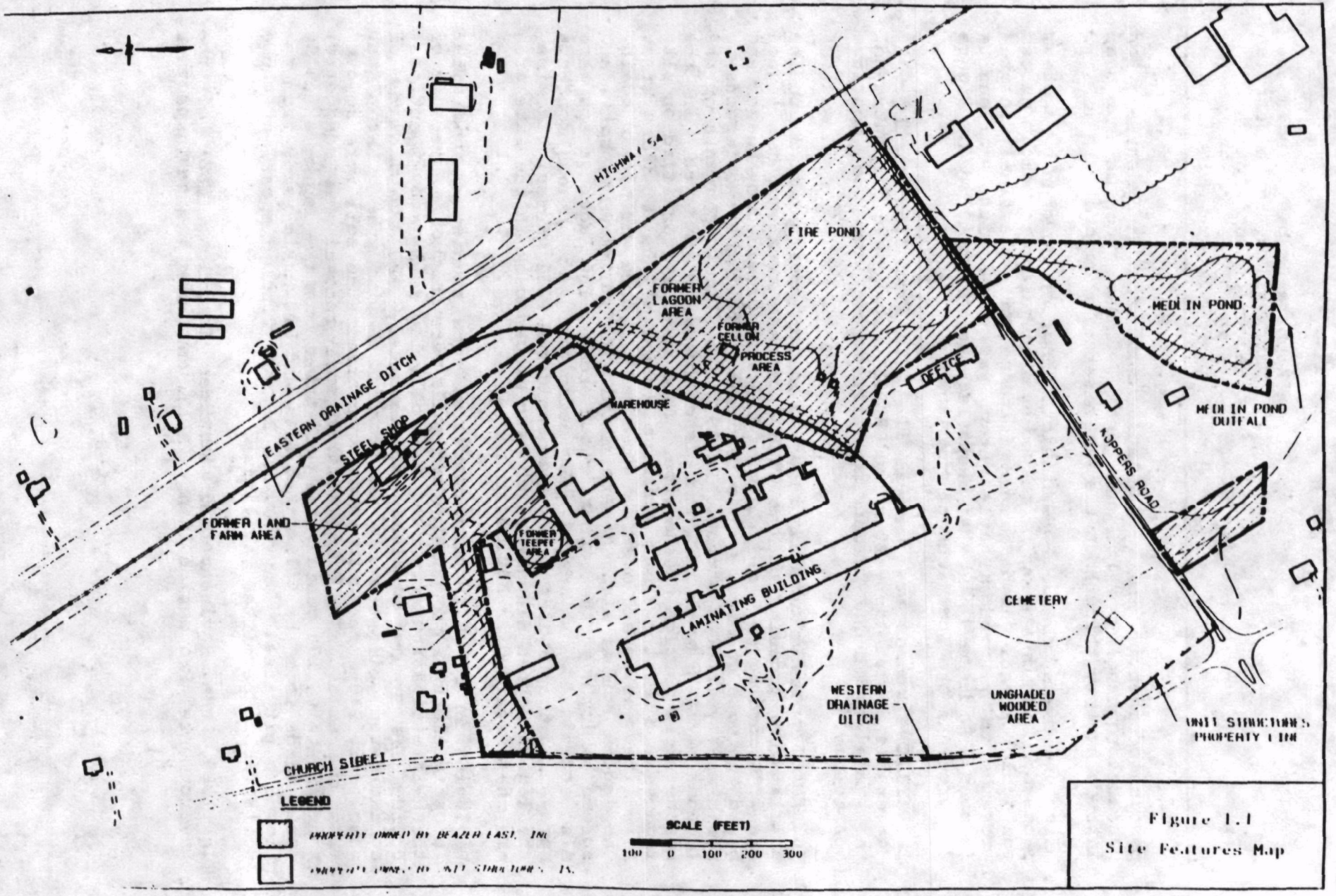


Figure 1.1
Site Features Map

pentachlorophenol in a butane carrier. Synonyms for pentachlorophenol are PCP and penta. These synonyms are used interchangeably throughout the Administrative Record.

After treatment, residual pentachlorophenol was removed by a steam process. The rinsate was processed by a coagulant to remove excess pentachlorophenol which was then filtered off. The final rinsate, presumed to be predominantly water, was pumped into two onsite lagoons. It is believed that these lagoons were not lined. Figure 2.1 presents the locations of the lagoons.

The CELLON process was used at the site from 1968 until 1975. Beazer has stated that after the CELLON process was discontinued, the facility began receiving pretreated wood to continue operations.

In 1976, Koppers voluntarily began to conduct environmental studies at the site focusing on the CELLON process area and the lagoon area. According to the history of the site provided by Beazer and based on those studies, it was recommended that the two lagoons be reclaimed by land treatment. In 1977, the liquid contents of the lagoons were pumped out and landfarmed, or sprayed, in the northernmost portion of the site. This area is identified on site figures and in the Administrative Record as the landfarm area. Fertilizer was spread over the area and the area was plowed again. The lagoon bottom sludges were mixed with surrounding soils and spread to dry over the former lagoon areas. The lagoon areas were also fertilized and seeded. By definition, the lagoon contents sprayed in the landfarm area are considered F032 wastes; likewise, the lagoon bottom sludges which were placed back in the same area are characterized as K001 wastes.

Beginning in 1980, Koppers conducted more studies on the site. Investigations of groundwater and soils were conducted. Results of these investigations prompted the following soil removal actions. During the spring of 1980, approximately 220 cubic yards of contaminated soil were removed from the lagoon area. Later that same year, 240 more cubic yards of contaminated soil were removed from the area. In 1986, another soil removal was conducted. Approximately 1100 cubic yards were taken from the lagoon area, 50 cubic yards from the filter bed area and 100 cubic yards from the blowdown pit area. According to Beazer, final disposal of these soils was to permitted facilities.

In 1980, the Environmental Services Division (ESD) of the Environmental Protection Agency (EPA), conducted a site inspection

Figure 2.1

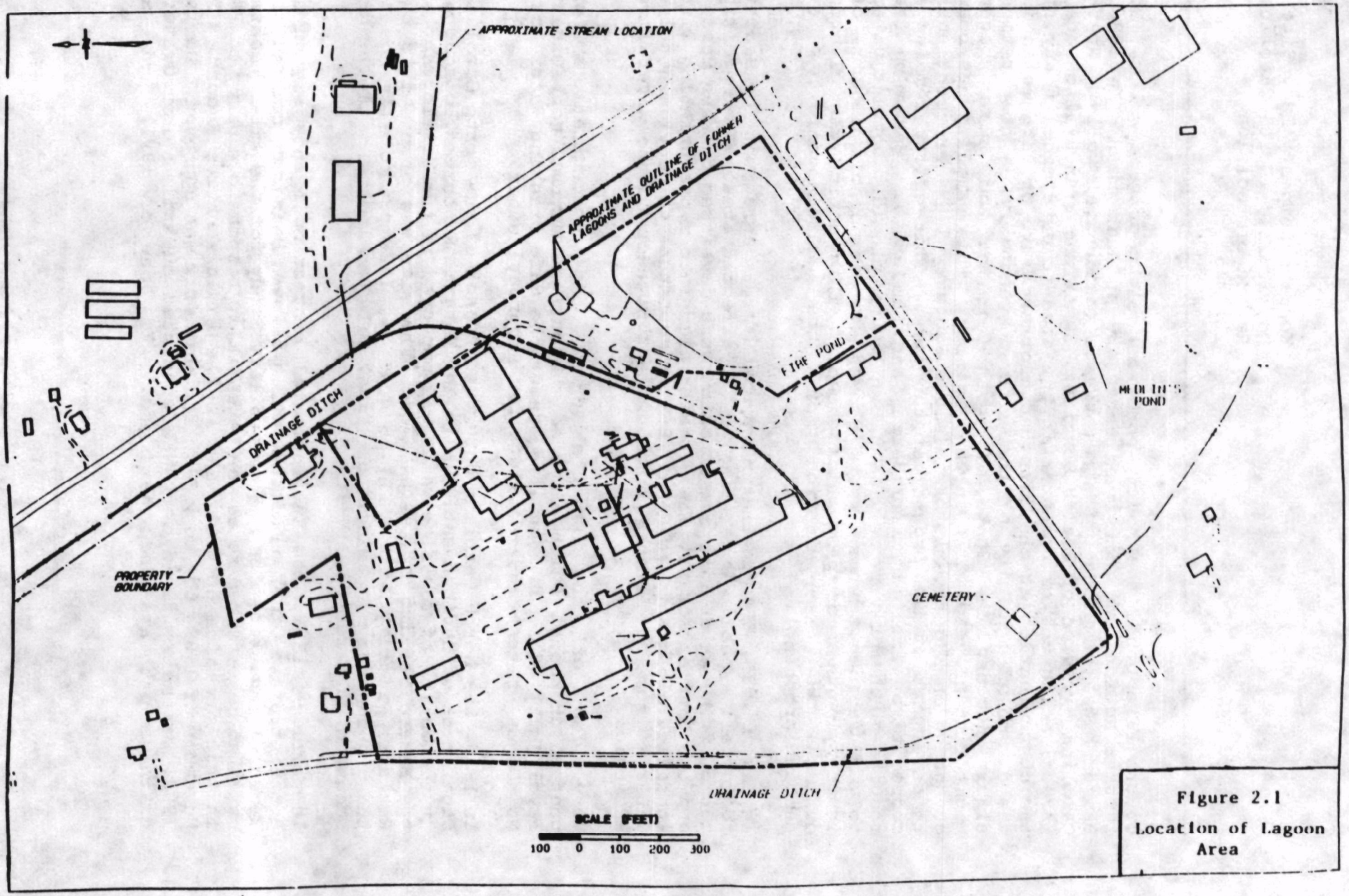


Figure 2.1
Location of Lagoon Area

of the Fire pond, the Medlin pond and select private wells. No further action was considered necessary at that time. In 1986, Beazer began sampling off site private residential wells. North Carolina Division of Health Services, Superfund Branch also began investigating the groundwater in the area to determine if any of the contamination at the site had migrated into private wells in the immediate vicinity of the site. Eventually, a cooperative effort between the State of North Carolina and Beazer began monitoring private wells in the vicinity. This sampling has been conducted on a quarterly basis since February 1989, and continues to be a part of the program at the site. This effort remains a cooperative effort between Beazer and the State. Based on the results of the private well sampling, Beazer provided bottled water to all residents whose wells showed any detectable amounts of isopropyl ether or pentachlorophenol. This action was elected during the re-evaluation of the carcinogenicity of pentachlorophenol.

In May of 1989, EPA and Beazer entered into an agreement for Beazer to install a public water line to the affected area. The specific terms of the water line construction were developed between Beazer and the town of Morrisville. Beazer tied into a pre-existing line installed along Koppers Road. Beazer continues to provide bottled water to some residences which did not connect to the water line extension.

Very few of the private wells had concentrations of pentachlorophenol which exceeded the current maximum contaminant level (MCL) of 1 ppb identified under the Safe Drinking Water Act. No MCL or State standard exists for isopropyl ether.

In 1986, the North Carolina Superfund Branch of the North Carolina Department of Environment, Health and Natural Resources, conducted an inspection of the site which was employed in the development of the Hazard Ranking System package. The site was proposed to the National Priority List (NPL) on June 24, 1988 principally due to the groundwater contamination. Final rule and inclusion on the NPL occurred on March 31, 1989.

In March of 1989, the Environmental Protection Agency signed an Administrative Order on Consent which allowed Beazer to conduct the Remedial Investigation and Feasibility Study for the site. Beazer may also be referred to as the potentially responsible party or PRP in this decision document and in the Administrative Record. In November of 1989, the Work Plan for this work was approved. During 1990, extensive field work was conducted on soils, groundwater, drainage pathways and the ponds. In June of 1991, it was

determined by the Agency that additional field work was required, specifically on surface soils in the lagoon and CELLON process areas. Additional groundwater sampling has also been conducted.

In 1986, a company known as Unit Structures, Inc., ("USI"), purchased approximately 40 acres of the Site from Koppers. As part of the settlement of certain legal matters between USI and Beazer, USI reconveyed certain portions of the property back to Beazer in March 1992. USI continues to own portions of the Site.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The EPA has encouraged public participation since NPL inclusion. The community has an active association, the Shiloh Coalition for Community Control and Improvement, that was established before the site was finalized on the NPL. More recently a subgroup has been formed out of the coalition which identifies itself as the Clean Water and Environment Project. Other citizens and groups have participated, but the Coalition represents the most vocal and active sector in the community.

The community has been quite organized in their participation of site activities and have held their own public meetings of which EPA was sometimes invited to attend. A total of four public meetings have been held by the Agency. Periodic fact sheets have been distributed to update the community during the Remedial Investigation and Feasibility Study.

EPA has solicited both formal and informal comments from the community since initial development of the work plan. Documents were placed in the information repository at the Cary Branch of the Wake County library for review. Input received from the public has influenced EPA's level of oversight of the investigation as well as the substance of the project. EPA increased its oversight presence during field activities in response to community concerns. Site areas were further investigated as a result of specific input from the community.

The community has had concerns with Beazer performing the work and has frequently suggested that EPA should be doing the investigative work instead of the PRP. This concern was heightened during the development of the Baseline Risk Assessment. The community felt that the report would not accurately reflect the hazards present at the site.

A major concern of the community has been with the contamination impact on groundwater in an area where most people have

traditionally used wells for domestic water supply. An alternative water supply was provided to all residents whose wells showed any detectable amounts of pentachlorophenol or isopropyl ether. Bottled water was originally provided; permanent water lines were installed later. Some residents continue to receive bottled water if the location of the resident is not in close proximity to the water line to make hook up feasible. The City of Morrisville required that annexation petitions be submitted prior to hookup. The resulting increase in taxation and the costs associated with hookup have been a primary source of anger and frustration for many of the residents. EPA's Regional Administrator sent a letter by personal courier to a Town Council meeting requesting a waiver and/or reconsideration of this requirement. However, the Town of Morrisville decided to maintain the annexation requirement.

The local community was awarded a Technical Assistance Grant in the fall of 1991. The EPA approved the use of the small purchase procurement method which allowed faster hiring of a technical advisor than is usual practice.

A public meeting was held on April 8, 1992 to discuss the findings of the Remedial Investigation. Potential remedial technologies were discussed. The public comment period on the proposed plan was held from July 17, 1992 to September 16, 1992. A 30-day extension was requested and is incorporated into this public comment period. The Administrative Record is located in the Site Information Repository at the Cary Branch of the Wake County Public Library. Public notice was provided as a display advertisement in the Raleigh News and Observer on July 17, 1992, and as a press release on July 21, 1992. It was also published as a public service announcement on two cablevision advertisement stations during the week of July 19, 1992. The formal public meeting identifying the proposed plan was held on July 23, 1992 in accordance with CERCLA Section 117(a)(2). The transcript of this meeting is enclosed as part of the Responsiveness Summary. The Responsiveness Summary also includes responses to community concerns which have been expressed during the formal public comment period. All requirements of CERCLA Sections 113(k)(2)(B)(i-v) and 117 have been met.

An availability session was held on September 3 and 4, 1992 to provide citizens with a second opportunity to express concerns and ask questions directly to EPA representatives prior to the end of the public comment period. An announcement was mailed to all community members listed on the EPA site mailing list.

4.0 SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

The response action defined in this Record of Decision (ROD) is anticipated to be the final action and subsequently the final ROD for this site. No separate Operable Units are anticipated as this remedy will address all aspects of the site which currently pose a threat to human health or the environment. Remediation of the groundwater will be to levels that will allow the aquifer to be returned to safe drinking water levels. Remediation of the soil contamination will both eliminate direct exposure risks to onsite workers as well as eliminate future adverse impacts to the groundwater. Remediation of the surface water will eliminate exposure pathways of site related contaminants to ecological populations.

5.0 SUMMARY OF SITE CHARACTERISTICS

The Site has been subjected to the requirements of CERCLA which mandate that a Remedial Investigation be conducted. This description of site characteristics is based on that Remedial Investigation, and presents a summary of the results. Further detail can be obtained from the Remedial Investigation report, contained in the Administrative Record for this Site.

The Remedial Investigation included the sampling and analysis of groundwater, soils, surface water systems, associated sediments and fish. The results of this sampling and analysis indicate that the contamination generated by the use of the CELLON wood preserving process has adversely impacted groundwater, soils and surface waters at and in the vicinity of the site. Samples were analyzed predominantly for extractable organic compounds, also known as semi-volatile compounds, since pentachlorophenol was the main chemical component of the wood treatment. Further refinement categorized the majority of the site related contaminants as phenolics. Approximately 15 % of all environmental samples, with the exception of fish samples, were analyzed for metals, volatiles, semi-volatiles, pesticides and PCBs to ensure that the historical information available for the site was accurate and that additional unknown contaminants were not adversely affecting the Site. Analysis for PCDD/PCDF was also required of a percentage, (approximately 15%), of the environmental samples collected during the Remedial Investigation. PCDD/PCDF is known to be a contaminant of pentachlorophenol. PCDDs/PCDFs refer to polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, which are also more commonly referred to as dioxins. TCDDs/TCDFs are the tetrachlorinated congeners substituted in the 2,3,7,8-configuration, specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran. Pentachlorophenol and PCDD/PCDF are considered the major contaminants at the Site. Other phenolic

compounds and isopropyl ether, a volatile organic compound, have been identified at the site, but are considered minor site contaminants due to frequency of detection and concentration.

The investigation of soil focused on the former process and lagoon areas, the former landfarm area, the tepee area and the remaining site proper. Figure 5.1 provides the locations of the soil samples collected during the RI. Surface and varying depths of subsurface soils were used in the characterization of the soils. The analytical results demonstrate that the contamination in the former process and lagoon areas poses a significant threat for human exposure from direct contact as well as a potential source of contamination to the groundwater. Tables 5.1A and Table 5.1B identify site contaminants and the concentration ranges. Figure 5.2 provides the contaminant concentrations of the major contaminants pentachlorophenol and TCDD toxic equivalents in the former process and lagoon areas for surface soils. A concentration range for total phenolics is also shown. Subsurface soil concentrations are lower; Figure 5.2 shows maximum concentrations.

The former lagoon and process areas have been determined to be the only areas of the site which currently contain unacceptable levels of soil contaminants. Investigation of the land-farm area did not demonstrate levels of contaminants which posed a risk to human health or the environment; no offsite soils were identified to contain unacceptable levels of soil contaminants. The volume of contaminated soil in the lagoon and process areas originally estimated in the Remedial Investigation Report was approximately 1000 yds^3.

EPA had independent volume estimates conducted on the contaminated soil based on electronic data provided by Beazer. This was conducted in an effort to examine the accuracy of Beazer's volume estimates. An upper bound estimate was determined at 10,000 yds^3. EPA qualified this estimate as a possible worse case scenario. The data used for PCDD/PCDF had not been converted into toxicity equivalency factors, and therefore is considered to be overly conservative. A second independent volume estimate was conducted by the University of Cincinnati; the result was an estimate of 2930 yds^3. This Record of Decision will use the 1000 yd^3 for costing purposes. The final volume can only be determined after excavation and confirmed by quantitative analysis. Changes in volume will not affect the selection of the remedy.

Groundwater contamination was known prior to the initiation of the Remedial Investigation and was the primary reason the site was placed on the National Priority List. Figure 5.3 provides onsite

Figure 5.1

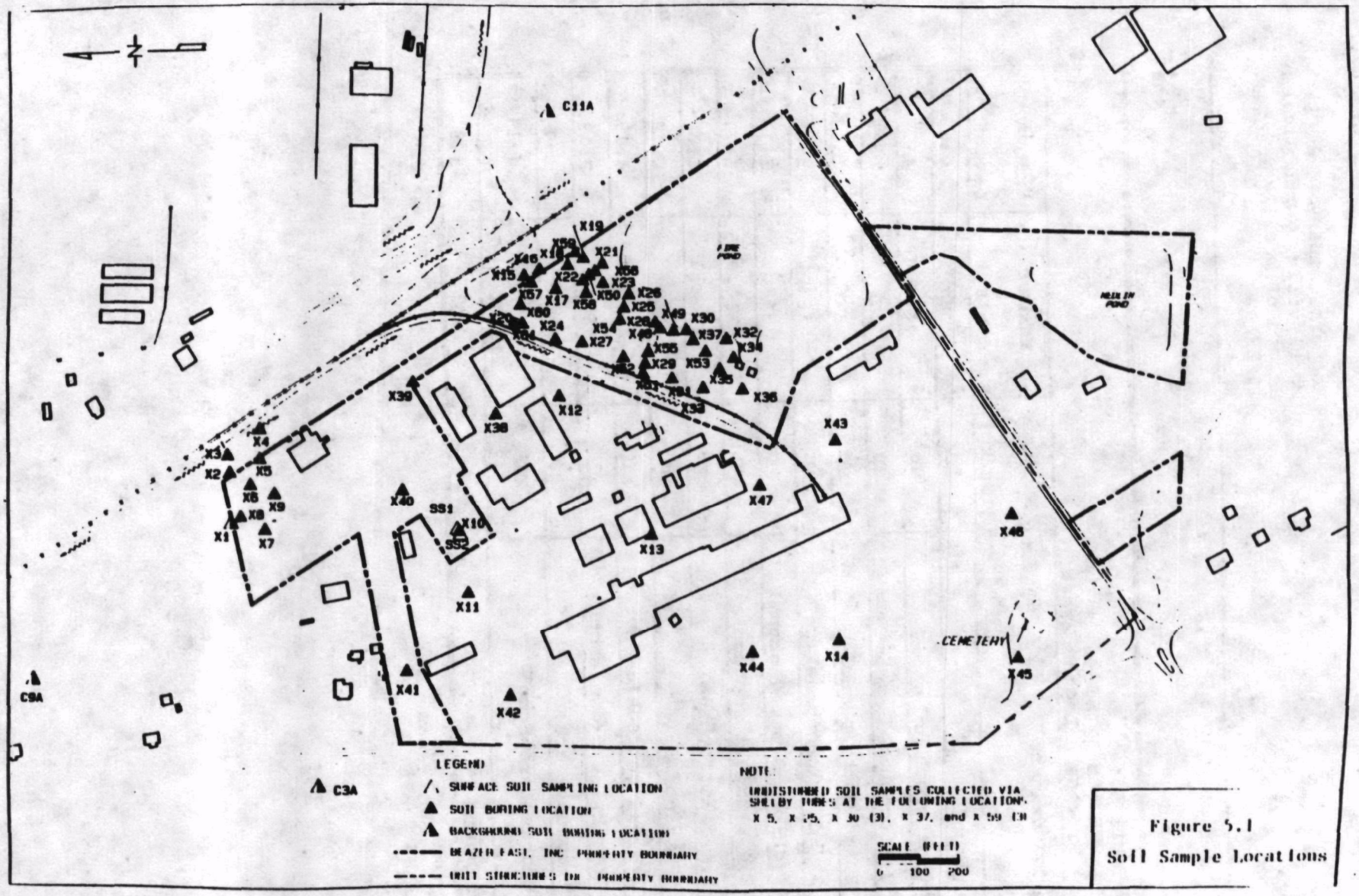


Figure 5.1
Soil Sample Locations

Table 5.1A
SURFACE SOILS -
Process & Lagoon Areas

Contaminant	Minimum (ug/Kg)	Maximum (ug/Kg)	Frequency of Detection
phenol	ND	ND	0:19
2-chlorophenol	ND	477.0	4:19
2-nitrophenol	ND	ND	0:19
2,4-dimethylphenol	ND	646.0	1:19
2,4-dichlorophenol	ND	383.0	3:19
4-chloro-3-methylphenol	ND	568.0	2:19
2,4,6-trichlorophenol	ND	190.0	1:19
2,4-dinitrophenol	ND	8740.0	1:19
4-nitrophenol	ND	ND	0:19
2,3,5,6-tetrachlorophenol	ND	3390.0	5:19
2-methyl-4,6-dinitrophenol	ND	580.0	2:19
isopropyl ether	ND	ND	0:1
pentachlorophenol	ND	3,220,000.00	16:19
TCDD-TE	0.480	270	5:5

