RECORD OF DECISION
COKER'S SANITATION SERVICE LANDFILLS

DECLARATION

Site Name and Location

Coker's Sanitation Service Landfills
Kent County, Delaware

FOIA

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Coker's Sanitation Service Landfills Site (Site), located in Kent County, Delaware, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site.

The State of Delaware concurs with the selected remedy. The information supporting this remedial action decision is contained in the Administrative Record file for this Site.

Assessment of the Site

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from this Site, as discussed in the "Summary of Site Risks" on pages 4 to 8 of the Decision Summary, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The selected remedy addresses the principal threats posed by the conditions at the Site by reducing the potential for human exposure to wastes remaining at the Site.

The major components of the selected remedy are as follows:

- Deed restrictions will be placed on both landfill properties.

- The entire waste disposal areas of both landfills will be enclosed by a chain-link security fence with a locked gate to restrict the access of unauthorized persons and equipment onto the landfills.

- Appropriate warning signs will be placed along the fence.

- Cover material will be placed along the northern slope of Landfill #1 to eliminate exposure to leachate seeps.

- Areas of Landfill #2 which have subsided due to uneven settling of waste will be backfilled to grade and seeded.

- Leachate collection wells at Landfill #2 will be sealed with grout to reduce the potential for direct contact with leachate.

- Ground water will be sampled semi-annually at both landfills.

- The landfills will be inspected semi-annually during ground water sampling events.

- Surface water monitoring will be conducted at the Willis Branch adjacent to Landfill #1 at the same time as ground water monitoring for a period of no less than five years.

- A Site review will be conducted at least every five years as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies, to the maximum extent practicable for this Site. However, because treatment of the principal threats of the Site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element.

The preamble of the NCP states that treatment will be the preferred means by which principal threats posed by sites will be addressed. The preamble characterizes principal threats as "waste that cannot be reliably controlled in place, such as liquids, highly mobile materials . . . and high concentrations of toxic compounds . . . Treatment is less likely to be practicable when sites have large volumes of low concentrations of material, or when the waste is very difficult to handle and treat." (55 Fed. Reg. 8,703, (March 8, 1990)). The waste material found in the landfills

at the Site is neither liquid nor highly mobile, and can be reliably controlled in place. The Site contains a large volume of material (110,000 yds^3) that would be difficult to handle and treat due to its clay-like physical properties and the potential risk posed by substantial release of volatile organic compounds. EPA and the State have therefore determined that onsite containment of waste is an appropriate remedial action.

Because this remedy will result in hazardous substances remaining on the Site above health-based levels, a review will be conducted within five years after commencement of remedial action and every five years thereafter, as required by Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), to ensure that the remedy continues to provide adequate protection of human health and the environment.

Edwin B. Erickson
Regional Administrator
EPA Region III

SEP. 28 1990
Date

DECISION SUMMARY

1. Site Name, Location, and Description

The Coker's Sanitation Service Landfills Site (Site) is located in Kent County, Delaware, approximately 1.3 miles northwest of Cheswold and 5.7 miles northwest of the City of Dover. The Site consists of two landfills located approximately one-half mile apart on opposite sides of County Route 152 (figure 1). Coker's Landfill #1, which is on the north side of Route 152, and Coker's Landfill #2, which is on the south side of Route 152, are both part of larger, heavily wooded tracts of land. Properties adjacent to both landfills are primarily used for agricultural or light residential development. Landfill #1 is bordered on the north by a forested wetland that includes a shallow meandering stream, the Willis Branch of the Leipsic River (Willis Branch). Agricultural lands border the tree lines east and west of Landfill #2. Deer and other wildlife populate this area of Kent County.

The Site overlies two aquifers, the Columbia aquifer and the Cheswold aquifer. The Columbia aquifer directly underlies both landfills, and in the vicinity of the Site discharges north-northeast toward the Willis Branch. This aquifer is not generally used for domestic water supplies due to indigenous high levels of iron and manganese. The Columbia and Cheswold aquifers are separated by several feet of clay containing sand and silt that has demonstrated some ability to transmit water. The Cheswold aquifer is the primary source of potable water in the Dover area. A geological cross-section, which includes the Site, the Columbia and Cheswold aquifers, and the Willis Branch, is shown in figure 2.