Table 5.1B
SUBSURFACE SOILS -
Process & Lagoon Areas

Contaminant	Minimum (ug/Kg)	Maximum (ug/Kg)	Frequency of Detection
phenol	ND	ND	0:42
2-chlorophenol	ND	1440	13:42
2-nitrophenol	ND	707	2:42
2,4-dimethylphenol	ND	1320	7:42
2,4-dichlorophenol	ND	1120	12:42
4-chloro-3-methylphenol	ND	322	4:42
2,4,6-trichlorophenol	ND	1120	15:42
2,4-dinitrophenol	ND	127	1:42
4-nitrophenol	ND	640	8:42
2,3,5,6-tetrachlorophenol	ND	2680	3:42
2-methyl-4,6-dinitrophenol	ND	ND	3:42
isopropyl ether	ND	621	1:3
pentachlorophenol	ND	560,000	20:42
TCDD-TE	0.002	3.99	13:13

Figure 5.2

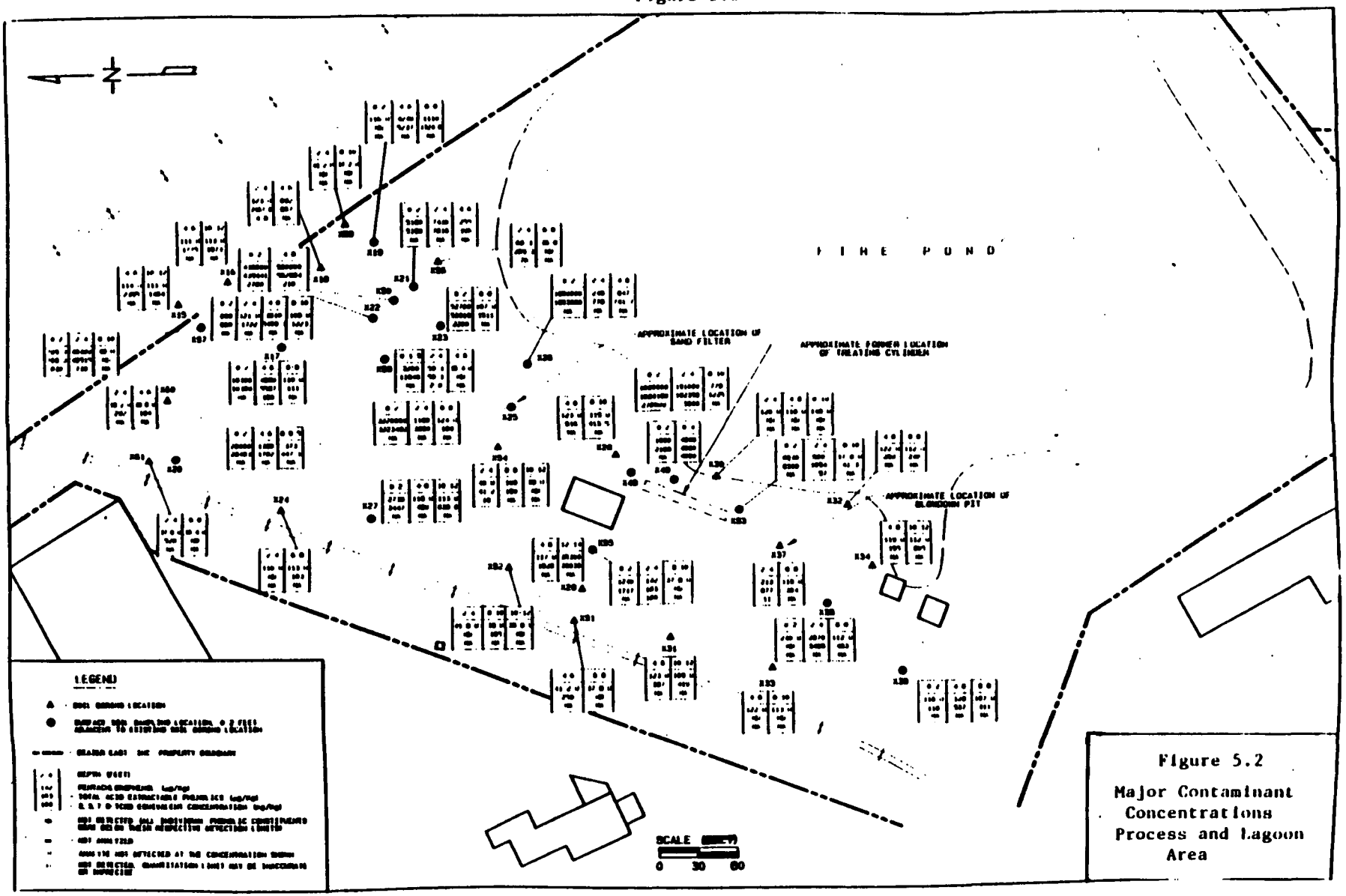


Figure 5.2
Major Contaminant Concentrations Process and Lagoon Area

Figure 5.3

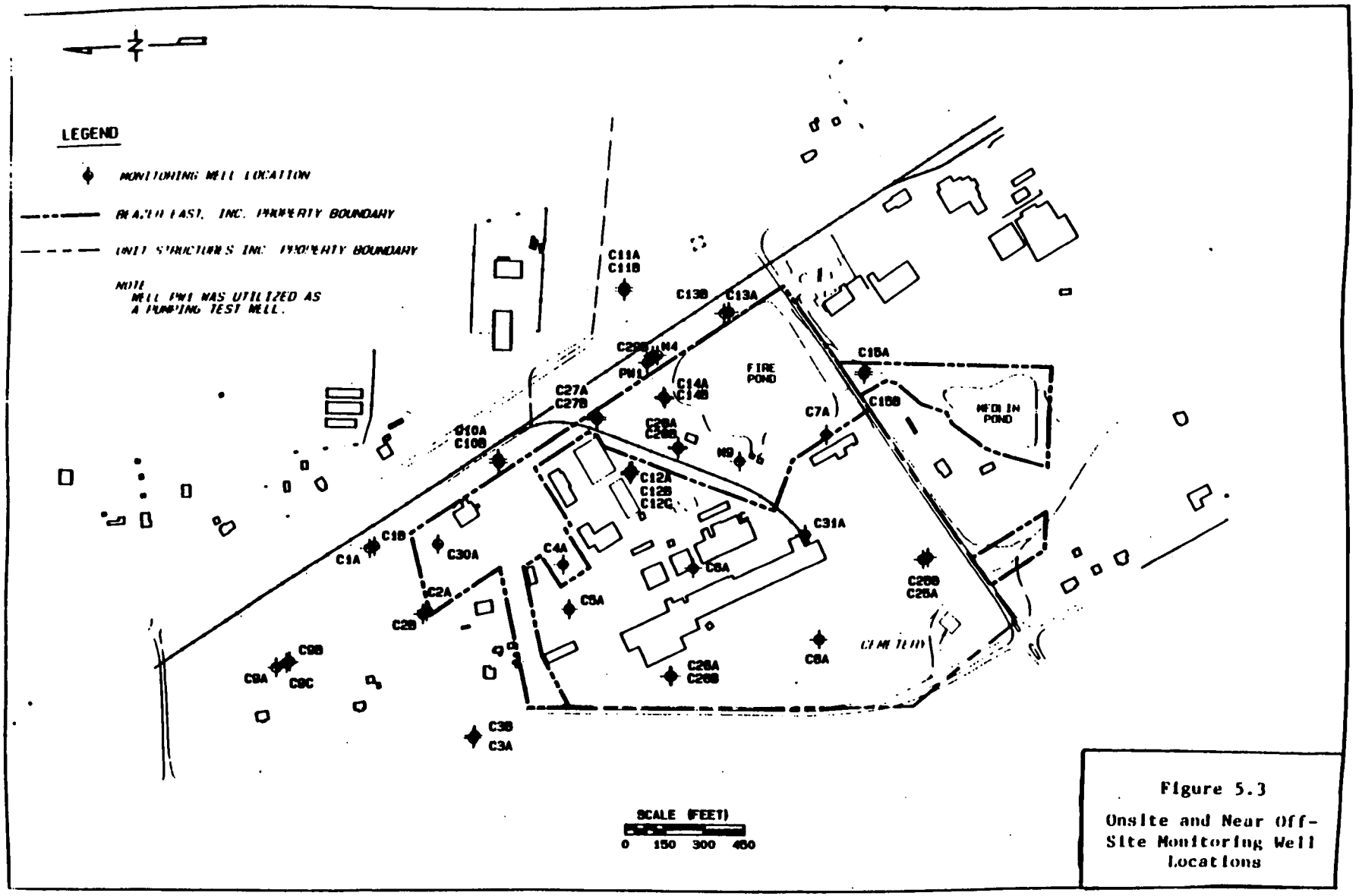


Figure 5.3

Onsite and Near Off-Site Monitoring Well Locations

and near site monitoring well locations. Figure 5.4 presents offsite monitoring well locations. Extensive groundwater sampling of private wells in the vicinity of the site was conducted. This investigative effort was not included in the scope of the Remedial Investigation. The results of the private well investigation are part of the Administrative Record and have been used in the decision making process for remedy selection. The Domestic Well Sampling Program can be found as Appendix I of the RI Report. Figure 5.5 shows the private well sampling locations. The MCL for pentachlorophenol was exceeded in wells OS-8, 5-H, OS-25, OS-12 and 14K during the private wells sampling program.

Tables 5.2.A, 5.2.B and 5.2.C provide the major contaminants and the concentration ranges for the groundwater in the eastern area of the site, the western area of the site and offsite, respectively. Table 5.2.D focuses on groundwater contamination in the lagoon and process areas. Figure 5.6 demonstrates the pentachlorophenol groundwater plume defined as any concentration in monitoring wells exceeding the MCL of 1.0 ppb. Figure 5.7 shows locations where dioxin has been detected in groundwater. Additional groundwater sampling of all monitoring wells and select private wells will be conducted during Remedial Design to better define the lateral and vertical extent of groundwater contamination.

The surface water investigation included the Fire Pond, the Medlin Pond, the outflow ditches from both ponds and drainage features termed the eastern and western ditches. The Fire Pond outflow ditch progresses into the Medlin Pond; the western ditch converges with the Medlin Pond outflow ditch and the confluence of these two continues downstream joining Crabtree Creek 2-3 stream miles south of the site.

Figure 5.8 shows the locations of the surface water sampling points. Figure 5.9 presents the locations of sediment samples. Table 5.3 identifies concentration ranges and frequencies of detection for surface water samples in the Fire Pond. Table 5.4 provides that information for the Medlin Pond. Tables 5.5 and 5.6 provide the concentration ranges for sediment samples in the Fire Pond and Medlin Pond respectively.

6.0 SUMMARY OF SITE RISKS

A primary directive under CERCLA is to protect human health and the environment from both current and future potential exposures to hazardous substances at Superfund sites. The Baseline Risk Assessment provides the basis for taking action and indicates the

Figure 5.4

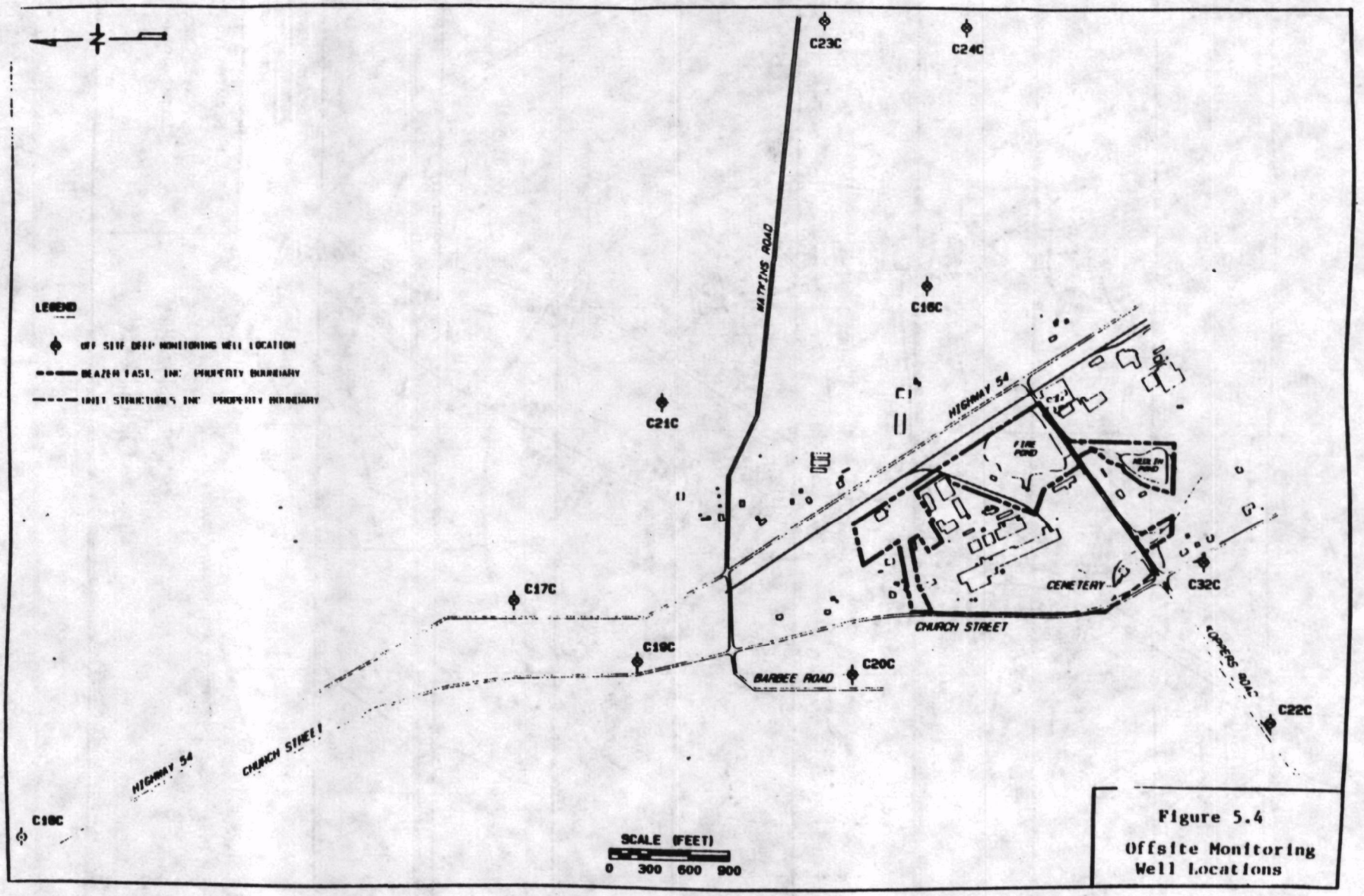


Figure 5.4
Offsite Monitoring Well Locations

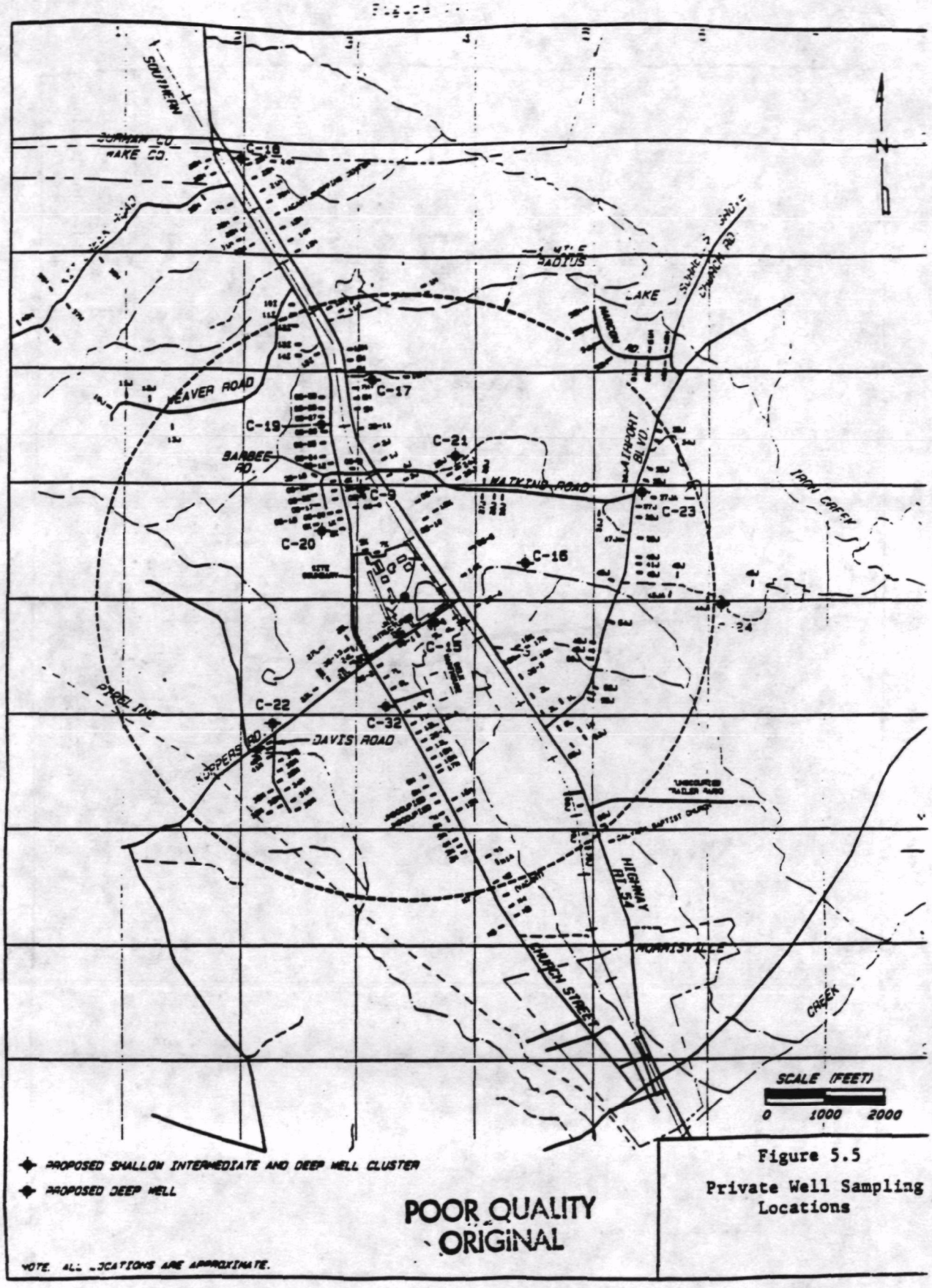


Figure 5.5

Private Well Sampling Locations

TABLE 5-2.A Groundwater Eastern Area			
Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	1.7	3:12
2-chlorophenol	ND	1.22	2:11
2-nitrophenol	ND	ND	0:12
2,4-dimethylphenol	ND	ND	0:11
2,4-dichlorophenol	ND	307.5	1:11
4-chloro-3-methylphenol	ND	7.91	2:11
2,4,6-trichlorophenol	ND	3.45	1:11
2,4-dinitrophenol	ND	ND	0:11
4-nitrophenol	ND	3.46	2:11
2,3,5,6-tetrachlorophenol	ND	0.73	1:11
2-methyl-4,6-dinitrophenol	ND	ND	0:13
isopropyl ether	ND	366	1:14
pentachlorophenol	ND	46.5	9:15
TCDD-TE	4.00E-07	1.69E-04	3:3

ND - Contaminant was not detected
If the value identified in the Remedial Investigation Report or Baseline Risk Assessment was below detection limit, the value is reported as Non-detect for purposed of this Record of Decision.

TABLE 5-2.B Groundwater Western Area			
Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	155	2:13
2-chlorophenol	ND	ND	0:13
2-nitrophenol	ND	0.98	2:13
2,4-dimethylphenol	ND	ND	0:13
2,4-dichlorophenol	ND	ND	0:13
4-chloro-3-methylphenol	ND	9.8	3:13
2,4,6-trichlorophenol	ND	ND	0:13
2,4-dinitrophenol	ND	ND	0:13
4-nitrophenol	ND	10.7	3:13
2,3,5,6-tetrachlorophenol	ND	ND	0:13
2-methyl-4,6-dinitrophenol	ND	57.5	1:16
isopropyl ether	ND	2.84	2:16
pentachlorophenol	ND	0.18	9:19
TCDD-TE	NA	NA	0:0

ND - Contaminant was not detected

TABLE 5-2.C Groundwater Offsite			
Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	32.4	4:23
2-chlorophenol	ND	11.5 J	1:23
2-nitrophenol	ND	134	2:23
2,4-dimethylphenol	ND	ND	0:23
2,4-dichlorophenol	ND	35.8	3:23
4-chloro-3-methylphenol	ND	ND	0:23
2,4,6-trichlorophenol	ND	ND	0:23
2,4-dinitrophenol	ND	13.5	1:23
4-nitrophenol	ND	36.2	5:23
2,3,5,6-tetrachlorophenol	ND	16.9 J	2:23
2-methyl-4,6-dinitrophenol	ND	98	3:27
isopropyl ether	ND	5.37	3:28
pentachlorophenol	ND	0.23	14:32
TCDD-TE	1.00E-08	1.50E-07	3:3

ND - Contaminant was not detected
J - Estimated Value
If the value identified in the Remedial Investigation Report or Baseline Risk Assessment was below detection limit, the value is reported as Non-detect for purposed of this Record of Decision.

TABLE 5.2.D
Groundwater Former Lagoon and Process Area

Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	2.67	4:17
2-chlorophenol	ND	ND	0:17
2-nitrophenol	ND	ND	0:17
2,4-dimethylphenol	ND	ND	0:17
2,4-dichlorophenol	ND	ND	0:17
4-chloro-3-methylphenol	ND	9.2	3:17
2,4,6-trichlorophenol	ND	9.81	3:17
2,4-dinitrophenol	ND	ND	0:17
4-nitrophenol	ND	1.66	1:17
2,3,5,6-tetrachlorophenol	ND	16.3	4:17
2-methyl-4,6-dinitrophenol	ND	12.7	3:22
isopropyl ether	ND	2800	14:22
pentachlorophenol	ND	1490	22:27
TCDD-TE	4.00E-07	7.93E-05	5:5

ND - Contaminant was not detected

Figure 5.6

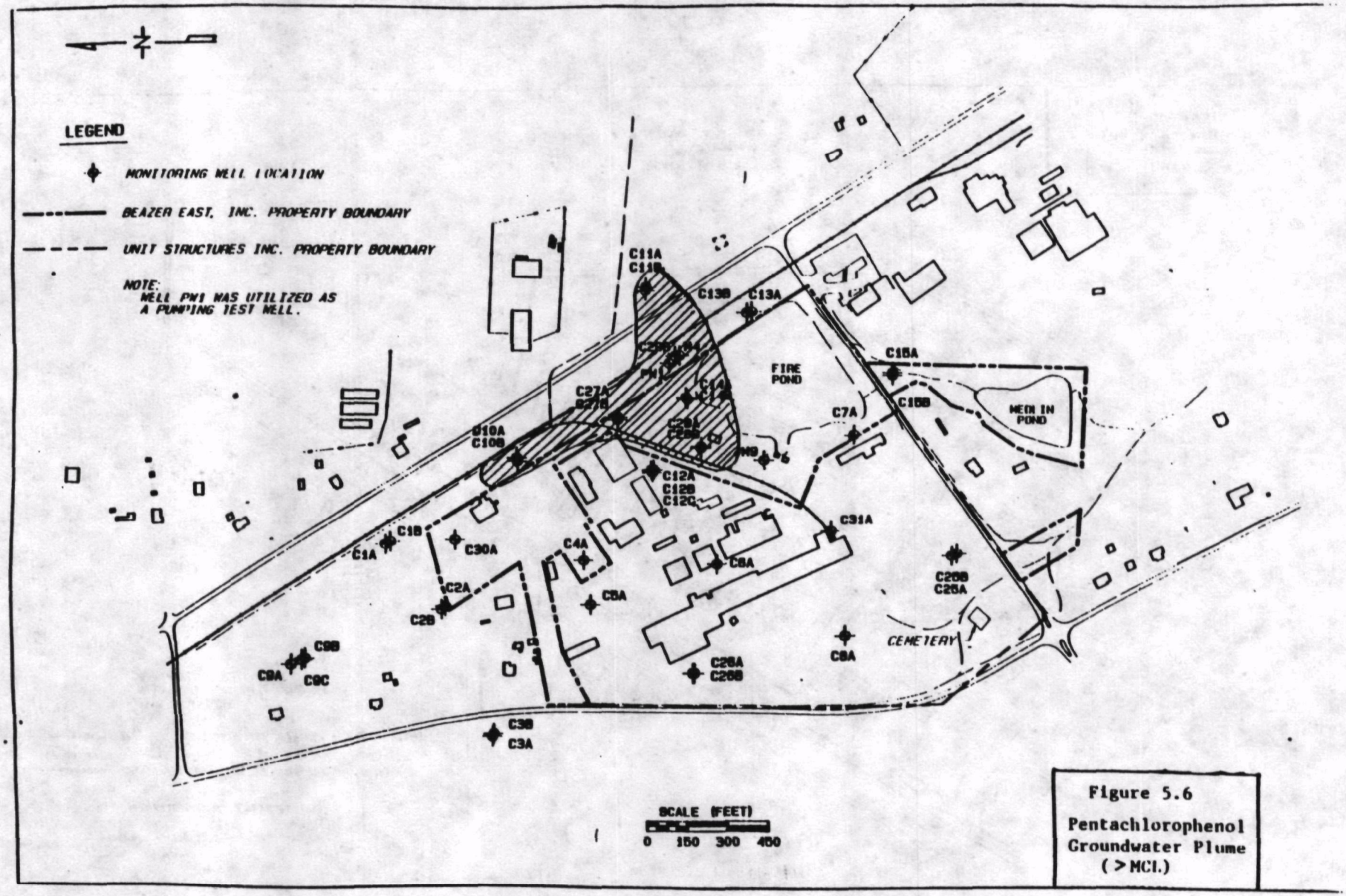


Figure 5.6
Pentachlorophenol
Groundwater Plume
(>MCL)

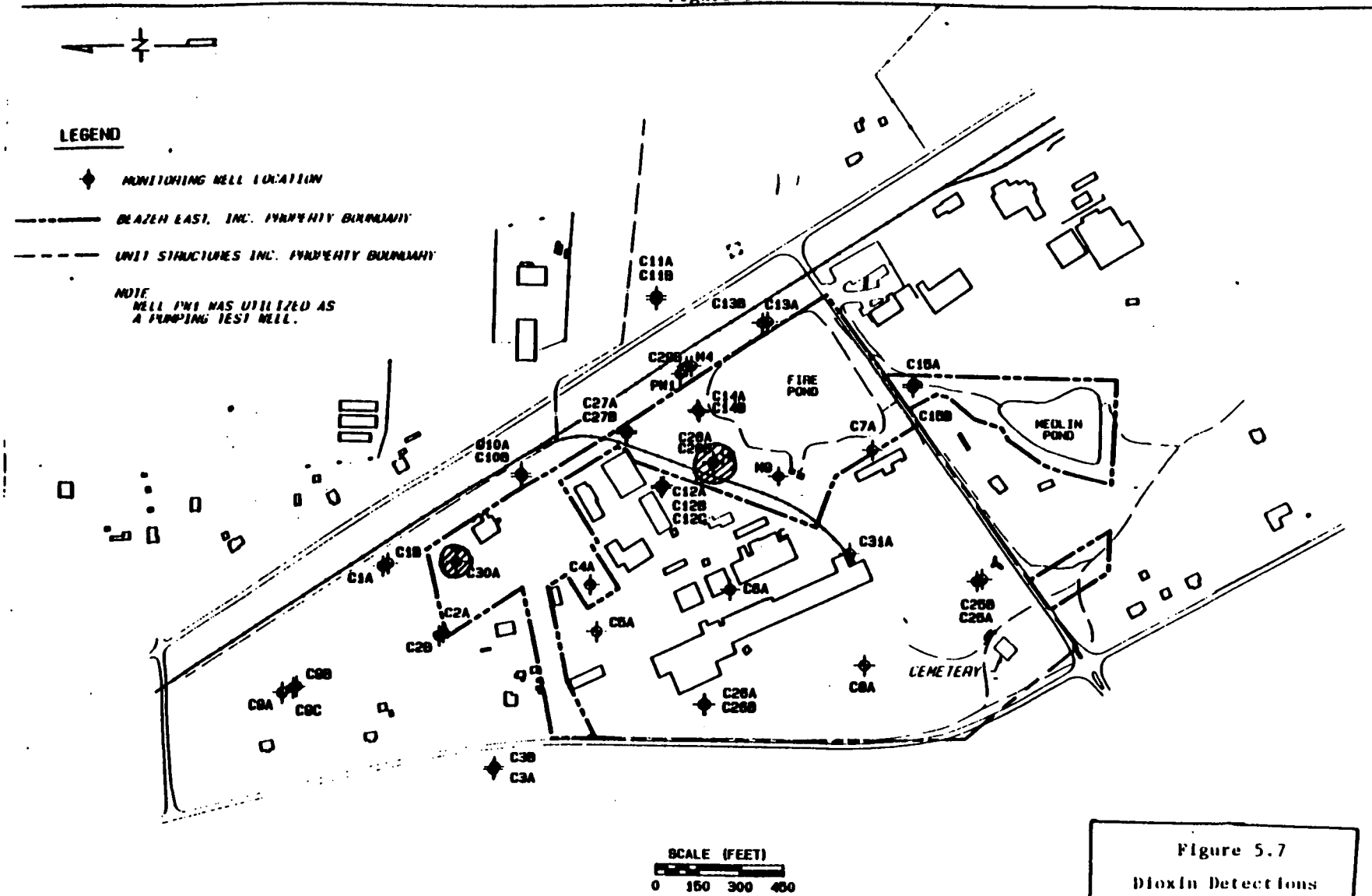


Figure 5.7

Dioxin Detections In Groundwater

Figure 5.8

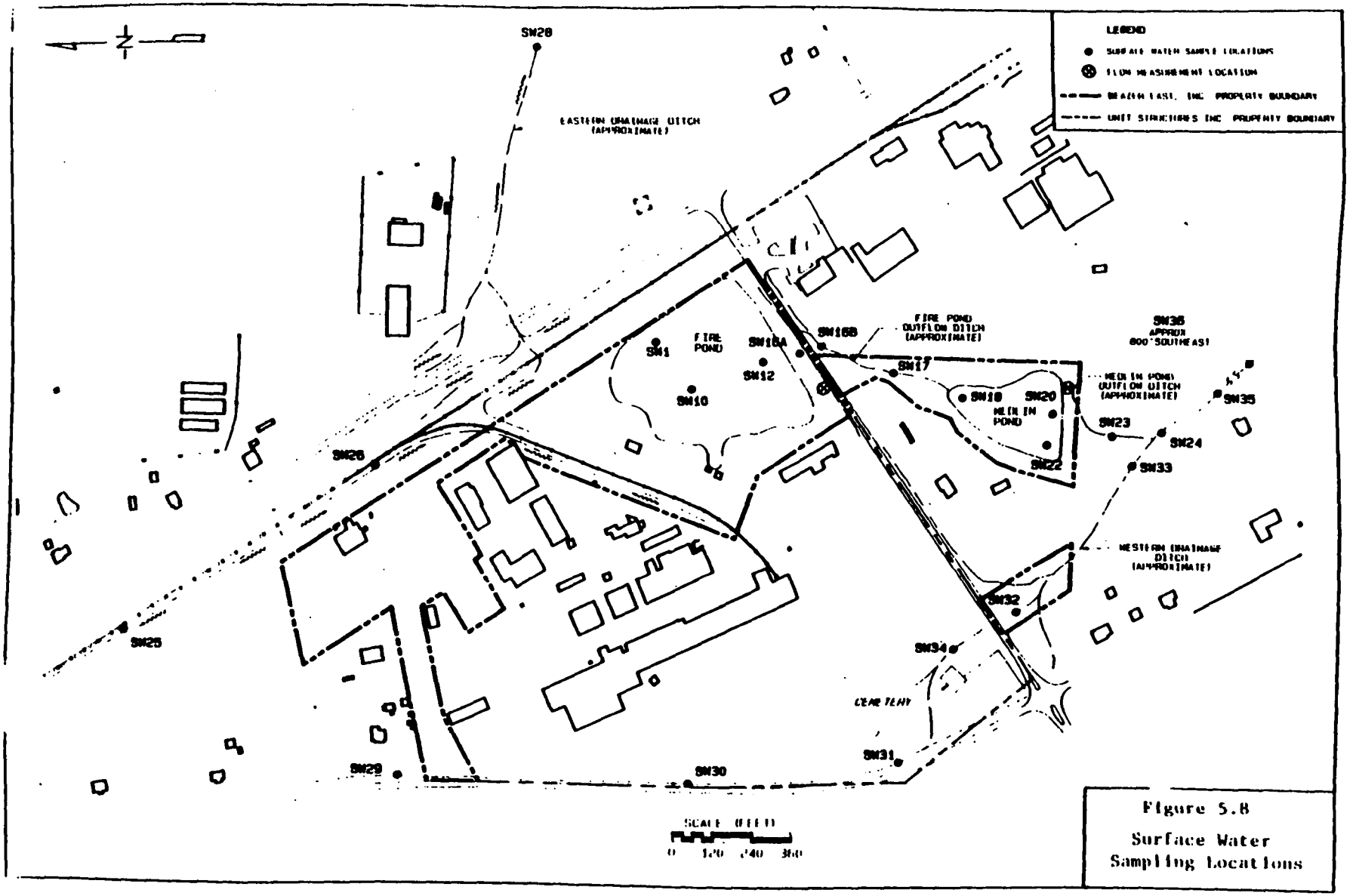


Figure 5.8
Surface Water
Sampling Locations

Figure 5.9

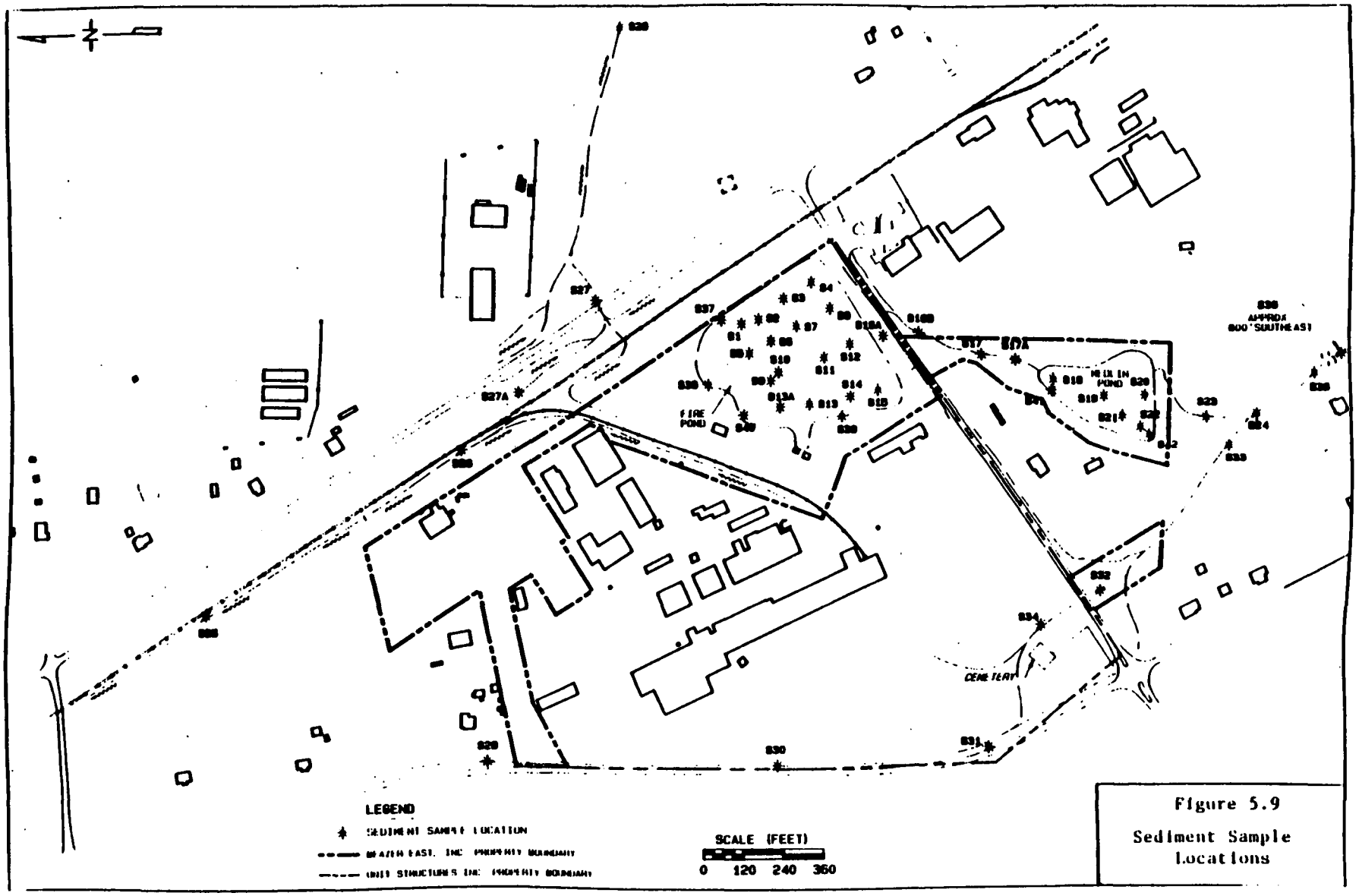


Figure 5.9

Sediment Sample Locations

TABLE 5.3 SURFACE WATER - FIRE POND			
Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	1.02	2:12
2-chlorophenol	ND	0.61	1:12
2-nitrophenol	ND	ND	0:12
2,4-dimethylphenol	ND	3.84	2:12
2,4-dichlorophenol	ND	3.69	6:12
4-chloro-3-methylphenol	ND	ND	0:12
2,4,6-trichlorophenol	ND	ND	0:12
2,4-dinitrophenol	ND	ND	0:12
4-nitrophenol	ND	4.13 (avg)	1:12
2,3,5,6-tetrachlorophenol	ND	1.92	5:12
2-methyl-4,6-dinitrophenol	ND	ND	0:12
isopropyl ether	ND	ND	0:6
pentachlorophenol	0.043	0.17	12:12
TCDD-TEF	1.20E-04	2.85E-04	6:6

ND - Contaminant was not detected

TABLE 5.4 SURFACE WATER - MEDLIN POND			
Contaminant	Minimum (ug/l)	Maximum (ug/l)	Frequency of Detection
phenol	ND	2.85	3:11
2-chlorophenol	ND	ND	0:11
2-nitrophenol	ND	1.3	3:11
2,4-dimethylphenol	ND	0.74	1:11
2,4-dichlorophenol	ND	0.55	2:11
4-chloro-3-methylphenol	ND	ND	0:11
2,4,6-trichlorophenol	ND	1.49	1:11
2,4-dinitrophenol	ND	2.11	1:11
4-nitrophenol	ND	ND	0:11
2,3,5,6-tetrachlorophenol	ND	4.89	5:11
2-methyl-4,6-dinitrophenol	ND	1.13	1:11
isopropyl ether	ND	ND	0:6
pentachlorophenol	ND	0.15	6:11
TCDD-TEF	4.60E-06	1.99E-05	2:2

ND - Contaminant was not detected

TABLE 5.5
SEDIMENT SAMPLES
Fire Pond

Contaminant	Minimum (ug/kg)	Maximum (ug/kg)	Frequency of Detection
phenol	ND	197	5:16
2-chlorophenol	ND	802	3:16
2-nitrophenol	ND	94.4	1:16
2,4-dimethylphenol	ND	184	1:16
2,4-dichlorophenol	ND	ND	0:16
4-chloro-3-methylphenol	ND	ND	0:16
2,4,6-trichlorophenol	ND	ND	0:16
2,4-dinitrophenol	ND	ND	0:16
4-nitrophenol	ND	ND	2:16
2,3,5,6-tetrachlorophenol	ND	ND	0:16
2-methyl-4,6-dinitrophenol	ND	233	1:16
isopropyl ether	ND	ND	0:4
pentachlorophenol	ND	5040	5:16
TCDD-TEF	0.04	0.49	5:5

ND - Contaminant was not detected
If the value identified in the Remedial Investigation Report or Baseline Risk Assessment was below detection limit, the value is reported as Non-detect for purposed of this Record of Decision.

TABLE 5.6
SEDIMENT SAMPLES
MEDLIN POND

Contaminant	Minimum (ug/kg)	Maximum (ug/kg)	Frequency of Detection
phenol	ND	134	2:5
2-chlorophenol	ND	ND	0:5
2-nitrophenol	ND	ND	0:5
2,4-dimethylphenol	ND	1590	4:5
2,4-dichlorophenol	ND	ND	0:5
4-chloro-3-methylphenol	ND	ND	0:5
2,4,6-trichlorophenol	ND	ND	0:5
2,4-dinitrophenol	ND	ND	0:5
4-nitrophenol	ND	ND	0:5
2,3,5,6-tetrachlorophenol	ND	ND	0:5
2-methyl-4,6-dinitrophenol	ND	ND	0:5
isopropyl ether	ND	ND	0:1
pentachlorophenol	ND	ND	0:5
TCDD-TEF	0.54	1.01	2:2

ND - Contaminant was not detected
If the value identified in the Remedial Investigation Report or Baseline Risk Assessment was below detection limit, the value is reported as Non-detect for purposed of this Record of Decision.

exposure pathways that need to be addressed by remedial action. It serves as the baseline indicating what risks could exist if no action were taken at the site. This section of the ROD reports the results of the Baseline Risk Assessment using the analytical data generated during the Remedial Investigation and summarizes the current and future risks associated with the contamination which presently exists at the site. The Baseline Risk Assessment was developed by Beazer. The Administrative Order by Consent signed in March of 1989 allowed Beazer to conduct the Risk Assessment concurrently with Remedial Investigation work.

6.1 Contaminants of Concern

Historical records and results of site sampling of environmental media were used in the original selection of contaminants of concern at the Koppers site. Pentachlorophenol, isopropyl ether, and the congeners of the dioxin/furan family were known to be contaminants at the site. To ensure that no additional major contaminants existed, approximately 15% of the samples collected during the Remedial Investigation were required to be "full scan" which included volatile organic compounds, semi-volatile organic compounds, pesticides and PCBs, (known as the Target Compound List) and metals and cyanide, (referred to as the Target Analyte List). The list of contaminants below is a subset of the overall list of site contaminants that were included in the quantitative risk assessment conducted in the Baseline Risk Assessment. This subset was derived by identifying those site contaminants which contribute to a site risk exceeding 1E-06 for carcinogens, or a Hazard Quotient exceeding 1.0 for noncarcinogens. Carcinogenic risks and hazard quotient data are discussed further in Section 6.3 and in depth in the Baseline Risk Assessment.

These contaminants of concern are:

pentachlorophenol
PCDDs/PCDFs[1]

[1] PCDDs/PCDFs refer to polychlorinated dibenzo-p-dioxins and dibenzofurans, commonly referred to as dioxins. TCDDs/TCDFs are the tetrachlorinated congeners substituted in the 2,3,7,8-configuration, specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran. Due to the greater toxicity associated with this 2,3,7,8- configuration, Toxic Equivalents Factors (TEFs) are calculated for all congeners. The toxicity assessment for the PCDDs/PCDFs are evaluated as TCDD-TEFs.

2,4-dichlorophenol

The tables in Section 5.0, Summary of Site Characteristics, identify the concentrations of the site contaminants in each medium of exposure. A site figure is provided for consistency to the Baseline Risk Assessment. Figure 6.1 subdivides the site into areas defined by use and contamination distribution. Tables 6.1 through 6.6 identify the subset of site contaminants and their exposure concentration with respect to media.

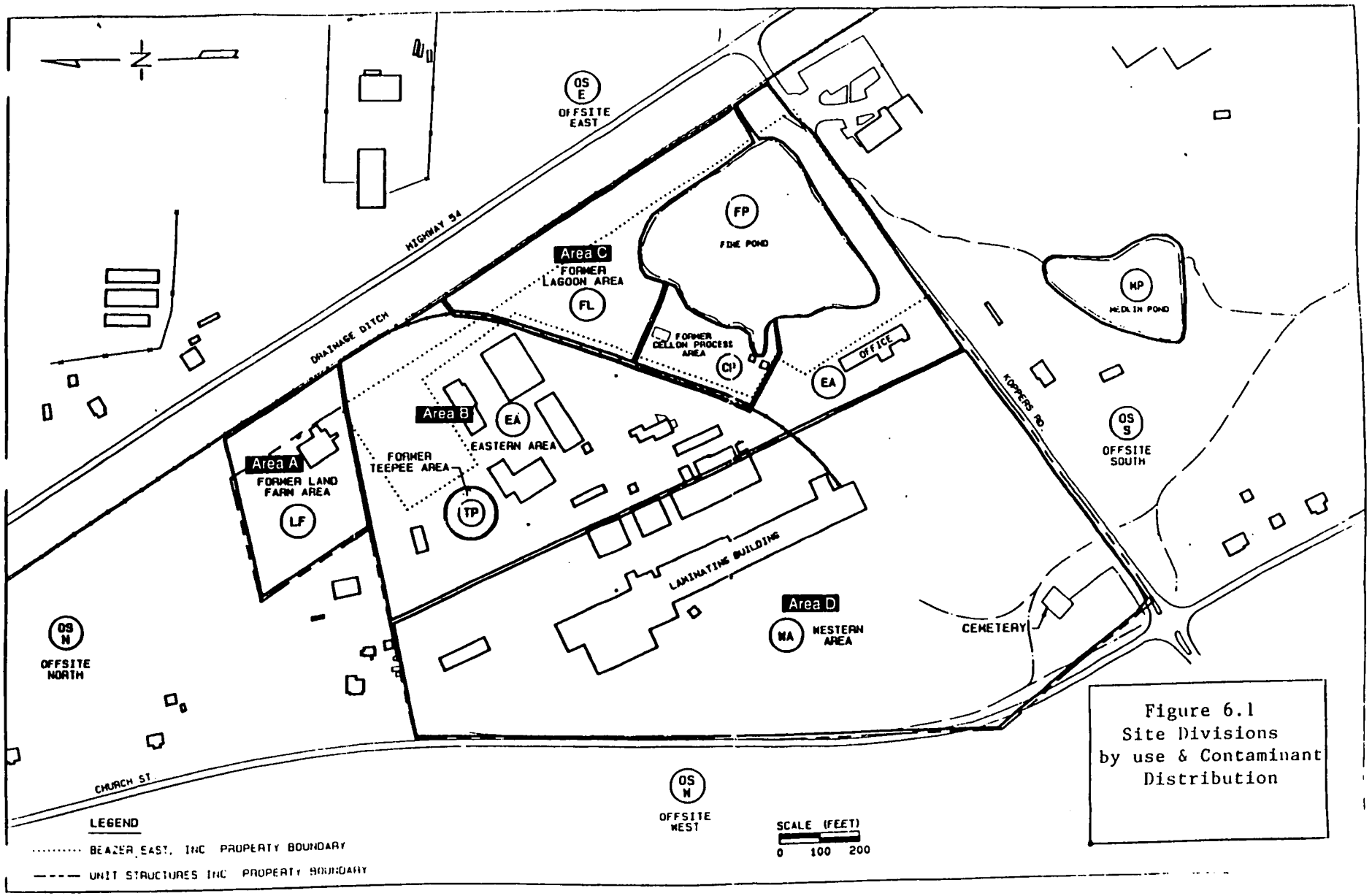
Table 6.1

Surface Soil	Representative Concentration [2] (ug/kg)
Area B	
PCDD/PCDF	0.13
Area C	
PCDD/PCDF	204.28
Pentachlorophenol	809,681.31

Table 6.2

Subsurface Soil	Representative Concentration (ug/kg)
	Area C
PCDD/PCDF	1.54

[2]The representative concentration is the Upper 95% Confidence Limit (UCL) or the maximum if the UCL exceeds the maximum. The UCL is a statistical calculation which equals or exceeds the true mean 95% of the time.