The waste disposed of in the landfills consists of process sludge generated during the manufacture of latex rubber. Approximately 45,000 yds^3 of waste sludge are present at each landfill. Landfill #1 covers about 10 acres, and Landfill #2 is about 15 acres in size.

2. Site History and Enforcement Activities

All waste disposed of at Landfills #1 and 2 was generated at a latex rubber manufacturing facility now owned by Reichhold Chemicals, Inc. The facility was previously owned by International Latex and Chemical Corp. (1962-1967), Glen Alden, now a part of Rapid American Corp. (1967-1968), and Standard Brands Chemical Industries, Inc. (1968-1978).

Landfill #1 is located on the property of Mr. John Schmidt. Use of Landfill #1 began in 1969 under a permit issued by the

Figure 1

Site Location Map

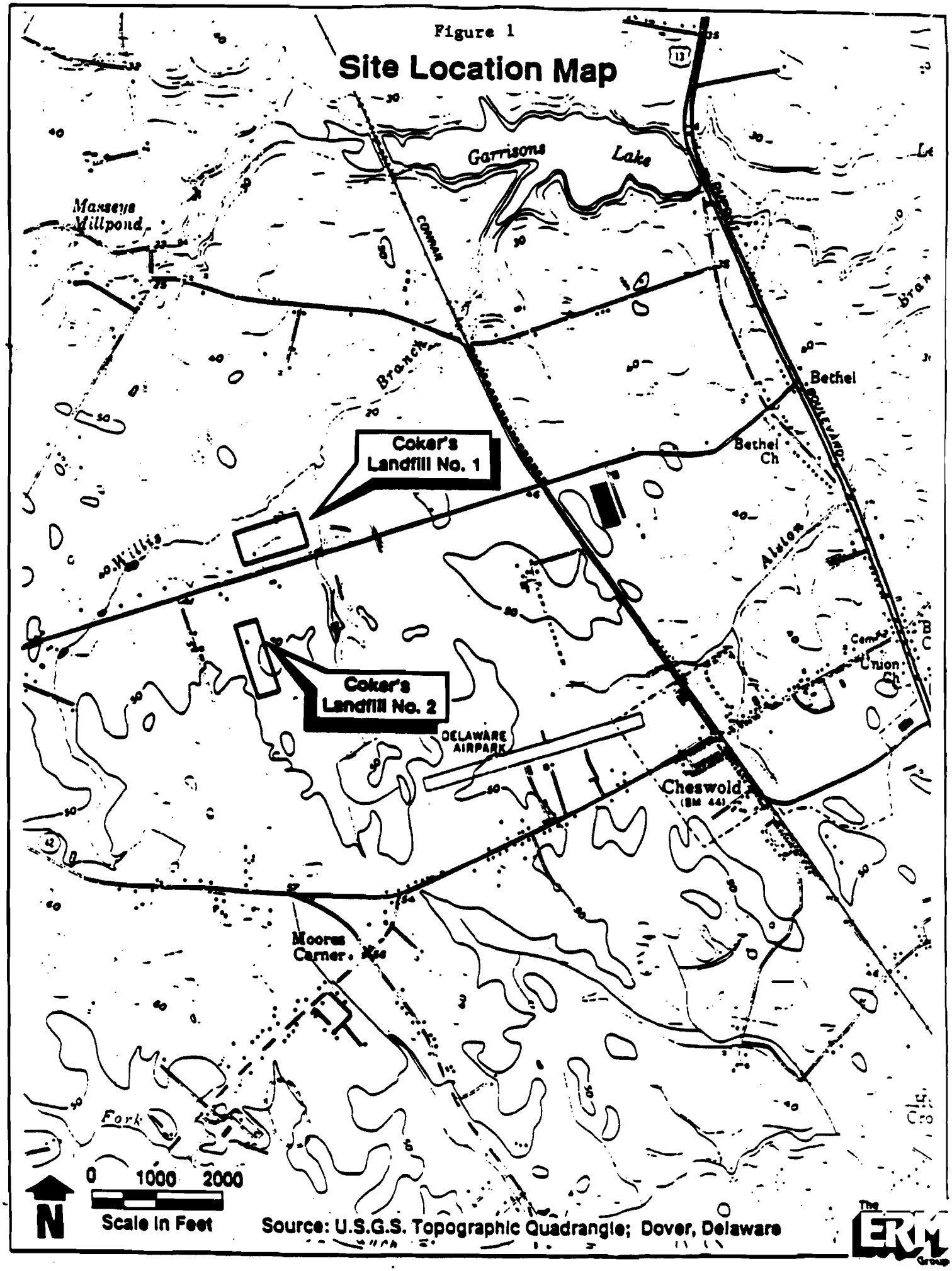

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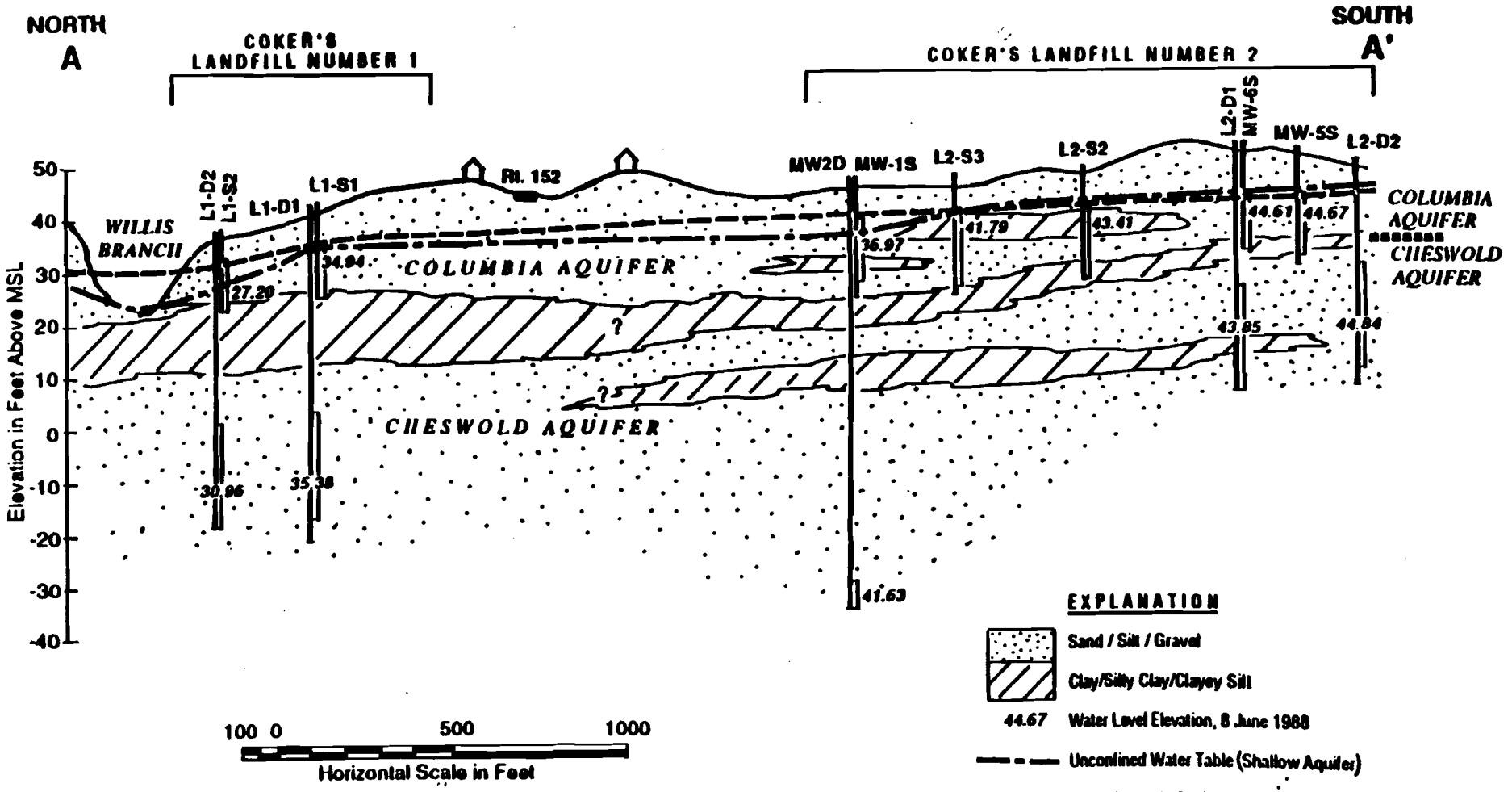
FIGURE 2