Source Keystone, 1992

Figure 6.1
Site Divisions
by use & Contaminant
Distribution

Table 6.3		
	Representative Concentration (ug/kg)	
	Surface Water	
	Fire Pond	Western Ditch
PCDD/PCDF	2.29E-04	Not Calculated

Table 6.4			
	Representative Concentration (ug/kg)		
	Sediment		
	Fire Pond	Fire Pond Discharge	Western Ditch
PCDD/PCDF-TE	0.45	1.39	Not calculated

Table 6.5		
	Representative Concentration (ug/kg)	
	Fish	
	Medlin Pond	Fire Pond
PCDD/PCDF-TE	2.59E-03	3.85E-02

Table 6.6			
	Representative Concentration (ug/kg)		
	Groundwater		
	Offsite	Eastern Area	Lagoon Area
2,4-dichlorophenol	5.59	90.41	
pentachloro-phenol		10.11	349.27
PCDD/PCDF-TE		1.69E-04	6.2E-05

The contaminants of concern can be related to the wood treatment process historically used at the site. The land use of the immediate site continues to be of an industrial nature, with an active wood laminating facility on the western portion of the site. Surrounding land use is a mixture of light industrial, commercial and rural residential. Current land use and zoning maps are included in the Baseline Risk Assessment. The likelihood of the site reverting to residential is extremely remote. The entire area known as the Raleigh, Durham, Research Triangle Park area is developing for industrial and commercial use.

Drinking water was obtained almost exclusively in the immediate area from groundwater prior to 1989, when Beazer signed the Administrative Order by Consent to install water lines. Many area residents outside the immediate vicinity continue to be served by groundwater for all domestic water uses. This groundwater is designated as Class GA in accordance with North Carolina's water classification system and Class IIB under USEPA Groundwater Classification Guidelines (December 1986). The Class GA classification means that the groundwater is an existing or potential source of drinking water supply for humans, North Carolina Administrative Code, Title 15, Subchapter 2L (NCAC T15:02L). EPA classifies the groundwater as Class IIB since the aquifer is of drinking quality. Class IIB groundwater must be remediated to levels protective of residential consumption. The onsite groundwater is not currently being used as a source of drinking water.

6.2 Exposure Assessment

The exposure assessment evaluates and identifies complete pathways of exposure to human populations on or near the site. Land use and human activity are utilized in this assessment.

The current principle human receptors (potentially exposed populations) include local offsite residents, onsite workers, and potential onsite trespassers. Onsite workers and trespassers may be exposed to site-related contaminants in surface water, sediments, and surface soil.

The primary future human receptors at the site may be onsite workers and potential trespassers, construction workers and offsite residents. Potential future exposures would include surface soils, sediments, and groundwater. The Baseline Risk Assessment ALSO evaluated the potential future human receptors considering land use under the residential scenario. However the remedial decision is based on the industrial scenario rather than the future residential scenario.

The current and future potential exposure pathways considered included both direct exposure pathways in which the receptor comes into contact with a contaminated medium and indirect exposures through which exposure to site contaminants would be from food-chain uptake. The exposure pathways listed below were evaluated quantitatively:

Inhalation of soil as dust (surface and subsurface)
Dermal contact with and inadvertent Ingestion of soil (surface and subsurface)
Dermal contact with and inadvertent Ingestion of sediment
Dermal contact with and inadvertent Ingestion of surface water
Consumption of Groundwater
Inhalation of Volatile constituents from groundwater while showering
Consumption of vegetables
Consumption of Fish

The exposure scenarios evaluated took various assumptions into account to develop estimates which represent risks quantitatively. A local off-site resident is assumed to live near the site property for the first 30 years of his/her life. Further categorization into age groups of young child (YC) ages 0 to 5, older child (OC) ages 6 - 17, and adult (A) 18 to 29. The future onsite resident is assumed to live on the site for 30 years. In addition, a local

off-site teenage trespasser is also evaluated and assumed to trespass for 8 years during ages 10 to 17. A worker onsite is assumed to be a 70 kg adult who works at the site 5 days a week for 47 weeks per year for 20 years. The major assumptions for both the hypothetical resident and onsite worker are provided in Tables 6.7 and 6.8. Further detail and mathematical calculations can be reviewed in the Baseline Risk Assessment Report.

Table 6.7

Major Assumptions for Residential Scenario

	Young Child	Older Child	Trespasser	Adult
Body Weight (kg)	13	38	50	70
Exposure Duration (yrs)	6	12	8	12
Soil Ingestion (mg/d)	200	100	100	100
Water Consumption (l/d)	1	2		2
Exposure Frequency (GW) (d/y)	365	365		365
Exposure Frequency (soil) (d/y)	182	182	12 (Area C) 3 (Areas A,B,D)	182
Soil on Skin (mg/cm^2)	1.45	1.45	1.45	1.45
Fish Consumption (kg/dy)	1.56E-03	1.56E-03	1.56E-03	1.56E-03

Table 6.8	
Major Assumptions for Onsite Worker Scenario	
Body Weight (Kg)	70
Exposure Duration (year)	20
Soil Ingestion (mg/d)	100
Exposure Frequency (GW) (d/y)	235
Soil on Skin (mg/cm^2)	145

6.3 Toxicity Assessment

Toxicity assessment, as part of the Superfund Baseline Risk Assessment process, considers (1) the types of adverse health or environmental effects associated with individual and multiple chemical exposures, (2) the relationship between magnitude of exposures and adverse effects, and (3) related uncertainties such as the weight of evidence for a chemical's potential carcinogenicity in humans.

Cancer slope factors (CSFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in (mg/kg/day), to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CSF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CSFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic (systemic) effects. RfDs, which are

expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, which will result in no adverse health effects. Estimated intakes of chemicals from environmental media (i.e., the amount of chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are also derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (i.e., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The Baseline Risk Assessment identified CSFs and RfDs for the contaminants of concern for the Koppers site. Table 6.9 provides the Cancer Slope Factors (CSFs); Table 6.10 provides the Reference Dose (RfDs) values. Those site-related contaminants for which EPA-derived RfDs or CSFs are not available, RfDs were derived using standard EPA methods from toxicity studies identified in the scientific literature. The contaminants of concern responsible for the majority of the risk associated with the site are PCDD/PCDFs, and to a lesser extent, pentachlorophenol.

TABLE 6.9 Constituent	EPA Carcinogen Class	EPA CSF	Source
pentachlorophenol	B2	O:1.2E-1 I:ND[3]	HEAST, 9/90
PCDD/PCDF	B2	O:1.5E+5 I:1.5E+5[4]	HEAST, 9/90 HEAST, 9/90

TABLE 6.10 Contaminant	Oral RfD (mg/kg/day)	Source
2,4-dichlorophenol	3E-3	IRIS, 4/91
pentachlorophenol	3E-2[5]	IRIS, 4/91

[3] ND - Not determined.

[4] I - CSF for exposure via the inhalation route.

6.4 RISK CHARACTERIZATION

The risk characterization step of the site risk assessment process integrates the toxicity and exposure assessments into quantitative and qualitative expressions of risk. The output of this process is a characterization of the site-related potential non-carcinogenic and carcinogenic health effects.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ), or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose. By adding the Hqs for all contaminants within a medium or across all media to which a given population may be reasonably exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The HI is equal to the estimated potential exposure dose divided by the RfD. When this ratio exceeds unity, the estimated potential exposure is greater than the allowable exposure and the potential for adverse health effects may exist. None of the hazard indices for the site exceed unity considering the current and future land use scenario as industrial.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (i.e., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of 1E-6 indicates that, as a plausible upper-bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

EPA has set an acceptable carcinogenic risk range of 1E-4 to 1E-6. The current site related quantitative carcinogenic risks which are either within or outside this risk range are presented in Table 6.11. Table 6.12 provides the future quantitative carcinogenic risks for the offsite resident; values for onsite worker do not change from current scenario to future scenario. Table 6.13 provides the future quantitative carcinogenic risks for the hypothetical onsite resident. The noncarcinogenic hazard quotient for 2,4-dichlorophenol exceeds the Agency benchmark of 1.0 for the ingestion of groundwater by the future onsite resident. (2,4-

[5] CSF is identified for this contaminant in addition to the RfD.

dichlorophenol HQ = 1.44). This scenario is evaluated primarily to address the groundwater contamination. Groundwater aquifers must be evaluated upon their potential use and groundwater classification. The groundwater at the site is classified as a drinking water aquifer.

Table 6.11 Current Carcinogenic Risks	
Local Resident (trespasser scenario)[6]	
Surface Area Soils - Lagoon & Process Area	7.8E-04
Fire Pond Surface Water (Oral & Dermal)	6.6E-06
Fire Pond Fish	1.9E-05
Western Ditch Surface Water (Dermal)	1.2E-06
Fire Pond Discharge stream sediments (oral, dermal)	7.1 E-06
TOTAL	8.1E-04
Onsite Worker[7]	
Surface Area Soils - Lagoon & Process Area	3.5E-03
Surface Area Soils - Area north of lagoon & process area excluding the landfarm area	2.2E-06
TOTAL	3.5E-03

[6] All risks in the risk range are attributable to PCDD/PCDF with the exception of the exposure to surface soils. The risk breakout for surface soil in the lagoon and process areas is: PCP = 6.1E-6, PCDD = 7.7E-4.

[7] All risks in the risk range are attributable to PCDD/PCDF with the exception of the exposure to surface soils. The risk breakout for surface soil in the lagoon and process areas is: PCP = 2.8E-05, PCDD = 3.5E-03.

Table 6.12 Future Scenario - Carcinogenic Risks	
Offsite Resident[8]	
Trespasser - Surface soil (lagoon & process area)	7.8E-04
Trespasser - Fire Pond Surface Water	6.6E-06
Trespasser - Fire Pond Fish	1.9E-05
Trespasser - Medlin Pond Fish	1.4E-06
Western Ditch - surface water	1.2E-06
Fire Pond Discharge Sediment	7.1E-06
TOTAL	8.2E-04

6.5 Risk Uncertainty

There is a generally recognized uncertainty in human risk values developed from experimental data. This is primarily due to the uncertainty of extrapolation in the areas of (1) high to low dose exposure and (2) animal data to values that are protective of human health. The Site specific uncertainty is mainly in the degree of accuracy of the exposure assumptions.

Most of the exposure assumptions used in a risk assessment have not been fully verified. For example, the degree of chemical absorption from the gut or through the skin or the amount of soil contact that may occur is not known with certainty. Generally EPA standard methods were used in developing values when EPA derived values were not available. In the presence of such uncertainty, the Agency and the risk assessor have the obligation to make conservative assumptions such that the chance is very small, approaching zero, for the actual health risk to be greater than that determined through the risk assessment process. On the other hand, the process is not intended

[8]All risks in the risk range are attributable to PCDD/PCDF with the exception of the exposure to surface soils. The risk breakout for surface soil in the lagoon and process areas is: PCP = 6.1E-06, PCDD = 7.7E-04.

Table 6.13 Future Scenario - Carcinogenic Risks	
Onsite Resident	
Surface Area Soils - Area B[9]	2.7E-05
Surface Area Soils - Area C[9]	4.3E-02
Subsurface Soils - Area C	4.4E-06
Fire Pond Surface Water (Oral & Dermal)	1.5E-04
Western Ditch Surface Water (Dermal)	1.2E-06
Fire Pond sediments (oral, dermal)	3.6E-06
Western Ditch sediments (oral, dermal)	1.1E-06
Groundwater (oral) - Area B[10]	5.4E-04
Groundwater (oral) - Area C[11]	1.0E-03
TOTAL - Area B Area C	8.1E-04 4.4E-02

[9] Area B is also referred to as the Eastern Area of the site. A distinction is made in Section 6.0 Summary of Site Risks to be consistent with the Baseline Risk Assessment Report. Area C is the former lagoon and process area.

[10]All risks in the risk range are attributable to PCDD/PCDF with the exception of the exposure to groundwater. The risk breakout for groundwater in the Eastern Area of the site is: PCP = 2.5E-5, PCDD = 5.2E-4.

[11]All risks in the risk range are attributable to PCDD/PCDF with the exception of the exposure to groundwater. The risk breakout for surface soil in the lagoon and process areas is: PCP = 8.6E-04, PCDD = 1.9E-04.

to yield absurdly conservative risk values that have no basis in reality. That balance was kept in mind in the development of exposure assumptions and pathways and in the interpretation of data and guidance for this Baseline Risk Assessment.

6.6 Ecological Risk

A qualitative ecological risk assessment using benchmark values was conducted as part of the Baseline Risk Assessment for the Site. The surface water of the Fire Pond and the Medlin Pond appear to pose to greatest potential risk to ecological populations at the site.

6.6.1 Fire Pond

The Ecological Risk Assessment showed a Chronic Toxicity Quotient for 2,3,7,8-TCDD of 16.5 using the EPA Region IV Surface Water Screening Values protective of aquatic life as benchmark value. The riparian assessment showed a toxicity quotient of 0.11 for mammalian receptor, the muskrat, and 0.60 for the avian receptor, the belted kingfisher.

6.6.2 Medlin Pond

The Ecological Risk Assessment showed Chronic Toxicity Quotients for some of the phenolic compounds and PCDD. These are considered benchmark values and are also based on EPA Region IV Surface Water Screening Values protective of aquatic life as benchmark values, with the exception of 2,3,5,6-tetrachlorophenol which used a Lowest Observed Effect Level (LOEL) for bluegill divided by a safety factor of 10 which is considered protective of more sensitive species.

6.6.3 Summary of Ecological Risk

While EPA Region IV Surface Water Screening Values are not designed to serve as remedial action levels, these values do serve as an indication of potential ecological threats. This value (0.00001 ppb) is also suggested by the United States Fish and Wildlife Service as being protective of aquatic life (Eisler, R. 1986. Dioxin Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Fish and Wildlife Service Biological Report 85(1.8), 37 pp). Table 6.14 provides the chronic toxicity quotients for five site contaminants. Based on the chronic toxicity quotients provided, remediation of the surface water in both the Fire and Medlin ponds is deemed appropriate.

Table 6.14 - Chronic Ecological Hazard Quotients		
Contaminant	Fire Pond Quotient	Medlin Pond Quotient
2,4,6-trichlorophenol	-	0.184
2,4-dinitrophenol	-	0.105
2,3,5,6-tetrachlorophenol	0.0671	0.149
2-methyl-4,6-dinitrophenol	-	2.43
2,3,7,8-TCDD	16.5	1.22

7.0 DESCRIPTION OF ALTERNATIVES

The media requiring remediation at the Koppers Company Site include soils, groundwater and surface water. The description of alternatives will address the separate components of the remedy by media.

7.1 REMEDIAL ALTERNATIVES TO ADDRESS SOIL CONTAMINATION

The former wood treating process area and the former lagoon area, also described as Area C, are targeted for remediation of contaminated surface and subsurface soils. The current risk associated with the contaminated surface soils for an on-site worker is calculated to be 3.5×10^{-3}. Cleanup numbers have been established to reduce the risk to within the acceptable range. Soil remediation will be conducted in the former lagoon and process areas and will be conducted until concentrations in the soil of PCDD/PCDF are at or below 7 ppb and concentrations of pentachlorophenol are at or below 95 ppm. Upon completion of the soil excavation, the risk associated with direct contact for an on-site worker at the site becomes 3.2×10^{-6} for pentachlorophenol and 1.2×10^{-4} for PCDDs/PCDFs.

7.1.1 ALTERNATIVE S-1: SOILS

No Action

Capital Costs:	$ 0
PW O&M Costs:	$ 140,000
Total PW Costs:	$ 140,000
Time to Implement:	None

CERCLA requires that the "No Action" alternative be evaluated at every Superfund Site to establish a baseline for comparison. No further activities would be conducted with Site soils under this alternative (i.e., the Site is left "as is"). CERCLA also requires that the selected remedy be protective of human health and the environment. Since the Site poses a future risk to human health and environment, the No Action alterative will not be selected. In this alternative, no soil remedial activities would occur. There are no construction costs. Operation costs would involve a review of the remedy every 5 years for 30 years.

7.1.2. ALTERNATIVE S-3: SOILS[12]

Surface Cover

Capital Costs:	$ 19,000
PW O&M Costs:	$ 1,307,000
Total PW Costs:	$ 1,326,000
Time to Implement:	1 month

This alternative provides for surface capping over the contaminated soils and includes surface drainage controls. Final soil compaction, seeding and mulching would be conducted to provide long term erosion control Use of a surface cover would be designed to eliminate or substantially reduce potential ingestion, dermal contact, and inhalation exposure pathways. Drainage control and long term maintenance would be required.

7.1.3. ALTERNATIVE S-4: SOILS

Surface Capping

Capital Costs:	$ 109,000
PW O&M Costs:	$ 1,368,000
Total PW Costs:	$ 1,477,000
Time to Implement:	5 months

[12] This Record of Decision does not identify an alternative titled S-2. The soil alterative S-2 was eliminated in the screening process of the Feasibility Study due to the lack of protectiveness; descriptive codes, e.g., S-5,S-9, etc., were kept for easy reference back to the Feasibility Study Report.

This alternative would be used to isolate the contaminated soils in the process/lagoon area. This alternative would specify the construction of a Resource Conservation & Recovery Act (RCRA) cap over the contaminated soils. This alternative also includes surface drainage controls. This alternative involves the implementation of institutional controls to prevent direct contact and incidental ingestion of contaminated soils by the general public. A RCRA multi-layer cap consists of the following layers in ascending order: a densely compacted 2 foot-thick clay layer placed over the contaminated soils, a synthetic polyethylene liner, minimum thickness no less than 30 mils placed on top of the clay layer, a synthetic fabric to prevent clogging of the drainage layer, and finally, 18 inches of native soils and 6 inches of top-soil on top of the geotextile fabric. A vegetative cover would be completed and fencing would be installed to provide a barrier to trespassing. Long-term maintenance would be required.

7.1.4. ALTERNATIVE S-5: SOILS
Excavation and On-site Landfill

Capital Costs:	$ 663,375
PW O&M Costs:	$ 1,506,625
Total PW Costs:	$ 2,170,000
Time to Implement	7 months

This alternative involves excavating the contaminated soils and landfilling the soils on-site. Major components of this on-site alternative would include capping and lining the landfill area to meet RCRA regulations. A leak detection system would be installed to ensure the liners do not fail. A leachate collection and removal system would installed. The cap would be identical to the RCRA cap as identified in Alterative S-4 for soils. Maintenance of the landfill would require periodic mowing and control of vegetative cover. Long term groundwater monitoring would be required to implement this alternative. The excavated areas would be backfilled with clean soils, graded, and revegetated. Long term maintenance would be required for this alterative.

7.1.5 ALTERNATIVE S-6: SOILS
Excavation and Off-site Landfill

Capital Costs:	$ 816,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 816,000
Time to Implement	approx. 12 months

This alternative involves excavating the contaminated soils in the

same manner as identified in Alternative S-5. The contaminated soils would be transported to a RCRA-permitted off-site landfill. The excavated areas would be backfilled with clean soils, graded, and revegetated. This alterative for soils would be complete upon final transport of soils and analytical confirmation of cleanup standards. No long term maintenance would be required.

7.1.6. ALTERNATIVE S-7: SOILS
Excavation and On-site Treatment by Dechlorination Process and Replacement of Treated Soils

Implementation

Capital Costs:	$ 4,530,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 4,530,000
Time to Implement:	Unknown

* Based on estimations using the APEG process.

Treatability Study $ 1,000,000 **

** Assumed to be an over-estimate. No data exists for development of a treatability study for base catalyzed dehalogenation.

This alternative involves excavating the contaminated soils and then chemically treating the contaminated soils on-site. A mobile treatment unit would be placed on-site. The chemical process attempts to detoxify and chemically decompose the contamination in the soils by removing the chlorine atoms from the pentachlorophenol and the PCDDs/PCDFs. Dechlorination is an innovative technology available. Currently, two separate dechlorination processes have been developed, glycolate dehalogenation and base catalyzed dehalogenation. These two processes are based on fundamentally different chemical reactions. Glycolate dehalogenation uses polyethylene glycol as the reagent to dechlorinate. A lab-scale treatability study was conducted on contaminated site soils using APEG, which is a patented glycolate dehalogenation process. The test did not prove the successful dechlorination of PCDD/PCDF on contaminated site soils. Base catalyzed dehalogenation uses bicarbonates as the reagent to dechlorinate the contaminants of concern. This process has not been utilized in the field on soil contamination, though generic lab-scale tests have been successful. No tests have been conducted on contaminated soils from the site. Costs identified above were based on assumptions using the APEG process. It is assumed that the costs for base catalyzed dehalogenation would be comparable. Upon final treatment of the

soils, the soils would be washed and replaced back into the excavated area(s). This alternative would comply with the land disposal restrictions through a Treatability Variance for the contaminated soil. The treatment level range established through a treatability variance that dechlorination must attain for pentachlorophenol is 90 - 99% reduction.

7.1.7 ALTERNATIVE S-8: SOILS
Excavation and On-site Incineration

Capital Costs:	$ 3,240,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 3,240,000
Time to Implement:	6 - 9 months

This alternative involves excavation and incineration of the contaminated soils in an on-site mobile incinerator. The incinerator destroys the organic contaminants in the soils. Excavation is expected to be done using conventional equipment and earthmoving techniques. Following excavation, the excavated soils would be transported to an on-site soil incineration unit. Soils would be stockpiled prior to treatment. For purposes of destroying PCDDs/PCDFs, the incinerator is assumed to be a mobile rotary kiln incinerator with appropriate air cleaning equipment. Site contaminants would be burned in the rotary kiln by heating the solids to a temperature of approximately 1400°C. Waste solids are discharged directly from the kiln, while the off-gases are discharged to a secondary combustion unit where complete oxidation is insured. Off-gases from the secondary combustion unit are treated in a multi-stage scrubbing unit for removal of particulates and neutralization of acidic gases formed during combustion. The treated soils (also considered ash) would either be placed back into the area of excavation onsite or disposed of in a RCRA-permitted landfill. The preference under SARA would provide for final onsite disposal. Onsite land disposal of the residual ash would require compliance with RCRA.

7.1.8 ALTERNATIVE S-9: SOILS
Excavation and Off-site Incineration

Capital Costs:	$ 4,750,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 4,750,000
Time to Implement:	6 - 9 months

This alternative involves excavating and transporting the

contaminated soils to a RCRA permitted off-site incineration facility. The contaminated soils would be incinerated which would result in the elimination of the potential risk of ingestion, dermal contact, or inhalation associated with the soils in the process and lagoon areas. It is anticipated that excavation would be accomplished using conventional equipment and earthmoving techniques. Following excavation and removal of contaminated soils, clean fill would be placed in the excavated area(s). Each area would be graded to achieve desirable surface drainage.

For the destruction of site contaminants, use of a rotary kiln incinerator is assumed. Temperatures reaching approximately 1400°C are used in conjunction with all appropriate air cleaning equipment. Waste solids are discharged directly from the kiln, while off-gases are discharged to a secondary combustion unit where complete oxidation is insured. Off-gases from the secondary combustion unit are treated in a multi-stage scrubbing unit for removal of particulates and neutralization of acidic gases formed during combustion. The ash which would result from the incineration would be disposed of at a secure chemical landfill and would be the responsibility of the operator of the incinerator facility. The excavated areas would be backfilled with clean soil, graded and revegetated.

7.1.9 ALTERNATIVE S-10: SOILS
Excavation and On-site Storage

Capital Costs:	$ 125,000
PW O&M Costs:	$ 534,000
Total PW Costs:	$ 659,000
Time to Implement:	approx. 3 months

This alternative involves excavating the contaminated soils and moving them to an on-site storage facility that would be constructed for the soils storage. A synthetic liner, leachate detection and collection system, concrete foundation with curbs, and a cover manufactured of synthetic liner material would be used. Excavation would be conducted as described in previous alternatives. The excavated areas would be backfilled with clean soil, graded and revegetated. This alternative would be a temporary measure utilized only until acceptable technology for treating the soils becomes available, and would be required to meet the requirements defined by RCRA for onsite storage. This alternative would eliminate the exposure routes for ingestion, dermal contact, and inhalation as well as the mobility of the contamination in the soils.

7.2 REMEDIAL ALTERNATIVES TO ADDRESS GROUNDWATER CONTAMINATION

The area of groundwater contamination which exceeds the cleanup standard in monitoring wells for pentachlorophenol is depicted on Figure 7.1. The monitoring wells which have PCDD/PCDF levels exceeding the cleanup standard for PCDD/PCDF are shown on Figure 7.2. The groundwater at the Koppers Site is classified as Class GA by North Carolina and Class IIB by the EPA. Since this groundwater is a potential source of drinking water, remediation is required to be protective of public health and the environment; cleanup standards will be met throughout the plume.

The Safe Drinking Water Act and North Carolina Administrative Code, Title 15, Subchapter 2L (NCAC T15:02L.0202) establish maximum concentration levels (MCLs) and non-zero maximum contaminant level goals (MCLGs) for numerous organic and inorganic constituents. The contaminant 2,4-dichlorophenol does not have a Federal or State cleanup goal; the cleanup standard identified below is a risk-based cleanup standard calculated at a 10^{-6} risk level. The cleanup standards are:

Site Contaminants:	Cleanup Standards
Pentachlorophenol[13]	1.0 ppb
2,4-dichlorophenol	20 ppb
Dioxins/furans	3.0×10^{-5} ppb

The groundwater extraction and treatment alternatives were developed based on an estimate of a 30 year operation time. Actual duration will be based on performance.

7.2.1 ALTERNATIVE GW-1: NO ACTION

Capital Costs:	$ 0
PW O&M Costs:	$ 140,000
Total PW Costs:	$ 140,000
Time to Implement:	None

This alternative for groundwater contamination would require no further activities to be conducted for on-site groundwater. The No

[13] Federal Maximum Contaminant Level (MCL).

Figure 7.1

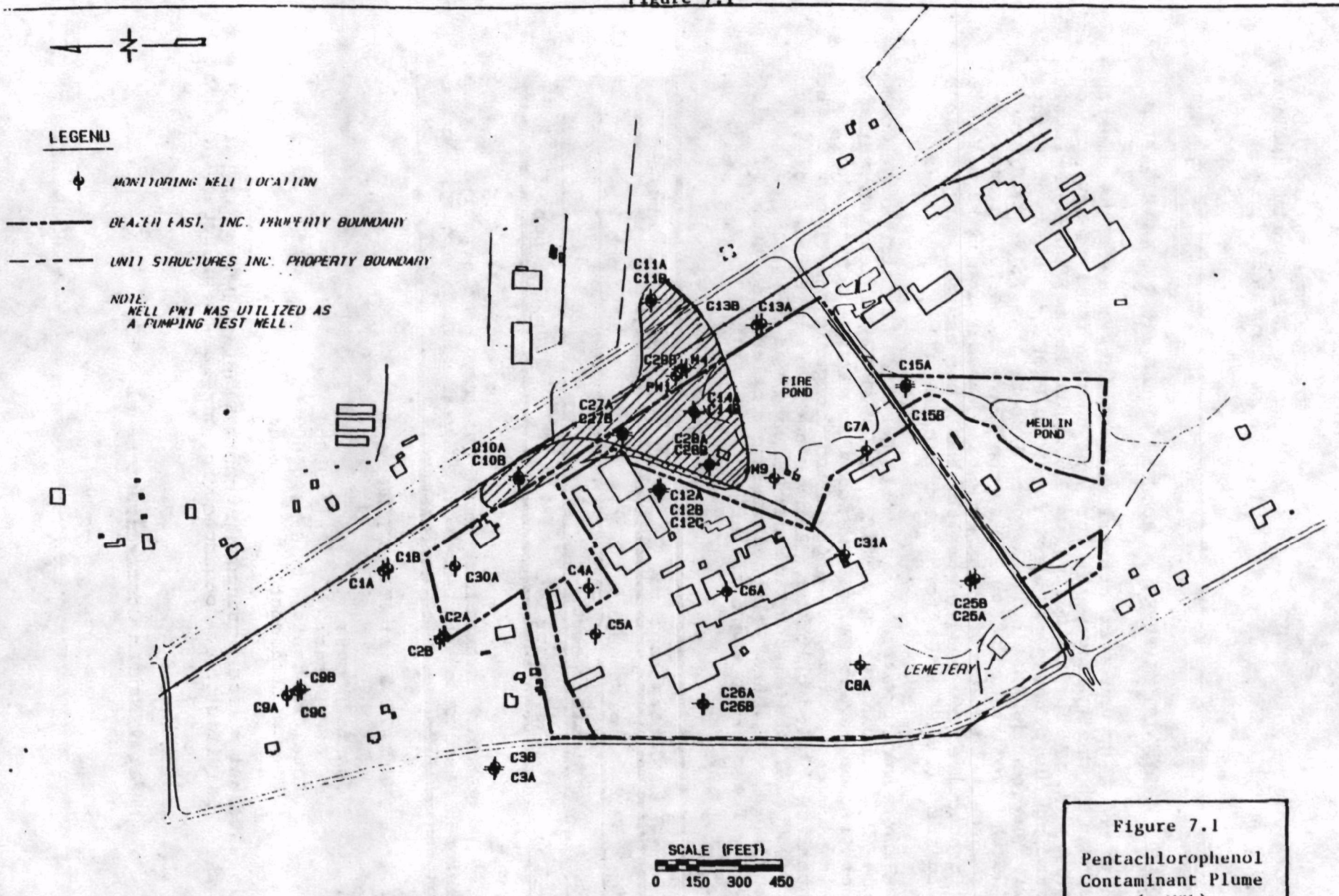


Figure 7.1

Pentachlorophenol Contaminant Plume (> MCL)

Figure 7.2

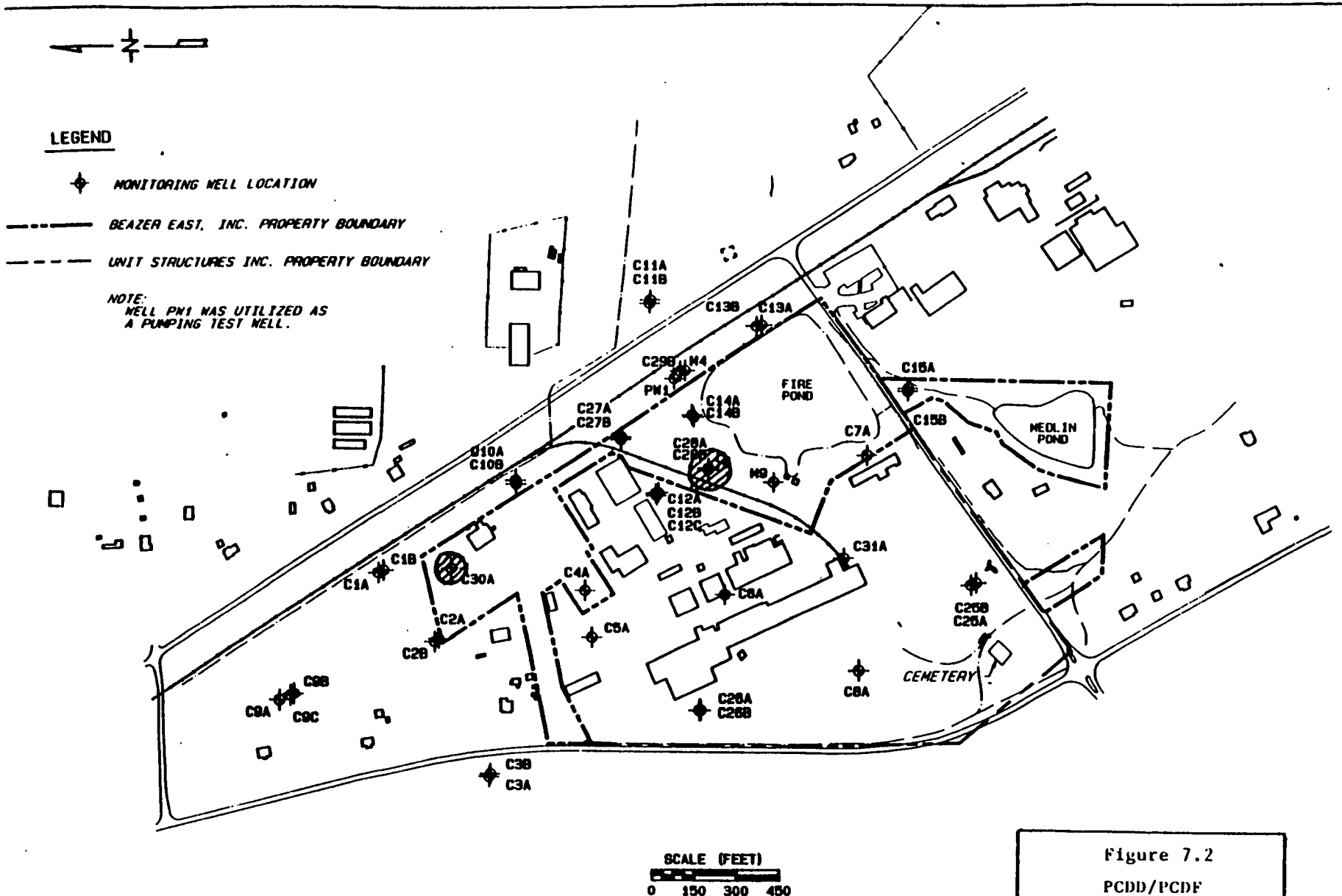


Figure 7.2

PCDD/PCDF Detections

Action alternative is required to be established for comparative basis under CERCLA. Groundwater contamination would be expected to continue to migrate with groundwater flow. This alternative involves no capital costs. Operating costs are based on the review of Site conditions every 5 years. There would be no maintenance costs.

7.2.2 ALTERNATIVE GW-3: EXTRACTION, ABOVE-GROUND BIOREMEDIATION, SURFACE WATER DISCHARGE[14]

Capital Costs:	$ 869,000
PW O&M Costs:	$ 4,231,000
Total PW Costs:	$ 5,100,000
Period of Operation:	30 years

This alternative involves installing extraction well(s) in the contaminant plume to actively extract groundwater for treatment. The steps in the treatment include equalization, filtration of suspended solids, Ph adjustment, removal of organic contaminants and a carbon polishing step. The primary organic treatment consists of a submerged fixed film bioreactor to permanently remove and destroy the organic contaminants. Effluent will be discharged to the surface water and monitored to insure compliance with National Pollution Discharge Elimination System (NPDES) discharge requirements.

7.2.3 ALTERNATIVE GW-4: EXTRACTION, ABOVE-GROUND PRETREATMENT & CARBON ADSORPTION, SURFACE WATER DISCHARGE

Capital Costs:	$ 419,000
PW O&M Costs:	$ 3,612,000
Total PW Costs:	$ 4,031,000
Period of Operation:	30 years

This alternative involves the installation of extraction well(s) in the contaminant plume on-site to actively extract groundwater for treatment. The steps in the treatment system would consist of equalization, filtration for removal of suspended solids, and carbon adsorption of dissolved organics. Groundwater would be pumped from extraction well(s) into an equalization tank designed to provide a 24 hour residence time for a predetermined flow rate. Groundwater would then be pumped into a sand filter for removal of

[14] The Alternative GW-2 was eliminated due to the lack of adequate protectiveness during the screening process in the Feasibility Study. The original codes identified in the Feasibility Study are retained.

suspended solids and other matter which could inhibit subsequent treatment units and hinder treatment capabilities. The filtration system would include a sand filter, backwash tank, and backwash pump. Soils would be removed periodically from the backwash tank and disposed of. Final disposition of the backwash soils would be determined during Remedial Design. If possible, onsite disposal is preferable. The filtered groundwater would be pumped from the sand filter into the activated carbon units; at present a minimum of two units of 500 pounds of activated carbon each, have been used in the conceptual design. A series arrangement would be used with the first unit serving as the primary adsorption unit and the second unit serving as a polisher. Disposal of spent carbon would be necessary. Final disposal options of spent carbon would be determined during Remedial Design Stage. The difference of treatment between GW-3 and GW-4 alternatives is the elimination of the fluidized bed biological reactor system. The pH adjustment would not be necessary since this step is taken to optimize conditions for the biological treatment. Effluent would be discharged to surface water and monitored to insure compliance with NPDES discharge requirements.

A treatability study was conducted to evaluate the performance of activated carbon adsorption for the contaminated groundwater from the site. The results of the Treatability Study indicated that granular media filtration in combination with activated carbon is an effective treatment technology for the site groundwater. The spent carbon and backwash soils would be the residual waste associated with the groundwater component of the remedy and would be treated in accordance with all applicable or relevant and appropriate requirements. Due to the PCDDs/PCDFs, incineration may be the choice for the disposal of the carbon units.

7.2.4 ALTERNATIVE GW-5: EXTRACTION, ABOVE-GROUND PRETREATMENT AND UV/CHEMICAL TREATMENT, SURFACE WATER DISCHARGE

Capital Costs:	$ 419,000
PW O&M Costs:	$ 4,714,000
Total PW Costs:	$ 5,133,000
Period of Operation:	30 years

This alternative involves installing extraction well(s) in the contaminant plume on-site to actively extract groundwater for treatment. The steps in this treatment alternative consist of equalization, filtration for removal of suspended solids, treatment in a UV/chemical oxidation reactor, including addition of peroxide for oxidizing/converting dissolved organic compounds to chemical species which meet required discharge levels and a carbon polishing

step for adsorption of residual organics. Extracted groundwater would be pumped to an equalization tank designed to provide a 24 hour residence time, followed by sand filtration. The filtered groundwater would then flow by gravity into a reaction tank equipped with ultraviolet (UV) lights. Hydrogen peroxide (H_2O_2) would be used as an oxidizing agent which, in the presence of UV light, will chemically oxidize the contaminants at the site. Site contaminants would be converted to chemical species which are detoxified. The reaction vessel would be designed to provide intimate contact between the extracted groundwater and the oxidant. The degree to which UV/chemical oxidation breaks down organic compounds is dependent upon: (1) the oxidant dosage, (2) the initial concentration of chemicals in solution, and (3) their molecular structure. Effluent from the reaction vessel would be pumped through two activated carbon units, a primary desorption unit and a secondary polisher unit. Effluent would be discharged to surface water and monitored to insure compliance with NPDES discharge requirements.

7.3 REMEDIAL ALTERNATIVES TO ADDRESS SURFACE WATER CONTAMINATION

There are two main surface water ponds that will be addressed under this component of the remedy. These are the Fire Pond and the Medlin Pond. Figure 7.3 shows the locations of the ponds. The remediation of the surface waters and the associated sediments is based on protection of the environment. No unacceptable human health risks are present. The Baseline Risk Assessment identifies the quantitative human health risks associated with the surface water and sediments.

7.3.1 ALTERNATIVE SW-1: NO ACTION

Fire Pond	
Capital Costs:	$ 0
PW O&M Costs:	$ 70,000
Total PW Costs:	$ 70,000
Time to Implement:	None

Medlin Pond	
Capital Costs:	$ 0
PW O&M Costs:	$ 70,000
Total PW Costs:	$ 70,000
Time to Implement:	None

This alternative for surface water contamination would require no further activities to be conducted for on-site groundwater. This alternative is required to be developed under CERCLA. No protection of environmental concerns would be afforded under this

Figure 7.3

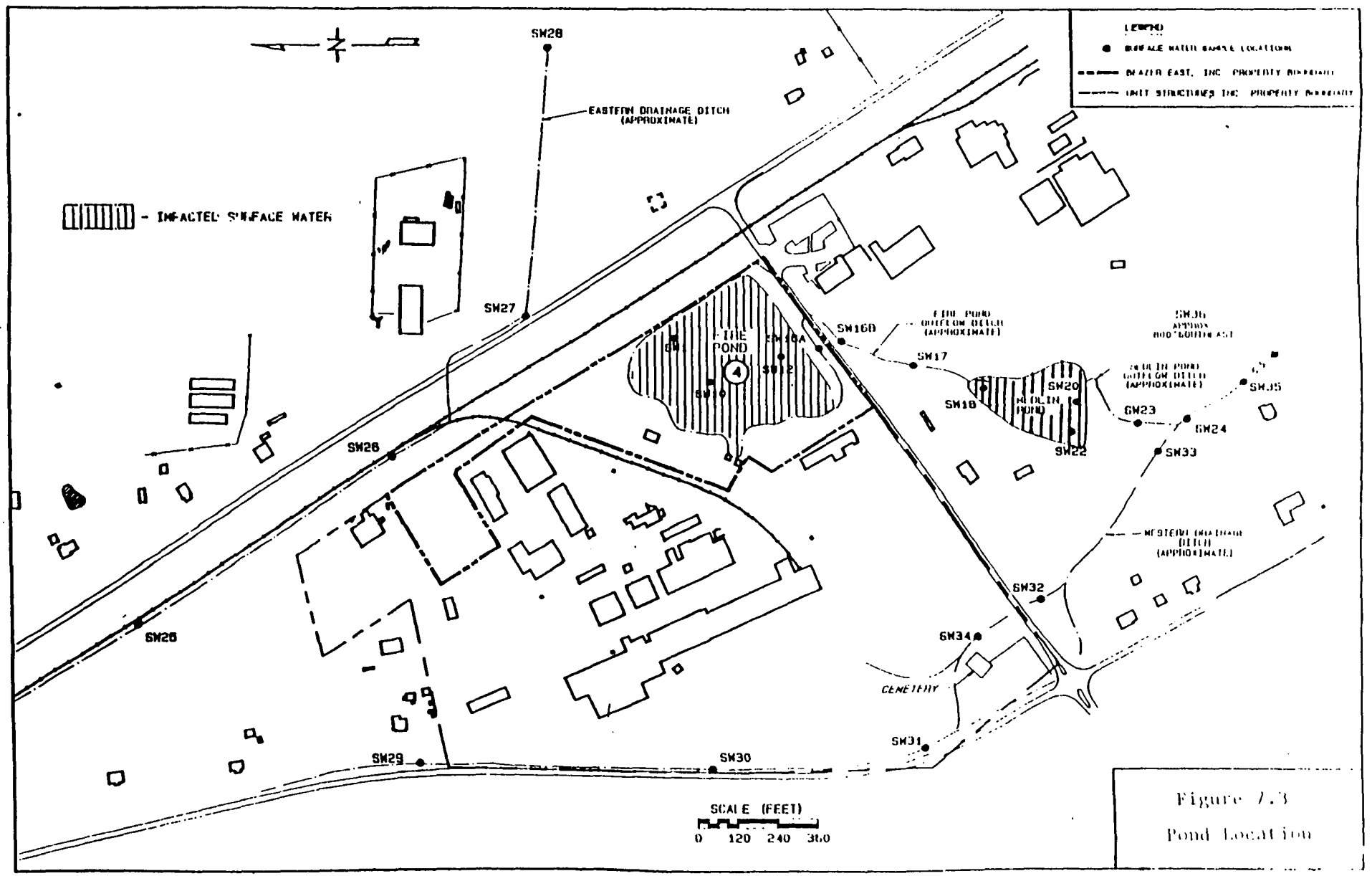


Figure 7.3
Pond Location

alternative. Costs are based on reviewing the remedy every 5 years. There are no construction costs.

7.3.2 ALTERNATIVE SW-3: POND DEWATERING, SURFACE WATER TREATMENT, SURFACE WATER DISCHARGE, BACKFILLING IN POND[15]

Fire Pond	
Capital Costs:	$ 1,300,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 1,300,000
Time to Implement:	3 months

Medlin Pond	
Capital Costs:	$ 695,500
PW O&M Costs:	$ 0
Total PW Costs:	$ 695,500
Time to Implement:	3 months

This alternative would require the draining of the on-site Fire Pond and the Medlin Pond, with surface water storage followed by treatment with activated carbon. The storage tanks would provide the necessary equalization capacity and would reduce suspended solids. Surface water from the ponds would be treated by mobile, truck-mounted carbon adsorption units. Dewatering of ponds would be assisted by the construction of diversion channels and berms to route stormwater run-on away from the existing pond waters. A mobile pumping unit would be used to pump the surface water to temporary storage tanks. The dewatering process would be staged to allow for the concurrent backfilling of the pond. Temporary cofferdams, consisting of portable dams would be used to segmentally dewater and backfill the pond. After dewatering and backfilling are completed, final grading of the Fire Pond area to control surface drainage would be conducted. Once final grading is completed, the disturbed land would be seeded and mulched to provide long term sediment and erosion control. Temporary storage tanks would function to equalize dewatering flows and to reduce suspended solids in the surface water prior to pumping the water through the treatment facility. Equalization storage required

[15] Alternative SW-2 was eliminated during the original screening process in the Feasibility Study due to lack of adequate protection to human health and/or the environment. The original codes are retained for ease of reference to the Feasibility Study.

would be based on the difference between the dewatering rate and the treatment rate, over a one-day period. Two carbon units, configured in a series for desorption and polishing would be used. Final effluent would be discharged to surface water and monitored to insure compliance with NPDES discharge requirements. The pond would be filled in with clean soil. The area would be graded to control surface drainage and a vegetative cover would be planted. Wetlands construction would also be conducted under this alternative to restore the wetlands which would be eliminated by this alternative.

7.3.3
ALTERNATIVE SW-4: POND DEWATERING, SURFACE WATER TREATMENT, POND LINING AND REFILLING

Fire Pond	
Capital Costs:	$ 952,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 952,000
Time to Implement:	3 months
Medlin Pond	
Capital Costs:	$ 710,000
PW O&M Costs:	$ 0
Total PW Costs:	$ 710,000
Time to Implement:	approx. 6 months

This alternative is identical to Alternative SW-3 except that the Fire Pond and Medlin Pond would be lined with a multi-layer synthetic liner which would be anchored into the banks of the ponds by an anchor trench. The ponds would be allowed to refill by storm water within the respective drainage areas. Disturbed soil areas would be revegetated for sediment and erosion control. Wetlands construction would also be conducted onsite under this alternative to restore the wetlands associated with the Fire Pond which would be eliminated by this alternative. Long-term maintenance may be necessary to ensure the integrity of the liners.

No specific treatability study was performed on surface water due to the successful results of the groundwater treatability study. Site contaminants are the same for the surface water and effectiveness is anticipated to be similar to that demonstrated during the groundwater treatability study using activated carbon. The spent carbon would be the only residual waste associated with the groundwater component of the remedy and would be treated in accordance with all applicable or relative and appropriate requirements. Due to the PCDDs/PCDFs, incineration may be the

choice for the disposal of the carbon units. Wetlands construction would also be conducted under this alternative to restore the wetlands which would be eliminated by this alternative.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The various remedial alternatives for all components were evaluated using the selection criteria presented in EPA Directive 9355.3-02. These criteria relate directly to factors mandated by Section 121 of CERCLA, 42 U.S.C. § 9621, and considerations which measure the overall feasibility and acceptability of the remedy.

8.1 THRESHOLD CRITERIA

8.1.1 Protection of Public Health and Environment:

Protection of human health and the environment is the central mandate of CERCLA, as amended by SARA. Protection is achieved by reducing risks to acceptable levels and taking action to ensure that there will be no future unacceptable risks to human health and the environment through any exposure pathway. Different remedial alternatives will have varying long-term and short-term impacts on the protection of human health and the environment.

All alternatives evaluated in this document, with the exception of the No Action alternatives, provide some degree of protection of public health and the environment. The degree of protection and the permanence of that protection vary between the alternatives. All alternatives evaluated for groundwater and surface water remediation, excluding the No Action alternative, would provide equivalent protection of public health and the environment. This is due to the performance standard that must be met regardless of treatment technology.

Alternatives involving excavation of contaminated soils from the uncontrolled area would provide a higher long-term degree of protection for human health and would minimize the need for ongoing operation and maintenance (O&M) activities and land use restrictions. Alternatives involving long-term management of the soil in-place or in a disposal unit would require more extensive monitoring and maintenance and reliance upon land use and access restrictions to adequately protect human health and to assure the continued effectiveness of the remedy.

Removal of soils exceeding the cleanup standard for designated non-residential land usage represents a substantially reduced risk to

human health and the environment. A minimum one-foot vegetative soil cover would further reduce risk by providing both a barrier against potential exposure and dilution of subsurface soils in the event of soil disturbance.

Both treatment and disposal were considered for final management of contaminated soils. Land disposal results in some risk of future release from the disposal facility as long as the dioxin remains in the environment. Thermal treatment of contaminated soil destroys dioxin to undetectable levels, permanently removing the contamination from the environment and eliminating the need for continuing maintenance or monitoring of the treated material.

8.1.1.1 Protection of the Environment:

The primary environmental concern at the Site is in the surface water of the Fire Pond and the Medlin Pond. These surface water bodies are not in violation of the Federal Ambient Water Quality Criteria (AWQC, EPA, 1986); however, EPA screening values were used in the development of acute and chronic toxicity quotients for qualitative risk evaluation with respect to the ecological receptors. The chronic toxicity quotient for dioxin indicates an area of high concern in the Fire Pond and an area of potential concern for dioxin in the Medlin Pond. Alternative SW-1 would not be protective of the environment because the No Action Alternative would not remove this threat.

The placement of clean fill into the pond areas, as required in Alternative SW-3, will reduce or eliminate the existing potential for further environmental impairment. The fill will eliminate future ponding and the potential for future surface water to become contaminated. The fill also renders the residual dioxin contamination in the sediments biologically unavailable by creating anaerobic conditions. The continued integrity of the soil cover would not be critical for maintaining the effectiveness of the remedy. Future contamination degradation and mixing of soils through natural processes is expected to further reduce residual contaminant concentrations and the potential for environmental impairment.

The action of wetlands mitigation provides reconstruction of the wetlands which will be destroyed by the surface water remediation. This action is protective of a vital environmental resource.

The remediation of soil and groundwater at the Site is primarily based on protection of public health but will provide extensive protection of the environment with the final cleanup of affected

and contaminated environmental media.

8.1.1.2 Protection of Human Health:

In this document, EPA establishes cleanup standards for soils contaminated with pentachlorophenol and PCDDs/PCDFs at the Site. A cleanup level of 95 ppm for pentachlorophenol and 7 ppb for PCDDs/PCDFs has been recommended for the protection of public health based upon the non-residential land usage of the site. These levels were established for the protection of groundwater, but are protective levels for dermal contact as well. The Agency believes that the continued non-residential usage of the site is assured based upon the current land development trend and the current zoning restrictions on adjacent properties. This is a practical consideration of the existing conditions of the immediately adjacent area known as Research Triangle Park in North Carolina. This consideration also acknowledges the current presence of an active facility of the Site property.

In-place containment of the contaminated soils would attain the objective of reducing surface concentrations to an acceptable level. Monitoring and maintenance requirements would be more extensive than for alternatives involving the removal of contaminated soils. Eventual replacement of the cover or cap may become necessary. Land use restriction would also be necessary to protect the soil cover and prevent possible human exposure in the event of cover failure. In the event of cap failure, there would be potential for offsite migration and human exposure.

Land disposal of the contaminated soils in a permanent facility meeting RCRA design criteria would provide a higher degree of protection to public health and the environment than in-place containment alternatives. There would be some risk of release due to failure of the disposal facility. This risk should be minimal if the disposal facility is properly designed, constructed and maintained. Regular monitoring and maintenance would be required to assure the continued integrity of the land disposal facility. Access restrictions would also be required to protect the disposal facility and prevent possible human exposure in the event of a facility failure.

An increased short-term risk associated with soil-disturbing activities is associated with all of the alternatives involving excavation and handling of dioxin-contaminated soil. This short-term risk is due to potentially contaminated dust which could be created during excavation activities. Mitigative measures, such as

dust suppression, are available to control this potential risk.

Thermal treatment alternatives S-8 and S-9 represent technologies which have achieved destruction of dioxin in soils to undetectable levels. These alternatives provide the greatest level of long-term protection of human health and the environment of the soil alternatives evaluated in the feasibility study because the toxicity and mobility of contaminated materials would be substantially reduced in comparison to the containment alternatives. Reduction of volume would be minimal. Alternative S-8, onsite incineration may not be capable of meeting the 99.99% Destruction and Removal Efficiency (DRE) requirement for the thermal treatment of organic hazardous materials.

Ongoing monitoring and maintenance requirements are less for alternatives involving removal of contaminated soils than for in-place containment alternatives. The removal of soils exceeding the cleanup standards are protective of human health for the industrial scenario. Since soils exceeding cleanup standards are removed, the continued integrity of any subsequent cap or soil cover is not essential to maintain the effectiveness of the remedy. In-place containment alternatives require critical maintenance for effectiveness.

The protection afforded by dechlorination alternative for soils, (Alternative S-7), which involves onsite treatment, is currently undefined. This is due to the unknown effectiveness regarding the dechlorination of PCDDs/PCDFs. Treatability studies would be necessary to determine effectiveness on site-specific soils. If dechlorination can be shown to be adequately effective, the long-term protection of human health and the environment would be administered because of substantial reduction of mobility and toxicity. For the glycolate dechlorination process, the use of solvent material also generates a new waste requiring a residuals disposal plan; this may also be the situation for the base catalyzed dechlorination process. The toxicity, the volume, and the potential RCRA classification of these residuals using any dechlorination process cannot be adequately defined at this time.

All alternatives involving transportation of contaminated soils to an offsite location for treatment or disposal would require special considerations to assure the short-term protection of human health and the environment during transport. These considerations include the method of containment and transport of contaminated soil, transportation routes and scheduling of hauls.

All alternatives, with the exception of "No Action", involving the

treatment of groundwater are considered equally protective of human health. This is primarily due to the intent to conduct mass removal of the contaminants from the aquifer, thereby ultimately restoring the groundwater to drinking water quality. Performance standards are the same regardless of technology.

8.1.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA, as amended by SARA, requires that onsite remedial actions comply with applicable or relevant and appropriate requirements or standards (ARARs) under Federal and State environmental laws. Such a standard or requirement must be attained if it is determined to be either directly applicable or both relevant and appropriate. Some of the requirements discussed in this section are directly applicable to a particular aspect or component of a remedial alternative. Other requirements are identified as being both relevant and appropriate to a remedial alternative. Both of these categories of requirements constitute ARARs and must be attained by the remedial alternative.

Three basic types or ARARs exist, Action-Specific ARARs, Location-Specific ARARs, and Chemical-Specific ARARs. Table 8.1 identifies potential federal action-specific ARARs for this site. Tables 8.2 and 8.3 list the potential federal location-specific and chemical-specific ARARs for the site. Potential State ARARs are identified in Tables 8.4, 8.5, and 8.6. These tables represent a comprehensive list of potential ARARs which were considered during the development of the Feasibility Study. Section 9.0 identifies the specific ARARs for the components of the selected remedy as presented in this Record of Decision.

Action Specific ARARs

Action-specific requirements are technology-based and establish performance, design, or other controls related to the management of the wastes associated with a site.

Location-Specific ARARs

Location-specific ARARs are standards or criteria which may affect the types of remedial alternatives or technologies used to remediate a site due to the location of the site. These ARARs consider any restrictions which may be present at the site and the area surrounding the site, which may require special consideration during the remediation. Types of locations-specific ARARs include regulations protective of wetlands, scenic rivers, and endangered

species.

Chemical-Specific ARARs

Chemical-specific ARARs are usually risk-based standards or criteria which may affect the types of remedial alternatives used to remediate a site. Maximum contaminant levels as identified under the Safe Drinking Water Act are examples of chemical-specific ARARs.

The following summaries are provided with respect to media.

8.1.2.1 Soils

There are no action-specific ARARs for the No Action Alternative, S-1. RCRA requirements for S-4 (capping) may be relevant and appropriate. An onsite landfill, S-5, will be subject to the disposal standards of RCRA. Alternative S-7 would be required to comply with Land Disposal Requirements (LDRS) through a Treatability Variance for the contaminated soil/debris. LDRs can be considered as action-specific since excavation triggers land ban requirements, and as chemical-specific in view that specific reduction requirements are identified for specific contaminants. The Treatability Variance does not remove the requirement to treat restricted soil/debris wastes; they allow the establishment of LDR standards on actual data collected form the Site. LDR treatment levels would be met for the soils/debris and for any sludge or used activated carbon generated by the treatment or processes. S-9 will be required to comply with LDRs. Alternative S-10 would be required to meet all onsite storage regulations as defined by RCRA. All soil alternatives which involve the excavation of soil will be subject to the generator standards of RCRA.

8.1.2.2 Groundwater

MCLs and North Carolina standards are ARARs for Site groundwater. Alternative GW-1 would not comply with ARARs. Alternatives GW-3, GW-4 and GW-5 would attain chemical-specific ARARs by achieving MCLs and cleanup standards throughout the contaminant plume. Construction of the groundwater recovery, treatment, and discharge system for each of these alternatives would satisfy action-specific ARARs. The disposal of any sludge or spent activated carbon generated by the groundwater system would also comply with ARARS. Final discharge of the treated water will comply with the substantive requirements of the National Pollutant Discharge Elimination System, (NPDES). Offsite discharge requires an NPDES

permit.

8.1.2.3 Surface Water

The No Action Alternative SW-1, would not comply with the ARARs associated with the surface water contamination. Alternatives SW-3 and SW-4 would comply with location-specific and action-specific ARARS. Treatment of the surface water of Alternatives SW-3 and SW-4 would result in compliance with the State of North Carolina chemical-specific ARARS. Final discharge of the treated water would comply with the substantive requirements of the National Pollutant Discharge Elimination System. Offsite discharge and action would require a permit.

Onsite actions for CERCLA sites, such as the disposal of structures and debris, are exempt from requiring permit administrative requirements. Nonetheless, all onsite actions would be required to meet all substantive requirements of any and all identified ARARs.

8.2 Evaluating Criteria

8.2.1 Cost:

The benefits of implementing a particular remedial alternative are weighed against the cost of implementation. Costs include the capital up-front costs of implementing an alternative over the long term, and the net present worth of both capital and operation and maintenance costs. Again, the components of the remedy are broken out by media and are presented in Table 8.7. These costs are relative costs developed for remedy selection based on 1000 yds^3.

8.2.2 Implementability:

EPA considers the technical feasibility (e.g., how difficult the alternative is to construct and operate) and administrative ease (e.g., the amount of coordination with other government agencies that is needed) of a remedy, including the availability of materials and services.

Evaluation of the soils alternatives indicates that no implementation is needed for the No Action alternative. Construction of the cover or cap (Alternatives S-3 and S-4) would pose no significant difficulties. Likewise, construction of a landfill onsite would present no significant implementation problems. Alternative S-7 would require an additional treatability study to determine whether assure achievement of Site-specific remedial goals and ARARS is possible with dechlorination technology

in soils. Uncertainties are associated with the effectiveness of the dechlorination of PCDDs/PCDFs. Treatability Studies would delay remediation at the site. Treatment units may not be immediately available. Site conditions of potential concern for on-site treatment using dechlorination are the clay and moisture content. A treatability study was conducted using the APEG-PLUS™ process. The treatability study using the APEG-PLUS™ process was not successful in demonstrating effective dechlorination of PCDDs/PCDFs. There are other dechlorination processes available, such as K-PEG, and BCD. An additional problem associated with dechlorination is the disposal of residual waste. Due to the use of solvents in the process, waste is generated which must also be properly disposed. Alternative S-8 would require test burns. Due to the 99.99% destruction and removal efficiency (DRE) requirements, onsite incineration may not be implementable. The 99.99% DRE may not be achievable by a mobile incinerator for the soils at the Koppers site given the low levels of contaminants in the soils. There may also be difficultly in obtaining a mobile incinerator vendor for the small quantity of soil associated with the Site. Alternatives S-6 and S-9 would pose no implementation difficulties. Potential facilities have been identified that are permitted to accept material such as the Site soils.

None of the groundwater remedial alternatives pose significant concerns regarding implementation. Final design of the treatment systems for Alternatives GW-3 through GW-5 cannot be completed until discharge requirements are defined.

None of the remedial alternatives pose significant concerns regarding implementation. Final design of the treatment systems for Alternatives SW-3 and SW-4 cannot be completed until discharge requirements are defined.

8.2.3 Short-Term Effectiveness: The length of time needed to implement each alternative is considered and EPA assesses the risks posed to workers and nearby residents during construction and implementation.

The short-term effectiveness is immediately accomplished for soils using Alternatives S-1, S-3, and S-4, since these alternatives could be implemented without significant risks to on-site workers or the community and without adverse environmental impacts. The principal short term impacts of implementing Alternatives S-5 through S-10 is the potential exposure of workers during excavation and the handling of contaminated soils.

All of the groundwater remedial alternatives can be implemented

Table 8.1

POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC SITE
BEAZER EAST, INC
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
CONSOLIDATION WITHIN a UNIT	None applicable.	When RCRA hazardous wastes are moved into or out of an area of contamination, RCRA disposal requirements are applicable to the waste being managed and certain treatment, storage, or disposal requirements are applicable to the area receiving the waste. (Ex Closure)	
CONTAINER STORAGE	Containers of RCRA hazardous wastes must be:	Storage of RCRA wastes (listed or characteristic) not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal or storage elsewhere:	
	- Maintained in good condition,		
	- Compatible with hazardous waste to be stored, and	(40 CFR 264 10) in a container A generator who accumulates or stores hazardous waste on site for 90 days or less in compliance with 40 CFR 262 34(a)(1 4) is not subject to full RCRA storage requirements Small quantity generators are not subject to the 90 day limit (40 CFR 262 34 (c), (d), and (e))	40 CFR 264 172
	Closed during storage (except to add or remove waste)		40 CFR 264 171

Table 8.1 (cont.)

POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
	Inspect container storage area weekly for deterioration.		40 CFR 264.174
	Place containers on a sloped, crack free base, and protect from contact with any accumulated liquids. Provide containment system with a capacity of 10% of the volume of containers of free liquids		40 CFR 264.175
	Keep containers of ignitable or reactive waste at least 50 feet from the facilities property line.		40 CFR 264.176
	Keep incompatible materials separate Separate incompatible materials stored near each other by a dike or barrier		40 CFR 264.177
	At closure, remove all hazardous waste and residues from the containment system and decontaminate or remove all containers, liners.		40 CFR 264.178
	Storage of banned wastes must be in accordance with 40 CFR 268. When such storage occurs beyond one year, the owner/operator bears the burden of proving that such storage is solely for the purpose of accumulating sufficient quantities to allow for proper recovery, treatment, and disposal		40 CFR 268.50

Table 8.1 (cont.)

POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citations
DISCHARGE of TREATMENT SYSTEM EFFLUENT	**BEST AVAILABLE TECHNOLOGY** Use of best available technology (BAT) economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutant control technology (BCT) is required to control conventional pollutants. Technology based limitations may be determined on a case-by-case basis.	Point source discharges to waters of the United States (Any water body or wetland CERCLA on-site activities are exempt from permitting requirements, but must meet the technical requirements of applicable regulations)	40 CFR 122 44 (a)
	WATER QUALITY STANDARDS Applicable Federally approved State water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA.		40 CFR 122 44 and State regs approved under 40 CFR 131
	BEST MANAGEMENT PRACTICES Develop and implement a Best Management Practice Program to prevent the release of toxic constituents of concern to surface waters.		40 CFR 125 100
	The Best Management Practice Program must: - Establish specific procedures for the control of toxic and hazardous pollutant spills	Discharge to waters of the U S (CERCLA on site activities are exempt from permitting requirements, but must meet the technical requirements of applicable regulations)	40 CFR 125 104

Table 8.1 (cont.)

POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
	- Include a prediction of the direction, rate of flow, and total quantity of toxic pollutants where experience indicates a reasonable potential for equipment failure.		
	- Assure proper management of solid and hazardous waste in accordance with regulations promulgated under RCRA		
	MONITORING REQUIREMENTS		
	Discharge must be monitored to assure compliance. Discharge will monitor.		40 CFR 122.41 (j)
	- The mass of each pollutant; - The volume of effluent; - The frequency of discharge and other measurements as appropriate.		
	Approved test methods for constituent to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided.		40 CFR 136.1 - 136.4
	Sample preservation procedures, container materials, and maximum allowable holding times are prescribed		
	Comply with additional substantive conditions such as:		40 CFR 122.41 (j)

Table 8.1 (cont.)
POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
	- Duty to mitigate any adverse effects of any discharge; and - Proper operation and maintenance of treatment system.		
DISCHARGE to PUBLICLY OWNED TREATMENT WORKS (POTW) (Off site activity)	Discharge of pollutants that pass through the POTW without treatment, interfere with POTW operation, contaminate the POTW sludge, or endanger health/safety of POTW workers is prohibited Specific prohibitions preclude the discharge of pollutants to POTWs that - Create a fire or explosion hazard in the POTW; - Will cause corrosive structural change to POTW; - Obstruct flow resulting in interference; - Are discharged at a flow rate and/or concentration that will result in interference, and	Indirect discharge of pollutants to POTW.	40 CFR 403.5

Table 8.1 (cont.)

POTENTIAL ACTION-SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
	- Increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104 F (40 C)		
	Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.		40 CFR 403.5
	RCRA permit-by-rule requirements (including corrective action where the NPDES permit was issued after November 8, 1984) must be complied with for discharges of RCRA hazardous wastes to POTWs.	Transport of RCRA hazardous waste to POTWs by truck, rail, or dedicated pipe (40 CFR 264) which discharges from within the CERCLA site to within the boundaries of the POTW	40 CFR 270.60
PLACEMENT of WASTE in LAND DISPOSAL UNIT	LAND DISPOSAL RESTRICTIONS Attain land disposal "treatment standards" before putting waste into landfill to comply with land ban restrictions. A treatment standard can be; a concentration level to be achieved (performance based), or a specified technology that must be used (technology based). If the standard is performance based, any technology can be used to achieve the standards. (See Treatment when waste will be Land Disposed.)	Placement of RCRA hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt bed or salt dome formation, or underground mine or cave for which LDRs have been promulgated	40 CFR 268 (D)

Table 8.1 (cont.)

POTENTIAL ACTION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
TANK STORAGE (On-Site)	**Tanks must have sufficient strength to ensure that they do not rupture or collapse.**	Storage of RCRA hazardous waste not meeting small quantity generator criteria	40 CFR 264 190 40 CFR 264 191 40 CFR 264 10
	Tanks must have secondary containment and sufficient freeboard to prevent overflow by wave action.		40 CFR 264 193 194
	- Repair of crack, or leaks.		
	- At closure, all hazardous waste and waste residue must be cleaned from tank.		40 CFR 264 196 40 CFR 264 197
	(Additional requirements will be included if this becomes an alternative.)		
TREATMENT in a UNIT	Design and operating standards for unit in which hazardous waste is treated. (See citations for design and operating requirements for specific units.)	Treatment of hazardous waste in a unit	40 CFR 264 190 264 192 (Tanks) 40 CFR 264 273 (Land Treatment Units) 40 CFR 264 601 (Misc. Treatment Units)

Table 8.1 (cont.)

POTENTIAL ACTION-SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC
MORRISVILLE, NORTH CAROLINA

Action	Requirements	Prerequisites	Citation
TREATMENT (When waste will be land disposed.)	Treatment of waste subject to ban on land disposal must attain levels achievable by BDAT for each hazardous constituent in each listed waste.	Disposal of some impacted soil and debris resulting from CERCLA response actions or RCRA corrective actions is not subject to land disposal prohibitions until May 8, 1992. No LDRs have been established for F032 to date.	40 CFR 268.10 40 CFR 268.11 40 CFR 268.12 40 CFR 268.41

Table 8.2

POTENTIAL LOCATION SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Location	Requirements	Prerequisites	Federal Citation
Wetlands	Action to prohibit discharge of dredged or fill material into wetlands without a permit.	Wetlands as defined in US Army Corps of Engineers regulations.	Clean Water Act section 404, 40 CFR 230 33 CFR 320-330
	Action to avoid adverse effects, minimize potential harm, and preserve and enhance wetlands, to the extent possible.	Action involves construction of facilities or management of property in wetlands, as defined by 40 CFR 6, Appendix A, section 4(j).	40 CFR Part 6, Appendix A
(Note: 40 CFR 6, subpart A sets forth EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Executive Orders are binding on the level (e.g., federal, state) of government for which they are issued.)			
Area affecting stream or river.	Action to protect fish or wildlife.	Diversion, channeling or other activity that modifies a stream or river, and affects fish or wildlife.	16 USC 661 et seq. (Fish & Wildlife Coordination Act), 40 CFR 6.302

Table 8.3

POTENTIAL CHEMICAL SPECIFIC ARARs

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Constituents of Concern	RCRA Maximum Conc. Limits (MCLs)	SDWA NPDWR Maximum Contaminant Levels (MCLs)	SDWA NPDWR Maximum Contaminant Level Goals (MCLGs)	SDWA NPDWR Secondary Maximum Contaminant Level Levels (SMCLs)	CWA Freshwater WQC Acute / Chronic ug/L.
Phenols					
Phenol (Total)	-	-			10,200 / 2,560
2-Chlorophenol	-	-			None None
2-Nitrophenol	-				
2,4-Dimethylphenol	-				None None
2,4-Dichlorophenol	-				2,020 365
4 Chloro-3-Methylphenol	-				
2,4,6-Trichlorophenol					None 970
2,4 Dinitrophenol					None None
4-Nitrophenol	-				
2,3,5,6-Tetrachlorophenol	-				
2-Methyl-4,6-Dinitrophenol	-				22 11
Pentachlorophenol	-	0.001 mg/L (a)			
Dioxins and Furans					
2,3,7,8-TCDD	-	5.00E-08 mg/L (a)			

(a) SDWA, NPDWR, MCLs (Effective 1 27 92); 55 FR 30445, 7 25 90; to be codified at 40 CFR 141 61

SDWA - Safe Drinking Water Act
NPDWR - National Primary Drinking Water Regulations
CWA - Freshwater Water Quality Criteria, from EPA Integrated Risk Information System

Table 8.4
POTENTIAL ACTION SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
North Carolina Solid and Hazardous Waste Management Act	Establishes regulations for handling and disposal of construction debris, trash, sludge, and hazardous waste. Also regulates recycling and processing of these materials.	G.S. 130A, Article 9
North Carolina Solid Waste Management Regulations	Rules governing the management of solid waste. Includes storage, collection, transportation, and disposal of solid waste	15A NCAC 13B
North Carolina Hazardous Waste Management Commission Act	Establishes regulations for siting, construction and operation of TSDFs	G.S. 130B
North Carolina Oil Pollution and Hazardous Substance Control Act	Establishes regulations protecting the land and waters over which the State has jurisdiction regarding oil products and other hazardous substances	G.S. 143, Article 21A
North Carolina Water Pollution Control Regulations	Establishes NPDES permit requirements and fees, for discharges to waters of the state	15A NCAC 2H

Table 8.4 (cont.)

POTENTIAL ACTION SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
	WASTEWATER DISCHARGES TO SURFACE WATERS Requires permit for the discharge of pollutants into waters of the United States.	15A NCAC 2H .0100
	WASTE NOT DISCHARGED TO SURFACE WATER Requires permit for systems which do not discharge to surface water of the state, includes sewer systems, treatment works, and sludge disposal systems which discharge waste onto or below land surface.	15A NCAC 2H .0200
	WATER QUALITY CERTIFICATION Requires dischargers to obtain a Certificate of Coverage, prior to issuance of a discharge permit.	15A NCAC 2H .0500
	STANDARDS FOR PRETREATMENT FACILITIES Requires permit for pretreatment facilities discharging waste to a Treatment Works	15A NCAC 2H .0900
N.C. Water Quality Standards	**CLASSIFICATIONS AND WATER QUALITY STANDARDS APPLICABLE TO SURFACE WATERS OF N.C.**	
Effluent Guidelines and Standards Applicable to Surface Waters	Requires specific effluent characteristics for discharge under NPDES permits	15A NCAC 2B .0200

Table 8.4 (cont.)

POTENTIAL ACTION SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
	EFFLUENT LIMITATIONS Requires technology based effluent limitations for pollutants.	15A NCAC 2B 0400
	STORMWATER RUNOFF DISPOSAL	15A NCAC 2H 1000
North Carolina Hazardous Waste Management Regulations	Establishes rules governing the management of hazardous waste within the State.	15A NCAC 13A (40 CFR 262)
	IDENTIFICATION AND LISTING OF HAZARDOUS WASTE Establishes criteria for identification of hazardous waste	15A NCAC 13A 0006 (40 CFR 261)
	STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE Establishes standards for generators of hazardous wastes	15A NCAC 13A 0007 (40 CFR 262 10-12)
	STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE Establishes standards applicable to transporters of hazardous waste within the U S	15A NCAC 13A 0008 (40 CFR 263)

Table 8.4 (cont.)

POTENTIAL ACTION-SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
	STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES Establishes minimum state standards for the acceptable management of hazardous wastes, for owners and operators of facilities which treat, store or dispose of hazardous waste	15A NCAC 13A 0009 (40 CFR 264)
	INTERIM STATUS STANDARDS FOR HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES Establishes state standards for the management of hazardous waste during the period of interim status and until certification of final closure or if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled.	15A NCAC 13A 0010 (40 CFR 265)
	LAND DISPOSAL RESTRICTIONS Establishes timetable for restriction of burial of wastes and other hazardous materials	15A NCAC 13A 0012 (40 CFR 268)

Table 8.4 (cont.)

POTENTIAL ACTION-SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
	HAZARDOUS WASTE PERMIT PROGRAM	
	Establishes provisions covering basic EPA permitting requirement actions.	15A NCAC 13A .0013 (40 CFR 270)
North Carolina Drinking Water and Groundwater Standards	**CRITERIA AND STANDARDS APPLICABLE TO WATER SUPPLY AND CERTAIN OTHER TYPE WELLS**	
	Establishes regulations defining injection wells, and the construction and monitoring requirements associated with them	15A NCAC 2, 2C .0200
	Established regulations and construction criteria for wells, and registration requirements for drillers	15A NCAC 2, 2C .0100 (N.C. Well Construction Act)
	N.C. GROUNDWATER CLASSIFICATIONS AND STANDARDS	15A NCAC 2L .0100
	Classifications and water quality standards applicable to groundwater of North Carolina	.0200 .0300
North Carolina Sedimentation Pollution Control Act	Requires the development of erosion and sediment control plans for land disturbing activities	G.S. 113A, Article 4
North Carolina Inactive Hazardous Substances and Waste Disposal Sites Regulations	Requires responsible parties to provide notification, to NCDEH and public, of proposed remedial actions. Also establishes a site ranking system	15A NCAC 13C (G.S. 130A-290.010) Article 9)

Table 8.4 (cont.)

POTENTIAL ACTION SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard, Requirement, Criteria, or Limitation	Description	Citation
Recyclable Materials Used in a Manner Constituting Disposal	Established regulations which apply to recyclable materials that are applied to or placed on the land.	15A NCAC 13A 0011 (40 CFT 266.20)
NC Air Pollution Control Requirements	Establishes state air pollution control policy.	15A NCAC 2D 0200

Table 8.5

POTENTIAL LOCATION - SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Standard Requirement, Criteria, or Limitation	*Description*	Citation
North Carolina Inactive Hazardous Sites Act	Requires responsible parties to provide notification to NCDEH and public of proposed remedial actions. Also establishes a site ranking system	GS 130A, Article 9
North Carolina Land Policy Act	Establishes a State policy to give local governments guidance and assistance in the establishment and implementation of local land planning.	G S 113A, Article 9

Table 3.6

POTENTIAL CHEMICAL-SPECIFIC ARARs (NORTH CAROLINA)

FORMER KOPPERS COMPANY, INC. SITE
BEAZER EAST, INC.
MORRISVILLE, NORTH CAROLINA

Constituents of Concern	Groundwater Maximum Contaminant Levels (MCLs)	Class WS Surface Water Maximum Contaminant Levels (MCLs)	Class C Surface Water Maximum Contaminant Levels (MCLs)	Standards for all Freshwater Aquatic Life	Standards for all Freshwater Human Health
Phenols					
2-Chlorophenol	0.0001 mg/L (a)	—	—	—	—
Pentachlorophenol	0.22 mg/L (a)	—			
Total phenol	-	1.0 ug/L (b)	(d)		
Dioxins					
2,3,7,8-TCDD	2.20E-10 mg/L (a)	0.000013 ng/L (b)*	(d)	—	0.000014 ng/L (c)*

(a) 15A NCAC 2L.0202 (Water Quality Standards).

(b) 15A NCAC 2B.0211 (Standards for Toxic Substances and Temperature in WS class waters).

(c) 15A NCAC 2B, pp. 24, 25. (Water Quality Standards for Freshwater Classes).

(d) Unspecified levels. Based on telephone conversations with North Carolina Division of Environmental management, site surface waters discharge to Crabtree Creek (near intersection of Route 54 and County Road 1002). Crabtree Creek at this location, is identified as Class C-NSW waters. Regulation 15A NCAC 2B.0211, paragraph (b) does not specify quantitative limits for phenolic compounds or dioxins for Class C waters.

* Measured as PQL.

Table 8.7 Soil Alternatives	
S1 - No Action	$ 0
S3 - Surface Cover	$ 1,326,000
S4 - RCRA Cap	$ 1,477,000
S5 - On-site Landfill	$ 2,170,000
S6 - Off-site Landfill	$ 816,000
S7 - On-site Dechlorination	$ 4,530,000
S8 - On-site Incineration	$ 3,240,000
S9 - Off-site Incineration	$ 4,750,000
S10- On-site Storage	$ 659,000
Groundwater Alternatives	
GW-1: - No Action	$ 0
GW-3: - Extraction, Bioremediation, Surface Water Discharge	$ 5,100,000
GW-4: - Extraction, Carbon Adsorption, Surface Water Discharge	$ 4,031,000
GW-5: - Extraction, UV/OX, Surface Water Discharge	$ 5,133,000

Surface Water Alternatives	Fire Pond	Medlin Pond
SW-1: - No Action	$ 0	$ 0
SW-3: - Pond Destruction, Carbon Adsorption, Surface Water Discharge	$ 1,300,000 Total	$ 695,000 $ 1,995,000
SW-4: - Pond Lining, Carbon Adsorption, Surface Water Discharge	$ 952,000	$ 710,000
	$ 2,252,000	$ 1,662,000

without significant risk to the community or on-site workers and without adverse environmental impacts.

All of the surface water remedial alternatives could be implemented without significant risks to the community or on-site workers. The potential impacts on the environment from implementation of Alternative SW-3 includes the removal of wetlands and the natural habitat for fish and wildlife by the destruction of the Fire Pond. This impact will be countered by a wetland mitigation plan which will restore wetlands in a portion of the area.

8.2.4 Long-Term Effectiveness: The alternatives are evaluated based on the alternatives' ability to maintain reliable protection of public health and the environment over time once the cleanup goals have been met.

For soils, alternative S1 would not be effective, long or short-term in reducing contaminant levels in the soil. Alternatives S-3 and S-4 could be effective in the long term through regular maintenance of the cover or cap, but a review of the remedy would be required every five years since a cap or cover is not considered to be a permanent remedy and leaves wastes in place that are above health protective levels. Alternative S-5 would also require the 5-year periodic review due to the levels of contaminants remaining onsite. Onsite landfilling, S-6, would require the same cap maintenance as Alternative S-4. Long-term maintenance at a permanent landfill would be required for offsite landfilling. Alternatives S-7 through S-9 call for treatment of the contaminated soil and therefore, result in the highest degree of long-term effectiveness by permanently reducing the Site risks. Alternative S-7 provides for onsite treatment by dechlorination. The effectiveness of this technology cannot be measured without treatability study results on Site-specific soils. The technology must provide equivalent levels of protection of human health and the environment to be deemed effective. Alternative S-10 does not provide long-term effectiveness or permanence since on-site storage would be on a temporary basis until better technology is developed.

Under Alternative GW-1, groundwater contamination would continue to migrate off-site, therefore the No Action Alternative would not be considered a permanent or effective remedial solution. The contaminant concentrations in the groundwater will be permanently reduced through groundwater extraction and treatment specified in Alternatives GW-3 through GW-5.

Under the No Action Alternative, surface water contamination would remain in the surface water; therefore, this is not considered a permanent or effective remedial solution. Contaminant concentrations in the surface water would be eliminated by either Alternative SW-3 or SW-4. These alternatives are considered to be

effective on a long-term basis and permanent.

8.2.5 Reduction of Mobility, Toxicity, and Volume: EPA evaluates each alternative based on how it reduces (1) harmful nature of the contaminants, (2) their ability to move throughout the environment, and (3) the volume or amount of contamination at the site.

Consideration of the soil remedial alternatives established that contaminant levels would remain unchanged for Alternatives S-1, S-3, S-4, S-5, S-6, and S-10. Alternatives S-3 and S-4 would not reduce the toxicity or the volume of the contamination, but would reduce the mobility and therefore the effective toxicity may be reduced. Alternative S-5 may reduce the mobility of the contamination. Alternative S-6 would permanently reduce the mobility of contamination in soils at the site; volumes and toxicity remain unchanged. If effective, Alternative S-7 would reduce the toxicity and mobility of the contaminants in the soils. Since the effectiveness of this treatment has not been demonstrated for site-specific soils, the reduction of overall toxicity, mobility and volume for Alternative S-7 is unknown. Alternatives S-8 and S-9 would effectively reduce the toxicity, mobility and volume of site contaminants in the soils. Alternative S-10 would reduce only the mobility of the soil contaminants, therefore, eliminating a source to groundwater.

Alternative GW-1 would not significantly reduce the toxicity, mobility or volume of contaminants in groundwater. Alternative GW-3 through GW-5 would reduce the volume of contaminants in the aquifer through recovery. The groundwater treatment systems will comply with the statutory preference for alternatives that reduce toxicity of contaminants.

The implementation of Alternative SW-1, No Action, would not reduce the toxicity, mobility or volume of contaminants in the surface water. Alternatives SW-3 and SW-4 eliminate the contamination in the surface water.

8.3 MODIFYING CRITERIA

8.3.1 State Acceptance:

As a matter of course, EPA requests State comments on the Remedial Investigation and Feasibility Study reports as well as the Proposed Plan, and must take into consideration whether the state concurs with, opposes, or has no comment on EPA's preferred alternative. The NC-DEHNR has reviewed and provided comments on the reports and data from the RI, the FS and the Baseline Risk Assessment. The State of North Carolina provided conditional concurrence on September 18, 1992. The conditions included a request to conduct a treatability study on dechlorination to determine whether the

technology can be effectively used on the site contaminated soils.

8.3.2 Community Acceptance:

The community has gone on record in support of the surface water and groundwater remedial alternatives identified in the Proposed Plan. EPA does not have community acceptance for offsite incineration. The residential community has expressly stated that dechlorination or onsite storage would be the only technologies acceptable to them. EPA has received comments from commercial representatives, including the current owner of Unit Structures, that favor offsite incineration. The Responsiveness Summary provides greater detail of the community comments and their respective positions concerning the remedy selection. A response to comments is included in a Responsiveness Summary which is a part of the Record of Decision (ROD) for the Site.

9.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the National Contingency Plan, the detailed analysis of alternatives and public and state comments, EPA has selected a multi-component remedy for this site to include source control for contaminated soils, groundwater and surface water remediation. At the completion of this remedy, the risk associated with this site has been calculated to be within the accepted risk range determined to be protective of human health and the environment. The total present worth cost of the selected remedy is estimated at $11.5 million. This estimate includes source control, groundwater and surface water remediation, treatability studies and fencing of the Fire Pond, lagoon and CELLON process areas.

The selected remedy is protective of human health and the environment, is cost-effective, attains ARARs, and utilizes permanent solutions and resource recovery technologies to the maximum extent practicable. This Record of Decision identifies both a primary and a contingency remedy for source control. Remedy-selection treatability studies will be conducted on site contaminated soils to evaluate the effectiveness of dechlorination. Sufficient quantities of treated product and treatment residuals must be generated to fully characterize the usability of this technology. The contingency remedy must be shown to provide adequate dechlorination of site contaminants and cost effectiveness with respect to the primary source control remedy; together, these two components would meet the evaluating criteria of remedy selection. The threshold criteria of overall protection of human health and the environment, as well compliance with ARARs must also be satisfied. The contingency remedy will be used if treatment of site soils can effectively reduce the levels of contaminants in the soil such that the soil no longer requires management as a

hazardous waste.

The primary remedy employs thermal destruction to eliminate the principal threat at the site, this option also satisfies SARA's preference for remedies which utilize treatment as their principle element to reduce toxicity, mobility and volume. If proven effective on site soils, the contingency remedy will also satisfy this preference.

9.1 Source Control

9.1.1 Primary Source Control Remedy

Source control remediation will address the contaminated soils at the Site. The primary source control remedy requires that the contaminated soils located in the former process and lagoon areas be excavated and transported to a permitted offsite incineration facility. Excavation will be conducted on all soils contaminated with greater than 95 ppm of pentachlorophenol and/or 7 ppb of dioxins/furans. Costs associated with this component of the remedy are approximately $ 4.8 million. This cost is based on a volume of 1000 yds^3.

Additional soil characterization will be required, either before excavation begins or as part of the excavation process, to more accurately define the lateral and vertical extent of soil to be excavated. It is anticipated that excavation will be accomplished using conventional excavation equipment and earthmoving techniques.

Following excavation and removal of the soils, clean fill will be placed in all excavated areas. A minimum of 1 foot of clean fill will be required. Areas will be graded to achieve desirable surface drainage patterns and revegetated.

The primary source control remedy mandates that the contaminated soils will be transported to an offsite permitted facility and incinerated. At a minimum, the facility permit must allow the treatment of K001 waste. CERCLA requires that the compliance history of a receiving facility be reviewed prior to transporting the material. Hazardous waste manifests will be required for the transport of the materials.

Upon completion of incineration, the residual ash will be disposed in a secure landfill and will be the responsibility of the operator of the incineration facility.

9.1.2 Contingency Source Control Remedy

Source control remediation under the contingency remedy would utilize dechlorination. Contaminated soils located in the former

process and lagoon areas will be excavated and moved to an onsite treatment facility. Excavation will be conducted on all soils contaminated with greater than 95 ppm of pentachlorophenol and/or 7 ppb of dioxins/furans. Costs associated with this component of the remedy are approximately $4.6 million. This cost is also based on a volume of 1000 yds^3.

As in the primary source control remedy, additional soil characterization will be required, either before excavation begins or as part of the excavation process, to more accurately define the lateral and vertical extent of soil to be excavated. It is anticipated that excavation will be accomplished using conventional excavation equipment and earthmoving techniques.

The soils will be treated in an onsite treatment facility until treatment standards are met. The treatment standard for PCDD/PCDF will be equal to or less than the cleanup standards established for excavation, 7 ppb. In this Record of Decision, EPA is granting a treatability variance for the contaminated soil pursuant to 40 CFR 268. The treatment standard for pentachlorophenol is dictated by the treatability variance and must meet the 90-99 % reduction range and be below the excavation standard of 95 ppm. The technology will be deemed effective if the treatment of the soils can effectively reduce the levels of contaminants in the soil such that the soil no longer requires management as a hazardous waste.

Following excavation and treatment of the soils, the treated soils will be placed in all excavated areas. Areas will be graded and revegetated to achieve desirable surface drainage patterns.

9.1.3 Excavation and Performance Standards

Excavation shall continue until the remaining soil and material achieve the following maximum contaminant levels.

	Cleanup Standard	Risk Level[16]
Pentachlorophenol	95 ppm	3.2E-06
Dioxins/furans	7 ppb	1.2E-04

The cleanup standards identified above, which are established for a current and future industrial scenario, were originally developed for the protection of groundwater. These levels are more stringent than those levels established for direct contact exposure, and are therefore more protective.

[16]Numbers represent a carcinogenic risk level.

9.2 Groundwater Remediation

Groundwater remediation will address the contaminated groundwater at the Site. Groundwater remediation will include extraction of contaminated groundwater, treatment and final discharge to surface water.

Groundwater at the Koppers Site occurs in the weathered bedrock unit (10 to 30 feet below land surface) underlying the surficial sediment deposits and in the lower fractured bedrock aquifer. Recharge is supplied to the fractured aquifer by leakage from the overlying semi-confining bed in the residual soil. Water producing fractures decrease in size, frequency, and interconnectedness with increasing depth. Water-bearing fractures in the bedrock are generally encountered at depths ranging from 30 to 55 feet below ground surface.

The current design of the pumping strategy consists of one main groundwater extraction well which is located in the onsite plume. Extracted groundwater is expected to contain pentachlorophenol, dioxins/furans, and phenolic compounds. During the Remedial Design and/or the Remedial Action, assessment of the effectiveness of the existing extraction well will be made. Additional extraction wells will be added if necessary.

The treatment of the groundwater will consist of equalization, filtration for removal of suspended solids, and carbon adsorption of dissolved organics to required discharge levels. Discharge of treated water will be to the nearest viable surface water body.

9.2.1 Extraction and Performance Standards

Groundwater will be extracted from the plume using the existing extraction well PW-1. This well is located adjacent to the former lagoon area. Additional extraction wells will be installed if necessary. The groundwater flowrate to treatment is approximated at 10 gallons per minute. Actual flow rate will be determined during remedial design. To accommodate the need for potential future additional groundwater pumping, treatment system components will be designed to treat 50 gallons per minute of groundwater.

Final discharge after treatment will be to the nearest viable surface water. Discharge standards will be driven by NPDES requirements and will be defined during the development of the Remedial Design. If the discharge is onsite, a permit will not be required; all substantive requirements of an NPDES permit will be met.

Groundwater shall be treated until the following maximum concentration levels are attained throughout the plume.

9.1 Groundwater Cleanup Standards	Cleanup Standard (ppb)	Risk Level or Hazard Quotient
pentachlorophenol	1 (MCL)	3E-06[17]
PCDD/PCDF	3E-05 (MCL)[18]	1E-04[17]
2,4-dichlorophenol	20[19]	0.2[20]

The goal of this remedial action is to restore the groundwater to its beneficial use, as defined in Section 6.0. Based on information obtained during the Remedial Investigation, and the analysis of all remedial alternatives, EPA and the State of North Carolina believe that the selected remedy may be able to achieve this goal.

Groundwater contamination may be especially persistent in the immediate vicinity of the contaminants' source, where concentrations are relatively high. The ability to achieve cleanup goals at all points throughout the area of attainment, or plume, cannot be determined until the extraction system has been implemented, modified as necessary, and plume response monitored over time. If the selected remedy cannot meet the specified performance standards, at any or all of the monitoring points during implementation, the contingency measures and goals described in this section may replace the selected remedy and goals for these

[17]Number represents a carcinogenic risk level.

[18] The promulgated North Carolina standard for dioxin in groundwater is 2.2E-10 parts per million. This state standard is more stringent than the federal MCL, but is below detection capability. North Carolina's regulations state that "where the maximum allowable concentrations of a substance is less than the limit of detectability, the substance shall not be permitted in detectable concentrations." In such a case, the Practical Quantitation Limit, PQL, is the established standard. The PQL for PCDD is equivalent to the MCL.

[19]The cleanup goal for 2,4-dichlorophenol is a health based value calculated by the same methodology used to determine MCLGs for noncarcinogens. The number is based on the chemical-specific reference dose, a water ingestion rate of 2 liters, a body weight of 70 Kg., and a relative sources contribution of 20%. As with the MCLGs, the cleanup goal was adjusted by the percentage of the total daily exposure expected to be contributed by drinking water or the relative source contribution.

[20]Number represents a noncarcinogenic hazard quotient (HQ).

portions of the plume. Such contingency measures will, at a minimum, prevent further migration of the plume and include a combination of containment technologies and institutional controls. These measures are considered to be protective of human health and the environment, and are technically practicable under the corresponding circumstances.

The selected remedy will include groundwater extraction for an estimated period of 30 years, during which time the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

a) at individual wells where cleanup goals have been attained, pumping may be discontinued;

b) alternating pumping at wells to eliminate stagnation points;

c) pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into groundwater;

d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

To ensure that cleanup continues to be maintained, the aquifer will be monitored at those wells where pumping has ceased on an occurrence of every 2 years following discontinuation of groundwater extraction.

If it is determined, on the basis of the preceding criteria and the system performance data, that certain portions of the aquifer cannot be restored to their beneficial use, all of the following measures involving long-term management may occur, for an indefinite period of time, as a modification of the existing system:

a) engineering controls such as physical barriers, or long-term gradient control provided by low level pumping, as contaminant measure;

b) chemical-specific ARARs may be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;

c) institutional controls may be provided/maintained to restrict access to those portions of the aquifer which remain above remediation standards;

d) continued monitoring of specified wells; and

e) periodic reevaluation of remedial technologies for groundwater restoration.

The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at 5 year intervals in accordance with CERCLA Section 121 (c).

9.3 SURFACE WATER REMEDIATION

The surface water contained in the Fire Pond and the Medlin Pond will be removed by pumping; water will subsequently be treated by carbon adsorption and discharged to the nearest viable surface water body. All applicable requirements associated with the National Pollution Discharge Elimination System will be complied with.

Diversion channels and berms will be constructed to minimize the amount of rainfall draining to the ponds during dewatering. The surface water will be treated by carbon adsorption units. Clean fill will be placed into the drained ponds to ensure that future surface water contamination by contaminated sediments does not occur. Current levels in sediments pose this potential problem. Pond sediments must be sampled to ensure concentrations of site contaminants do not exceed soils cleanup standards established for the site. Filling of the ponds with clean fill will result in the dioxin contamination being removed from the sediment-water interface and prohibit additional surface water contamination. Clean soil will be used to backfill the ponds. After dewatering and backfilling are completed, final grading of the pond areas to control surface drainage will be conducted. Final revegetation will be maintained to provide long term sediment and erosion control.

Wetlands construction will be conducted to restore the wetlands which will be destroyed by the surface water remediation. This work will involve the creation of new wetlands or the expansion of existing wetlands at a nearby location.

9.4 ADDITIONAL COMPONENTS

In addition to the source control, groundwater and surface water remediation requirements identified in this section, additional components of this Record of Decision are identified in the following paragraphs:

9.4.1 Sampling Requirements

Additional confirmatory samples will be collected in the western ditch, the Fire Pond overflow, and pond sediments. The laboratory analysis will be for phenolic compounds and PCDD/PCDF. Analytical

methodologies selected must be approved by EPA prior to use and must meet Level IV data quality objectives.

9.4.2 Groundwater Evaluation and Plume Definition

The groundwater monitoring wells installed during the Remedial Investigation will be resampled for phenolic compounds and PCDD/PCDF. Complete definition of contaminant plume will be conducted. Discrepancies between contaminant levels in domestic wells which were not confirmed in monitoring wells will be investigated and explained by monitoring well installation, sampling and analysis. Analytical methodologies selected must meet with EPA approval prior to use and must meet Level IV data quality objectives.

9.4.3 Fencing and Maintenance

The area requiring remediation that consists of the Fire Pond, Medlin Pond, the CELLON process area and the lagoon area shall be enclosed with adequate fencing and security measures until remediation is complete. Grounds maintenance shall be conducted on a timely and frequent basis to ensure minimal hazards due to snake infestation or neglect of premises.

9.4.4 Habitat Evaluation

Wetlands will be eliminated as a result of the surface water component of the remedy. This surface water remediation will subsequently eliminate certain habitats associated with these wetlands. Therefore, a habitat restoration plan will be developed in conjunction with wetlands mitigation.

9.5 COMPLIANCE MONITORING

Groundwater, treated soils and surface water monitoring shall be conducted at this site. Analytical methodologies selected must be approved by EPA prior to use and must meet Level IV data quality objectives. After demonstration of compliance with Performance Standards, the Site including soil and groundwater shall be monitored for five years. If monitoring indicates that the Performance Standards set forth in this Record of Decision are being exceeded at any time after pumping has been discontinued, extraction and treatment of the groundwater will recommence until the Performance Standards are once again achieved. If monitoring of soils indicates that Performance standards are exceeded, the effectiveness of the source control component will be re-evaluated.

9.6 Applicable or Relevant and Appropriate Requirements (ARARs)

CERCLA Section 121(d)(2) requires that the selected remedy comply

with all federal and state environmental laws that are applicable or relevant and appropriate to the hazardous substances, pollutants, or contaminants at the site or to the activities to be performed at the site. Therefore, to be selected as the remedy, an alternative must meet all ARARs or a waiver must be obtained.

North Carolina Hazardous Waste Management Regulations

Federal regulations under the Resource Conservation and Recovery Act ("RCRA") establish minimum national standards defining the acceptable management of hazardous waste. States can be authorized by EPA to administer and enforce RCRA hazardous waste management programs in lieu of the Federal program if the States have equivalent statutory and regulatory authority. If the CERCLA site is located in a State with an authorized RCRA program, the State's promulgated RCRA requirements will replace the equivalent Federal requirements as potential ARARs. If the State is authorized for only a portion of the RCRA program, both State and Federal standards, for the portion of the RCRA program not delegated to the State, may be ARARs.

Since EPA has delegated the RCRA program to North Carolina, the North Carolina hazardous waste management regulations are potential ARARs, except for requirements such as those promulgated under the Hazardous and Solid Waste Amendments of 1984 ("HSWA"), which have not been delegated to North Carolina.

The bottom sludge from the wood treatment process lagoons is classified as K001 hazardous waste. Although the disposal of these wastes originally occurred prior to the effective date of the RCRA regulations (November 19, 1980), the ROD requires the excavation of the soil contaminated with those wastes. That soil therefore must be treated as K001 hazardous waste. Therefore, except for the HSWA requirements, North Carolina hazardous waste management regulations at 15A NCAC 13A are applicable requirements for this Site. Certain of the regulations are described in greater detail below.

15A NCAC 13A.0007

The ROD requires excavation of the contaminated soil. Such excavation will qualify as the generation of hazardous waste. The treatment residuals generated from on-site dechlorination, if implemented, and residuals from the groundwater and surface water treatment processes will also qualify as K001 hazardous waste. These regulations establish standards applicable to generators of hazardous waste and are applicable at this Site.

15A NCAC 13A.0009

These regulations establish standards for hazardous waste

treatment, storage and disposal facilities. The on-site dechlorination remedy, if implemented, will qualify as the treatment of hazardous waste. The provisions of these regulations pertaining to treatment facilities are applicable requirements for that remedy. The provisions of these regulations pertaining to storage facilities are applicable requirements for any on-site storage of hazardous waste.

Resource Conservation and Recovery Act Regulations

Federal regulations promulgated pursuant to HSWA which have not been delegated to North Carolina are also applicable requirements for the Site.

Land Disposal Restrictions; 40 CFR Part 268

K001 waste is subject to the provisions of 40 CFR Part 268, commonly referred to as the Land Disposal Restrictions ("LDRs"). These LDRs are applicable requirements at this Site. Certain of these provisions are described in greater detail below.

40 CFR 268 Subpart D - Treatment Standards

The ROD calls for the treated soil from the dechlorination process to be redeposited at the Site. These regulations require that the soil be treated to specified levels prior to placement in the ground and are applicable requirements at this Site. The contingency remedy will comply with the LDRs through a Treatability Variance for the contaminated soil as defined 40 C.F.R. §268.44. The LDRs are also applicable requirements for any on-site land disposal of residuals from the groundwater and surface water treatment systems, or residuals from the dechlorination process.

40 CFR 268 Subpart E - Storage Requirements

LDR hazardous waste stored on the Site must comply with 40 CFR § 268.50, which sets forth conditions on the storage of hazardous waste which are regulated under Part 268.

North Carolina Solid Waste Management Regulations; 15A NCAC 13B

Any on-site disposal of waste materials not regulated as hazardous waste, e.g. solid waste would be governed by these regulations rather than the Hazardous Waste Management Regulations at 15A NCAC 13A.

Safe Drinking Water Act; National Primary Drinking Water Standards: 40 CFR Part 141

The Safe Drinking Water Act sets Maximum Contaminant Levels ("MCLs") for public drinking water systems. These regulations identify MCLs for pentachlorophenol and dioxin at 1 part per billion ("ppb") and 3 x 10^{-5} ppb, respectively. These MCLs are relevant and appropriate requirements at this Site.

North Carolina Groundwater Regulations; 15A NCAC 2L

These regulations set a dioxin water quality standard for groundwater at 2.2 x 10^{-7} ppb. This, however, is below the practical quantitation limit ("PQL") for dioxin. The North Carolina regulations further state that for contaminants for which the water quality standard is below the PQL, the standard shall be the PQL. The PQL for dioxin is 3 x 10^{-5} ppb.

North Carolina Well Construction Regulations; 15A NCAC 2C

These regulations apply to injection wells and are therefore not applicable to this Site. However, these regulations are relevant and appropriate to the construction of the additional groundwater monitoring wells to be installed at the Site.

Federal Water Pollution Control Act: Discharge Limitations; (33 U.S.C. § 1311; 40 CFR Parts 122, 125, 129, 133 and 136)

Under the Federal Water Pollution Control Act ("Clean Water Act"), provisions relating to the National Pollution Discharge Elimination System ("NPDES") and regulations promulgated thereunder govern discharges to surface waters. The NPDES provisions of the Clean Water Act, and regulations promulgated thereunder, are applicable requirements for the surface water discharges required by the ROD.

Federal Water Pollution Control Act: Water Quality Criteria; (33 U.S.C. § 1314)

Water quality criteria set under the Clean Water Act may be relevant and appropriate requirements for the surface water discharges required by this ROD.

North Carolina Water Pollution Regulations and Water Quality Standards; 15A NCAC 2B and 15A NCAC 2H

These regulations govern surface water discharges and are applicable requirements for the surface water discharges required by this ROD.

FEDERAL WATER POLLUTION CONTROL ACT: Dredge And Fill

Section 404 of the Federal Water Pollution Control Act (33 U.S.C. §1344) governs the permitted discharges of dredged or fill material. The surface water remedy will result in the destruction of wetlands. Regulations implementing Section 404 are found at 40 CFR Part 230 and 33 CFR Parts 230-330 and are applicable requirements for this Site.

Fish and Wildlife Coordination Act; 16 U.S.C. §661 et.seq.

This statute requires measures to mitigate, prevent and compensate for losses of wildlife resources resulting from any control or structural modification of streams or the Ponds as required by this Record of Decision. This statute is an applicable requirement for this Site.

North Carolina Sedimentation Pollution Control Act; G.S. 113A, Article 4

This statute requires the development of erosion and sedimentation control plans and is an applicable requirement for any land disturbing activities at this Site.

To Be Considered

In the selection and implementation of the remedy defined in this Record of Decision, EPA is also considering certain additional guidances. These include:

Superfund LDR #6A (Second Edition), Obtaining a Soil and Debris Treatability Variance for Remedial Actions, OSWER 9347.3-06, September 1990.

U.S. EPA Statement of Policy on Floodplains and Wetland Assessments for CERCLA Actions - August 5, 1985.

Executive Order 11990, Protection of Wetlands

Executive Order 11988, Floodplain Management

10.0 STATUTORY DETERMINATION

Based upon available information, the selected remedy, including the contingency source control remedy, satisfies the remedy selection requirements under CERCLA, as amended by SARA, and the National Contingency Plan. The remedy provides protection of public health and the environment, is cost-effective, utilizes permanent solutions to the maximum extent practicable, and satisfies the statutory preference for remedies involving treatment

technologies.

10.1 Protection of Human Health and the Environment

The selected remedy for the Site will provide a high degree of protection of human health and the environment. For soils, the primary remedy offers the highest degree of overall long-term protection; likewise, the contingency remedy will be required to provide equal protection to be implemented. The soils remedy selection will eliminate all onsite potential exposure pathways associated with soils. The groundwater component of the remedy will significantly reduce contaminant levels within the aquifer. An alternative drinking water supply has been made available to the immediate area to include approximately 4 miles of water lines. This action was taken under an EPA Administrative Order on Consent in 1989. The potential for a private drinking water well to contain levels of contaminants which exceed the maximum contaminant levels has been substantially reduced; this potential will be further reduced upon implementation of the groundwater extraction system by disallowing the plume to migrate further. Surface water remediation will eliminate all potential exposure pathways associated with the Fire Pond and the Medlin Pond.

10.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will be designed to meet all Federal or State ARARs. No waivers of State or Federal requirements are anticipated for this site.

10.3 Preference for Treatment

The selected remedy satisfies the statutory preference (established by SARA) for remedies involving treatment which result in the permanent reduction of the volume, toxicity, or mobility of hazardous substances. Thermal treatment destroys the PCDD/PCDF and pentachlorophenol contamination, thereby eliminating the toxicity associated with the contamination in the soil. Dechlorination, if implemented, must destroy PCDD/PCDF and pentachlorophenol contamination in the soils and by that destruction would permanently reduce the toxicity and mobility associated with the soil contamination. Mass reduction of contaminants in the groundwater by extraction and treatment will also satisfy this statutory preference.

10.4 Cost Effectiveness

The selected remedy provides a greater level of protection and permanence for the soils at the site within the same relative cost of the other technologies evaluated. If equally protective, the

contingency remedy will be more cost effective than the primary remedy selection for soils. Onsite incineration may not be able to meet the destruction and removal standard of 99.99%, which a permitted facility operates under. A greater level of protection and permanence causes the soil remedy selection to be cost effective. Carbon adsorption provides treatment of both the groundwater and surface water in a cost effective manner.

10.5 Preference of Permanent Solutions and Alternative Treatment Technologies or Resource Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment can be practicably utilized for this action. Of the alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides that best balance of trade-offs in terms of long-term effectiveness and permanence reduction in toxicity, mobility and volume achieved through treatment, short-term effectiveness, implementability, and cost, State and community acceptance, and the statutory preference for treatment as a principal element. State and community acceptance of dechlorination over incineration were key factors in the decision to utilize a treatability study to determine the implementabilty of the contingency source control remedy.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of any significant changes from the preferred alternative presented in the Proposed Plan. The EPA has selected a multi-component remedy consisting of excavation and treatment of contaminated soils, groundwater and surface water remediation. The major components of the remedy identified in the Proposed Plan are identical to the description in this Record of Decision with the exception of costs of soil remediation, and the addition of a treatability study and a contingency remedy for the soil contamination based on the results of that treatability study.

Volume - Volumes were re-evaluated during public comment period. On behalf of EPA, The University of Cincinnati estimated the volume after excavation to be 2930 cubic yards.

Costs - Both the revised Feasibility Study and EPA independent cost estimates reflect increased costs with increased volumes. The cost estimates for offsite incineration increase rapidly with increase of volume. The Feasibility Study costs for onsite and offsite incineration were based on standard estimates used in the industry. These costs did not accommodate the current costs for the destruction of PCDD/PCDF

contamination. During public comment period, Beazer submitted revised cost estimates which more accurately reflect current industry standards for offsite incineration. These estimates were developed for 1000 cubic yards and 3000 cubic yards; the revised costs are $7.75 million and $14.4 million, respectively. EPA also evaluated the costs during public comment period. These independent estimates were $3.8 million for 1000 cubic yards and $11.3 million for 3000 cubic yards.

This Record of Decision reflects Beazer's revised cost for 1000 cubic yards. However, in light of the fact that there may be 3000 cubic yards, the final cost could increase to the revised estimate. The range of this cost is $11.3 million (EPA estimate) to $ 14.4 million (Beazer estimate). This potential increase in soil volumes and costs will not affect the selection of remedy identified in this Record of Decision.

The cost comparisons between the primary and the contingency source control remedies are valid if dechlorination can be shown to be effective. If the technology is not effective, the primary remedy would be the best demonstrated available technology and perhaps the only demonstrated available technology for the contaminated soils. Onsite incineration would not be considered for various reasons: the 99.99% destruction and removal efficiency requirement may not be obtainable for a mobile incineration unit in the destruction of low-level PCDD/PCDF contaminated soils; a vendor may be difficult to obtain for such small volumes; the local community does not accept or concur with onsite incineration.

Additional major components of this final Record of Decision are the identification of a contingency remedy and the use of a mandatory treatability study. These components are in direct response to the public comments received from Beazer, the state of North Carolina and the community expressing a strong desire to implement dechlorination especially at possible increased volumes.

Minor components were discussed at the July 23, 1992 public meeting, but were not explicitly identified in the Proposed Plan Fact Sheet. These minor components consist of the following items:

Groundwater Confirmation Sampling - sampling of the monitoring wells will be conducted. Select private wells will be included in the sampling. Methodology will be clearly selected and approved by EPA prior to sampling commencement, and will be required to meet all appropriate detection limits and Level IV data quality objectives defined by the EPA. Re-evaluation of the plume will be necessary under Remedial Design.

Soil Excavation Confirmation Sampling - sampling of the soils must be conducted to ensure that all soils which exceed the cleanup standards identified for pentachlorophenol and PCDD/PCDF, 95 ppm and 7 ppb, respectively. Confirmation sampling will also be required of the sediments of both ponds prior to covering with clean fill to ensure that the soil cleanup standards are not exceeded.

A perimeter fence to enclose that area of the site property which will require remediation will be installed. Signs noticing the public of a Superfund Site will be posted on at least two places on the fence, one along Koppers Road side and one along Highway 54 side.

Additional changes may be incorporated into this Decision Document based on any potential changes EPA deems necessary in response to significant community or state comments.

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

mes G. Martin, Governor
illiam W. Cobey, Jr., Secretary

William L. Meyer
Director

September 18, 1992

Mr. Greer C. Tidwell
Regional Administrator
U.S. EPA Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

Subj: Conditional Concurrence with the Draft Record of Decision
Koppers Company NPL Site
Morrisville, Wake County, NC

Dear Mr. Tidwell:

The NC Division of Solid Waste Management (DSWM) has completed review of the attached Draft Record of Decision (ROD). However, State review of the ROD cannot be considered complete until the NC Division of Environmental Management (DEM) completes its review of the ROD. Although DEM requires 5 to 6 weeks to review a ROD, they are attempting to accelerate their schedule in this case, and, if possible, provide comment by September 30, 1992. We will forward any additional comments at that time. Until then, the DSWM concurs with the selected remedy subject to the following conditions.

1. The State is listening to the concerns of the affected community and is aware that they support on-site dechlorination over off-site incineration for a soil remedy. The State is also aware of EPA Region IV's recent attempts to gather additional information from other EPA Regions and offices about dechlorination to assess its effectiveness for soil treatment. The State was made aware of the significant problems with odors and handling of treated soils at an NPL Site in Houston, TX, where the enhanced alkaline polyethylene glycol process (APEG-Plus) was used. We have personally discussed this failure with Region VI and agree that there are serious questions about APEG's ability to treat clay soils.

However, because community interest in this subject is very high and serious questions have been raised, the details of the reassessment and how the recently gathered information affects the decision for the Koppers Site should be a part of

the public record. Therefore, the State requests written documentation as to Region IV's reassessment of the dechlorination technology as it applies to the Koppers Company Site. This would include assessment for any and all technology, such as APEG-Plus and Base Catalyzed Decomposition (BCD), that would have the capability of treating soils. Such a document (which would be natural to include in the Responsiveness Summary for the ROD) could answer some important unanswered questions, such as, is off-site thermal treatment still the treatment of choice after a review of the status of dechlorination? Also, what is EPA's opinion on the efficacy of conducting further site-specific treatability/pilot studies of dechlorination for the Koppers Site? Is it feasible to include the Koppers Company Site in EPA's Superfund Innovative Technology Evaluation (SITE) program for testing of innovative technology?

2. On page 2 of the Declaration for the ROD, a fourth activity describing additional monitoring requirements should be added to the three bulleted activities presented for the groundwater alternative. Such activity should comprise of placement of additional monitoring wells on and off site to define the horizontal and vertical extent of contamination and to address the disparity between results in the existing set of monitoring wells and private wells.

3. On page 6 of the ROD, the last sentence of the fourth paragraph states, "The annexation requirement was maintained". For clarity of meaning the State suggests that the sentence be modified to read, "However, the Town of Morrisville decided to maintain the annexation requirement."

4. On Page 78 of the ROD, Section 9.1.1, cleanup goals are presented. The NC Environmental Epidemiology Section has previously commented that the cleanup goal for pentachlorophenol should be 30 mg/Kg instead of 95 mg/Kg to maintain a 10-6 risk level. Therefore, the State asks that EPA consider revising this goal.

5. On page 79 of the ROD, Section 9.2.1.2, it is stated that "Groundwater shall be treated until the following maximum concentration levels are attained at the wells designated by EPA as compliance points." The State realizes that compliance points may not be able to be selected at this time. However, the general theory as to where they will be should be discussed. The State requests that the compliance points be selected both on and off site such that they cover the entire plume. This will ensure that the entire plume will be reduced to the goals and not the on site portion of the plume.

6. If State comments are not incorporated into the cleanup goals as described above in Comment 4, the total additive residual risk after site cleanup will exceed 10^{-6}. If, after remediation is complete, the total residual risk level exceeds 10^{-6}, the State may require deed recordation/restriction to document the presence of residual contamination and possibly limit the future use of the property as specified in NCGS 130A-310.8.

7. State concurrence on this Record of Decision and the selected remedy for the site is based solely on the information contained in the attached Record of Decision. Should the State receive new or additional information which significantly affects the conclusions or remedy selection contained in the Record of Decision, it may modify or withdraw this concurrence with written notice to EPA Region IV.

8. State concurrence on this Record of Decision in no way binds the State to concur in future decisions or commits the State to participate, financially or otherwise, in the clean up of the site. The State reserves the right to review, comment, and make independent assessments of all future work relating to this site.

The State of North Carolina appreciates the opportunity to comment on the Draft Record of Decision for the subject site, and we look forward to working with EPA on the final remedy.

Sincerely,

Jack Butler

Jack Butler, PE
Environmental Engineering Supervisor
Superfund Section

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cc: Michael Kelly
Bruce Nicholson
Curt Fehn
Barbara Benoy

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

SEP 2 8 1992

4WD-NSRB

Jack Butler
North Carolina Department of Environment,
Health, and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Re: North Carolina's Conditional Concurrence
Koppers Co., Inc. (Morrisville Plant) Superfund Site
Record of Decision

Dear Mr. Butler:

EPA-Region IV appreciates the State's conditional concurrence on the Record of Decision (ROD) for the Koppers Co., Inc. (Morrisville Plant) Superfund Site located in Morrisville, North Carolina. For the record, EPA would like to respond to the conditions identified by North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR) - Superfund Section and specified in your September 18, 1992 correspondence to Mr. Greer Tidwell. Your September 18, 1992 letter, along with this response, will be included as an Appendix to the ROD. These letters should stand as official documentation that EPA-Region IV and NCDEHNR-Superfund Section have agreed on the preferred alternatives at this point in time.

In response to the first condition, EPA may provide for the inclusion of a treatability study for the dechlorination of the contamination soils. The Superfund Innovative Technology Evaluation (SITE) program may be involved to participate in the analytical evaluation of the treatability study.

The second condition requested an additional bulleted item on page 2 of the Declaration clearly requiring further delineation of the groundwater plume. This will be added. A discussion of analytical disparity is not appropriate in the declaration; the text of the ROD clearly requires further sampling of the monitoring system. Any disparity or inconsistency will be resolved during the Remedial Design.

The third condition requests a sentence to be reworded for clarity; the sentence will be reworded as requested.

In response to the revision of the soil cleanup goal for pentachlorophenol provided in condition number four, please refer to EPA's response to your sixth condition.

In response to the fifth condition, the points of compliance for the groundwater remediation will include the entire plume.

Of the remaining conditions expressed, only the sixth condition requires a response from the Agency. In response to this condition, the State may in the future put in place, pursuant to State law (G.S. 130A-310.8), a deed recordation/restriction to document the presence of residual contamination which may limit the future use of the preperty. And, as stated, this would be done after the completion of the Site's remediation.

Please contact me at 404/347-7791 or fascimile number 404/347-1695 if you have any questions or comments regarding this matter.

Sincerely yours,

Barbara H. Benoy
Remedial Project Manager
Waste Management Division

cc: Curt Fehn, EPA
Rick Leahy, ORC
Bruce Nicholson, NCDEHNR