Geologic Cross Section
Coker's Landfills Site



The ERM Group

Delaware Water and Air Resources Commission. Subsequent permits (1973-1976) were issued by the Delaware Department of Natural Resources and Environmental Control (DNREC). The landfill was closed in 1977 in accordance with Delaware Solid Waste Disposal Regulations of August 1974. During landfill operation, latex waste sludge was discharged into unlined trenches that were 6 to 8 feet deep and 12 feet wide. Liquids were allowed to drain off as solids settled. Trenches were used until the solids level was within several feet of the ground surface. Trenches were then backfilled with soil obtained locally.

Landfill #2, located on property formerly owned by Mr. Joseph Kowinsky and currently owned by the estate of Genevieve M. Kowinsky, was operated from 1976 to 1980 under state permit. The permit required each 6-foot deep, 28-foot wide, 125-foot long trench to have a synthetic liner and a leachate collection system. The permit also required leachate collection and treatment, installation of ground water monitoring wells, regularly scheduled site inspections, and periodic ground water and leachate monitoring. When the Site was closed in 1980, all trenches were capped with two feet of native soil. As waste settled and no longer generated collectable quantities of leachate, leachate collection was phased out in the early 1980's.

EPA has taken several actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in response to conditions at the Site. Site investigations, including sampling of ground water (Landfill #2 only) and leachate were conducted in 1980. Samples taken from one ground water monitoring well and one leachate collection pipe at Landfill #2 were found to contain elevated levels of acrolein (1278 parts per billion (ppb) and 2128 ppb, respectively); ethylbenzene was detected in the same leachate collection pipe at 3987 ppb. In 1983, 17 ppb ethylbenzene was detected in the same well, and 28 ppb bis(2-chloroethyl)ether was detected in Landfill #1 leachate seeps.

In 1985, the Site was scored using the Hazard Ranking System. The Site was proposed for inclusion on the National Priorities List (NPL) in April 1985, and was finalized on the NPL in July 1987.

In April of 1986, EPA issued letters to several potentially responsible parties (PRPs) notifying them of their potential liability for Site response actions and inviting them to perform the Remedial Investigation and Feasibility Study (RI/FS). The purpose of the Remedial Investigation (RI) is to determine the nature and extent of contamination at a site, while the Feasibility Study (FS) develops, screens, and evaluates potential clean-up actions. On December 30, 1987, three PRPs signed an agreement with EPA in the form of an administrative order on consent (docket number III-88-16-DC) to conduct the RI/FS.

DNREC, the support agency for Site activities, agreed with the entry of this order. The parties agreed, under a separate order, to remove drums containing varying quantities of latex waste found onsite during the RI.

3. Highlights of Community Participation

The RI/FS Report and the Proposed Plan for the Site were released to the public for comment on August 22, 1990. These two documents were made available to the public in the administrative record file maintained at the EPA Docket Room in Region III and at the information repository at the Clayton Post Office, Railroad Ave., Clayton, Delaware 19938. The notice of availability of these two documents was published in the Wilmington News Journal and the Delaware State News on Wednesday, August 22, 1990. A public comment period was held from August 22, 1990 to September 21, 1990. In addition, a public meeting was held on September 5, 1990. At this meeting, representatives from EPA and DNREC answered questions about the Site and the remedial alternatives under consideration. The comments received during the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary, which is part of this Record of Decision (ROD). EPA has thus met the public participation requirements of Sections 113(k)(2)(B) and 117(d) of CERCLA, 42 U.S.C. §§ 9613(k)(2)(B) and 9617(d).

4. Scope and Role of the Response Action

The principal concerns posed by conditions at the Site are summarized below. The remedial action will address these concerns by reducing the potential for human exposure to wastes remaining at the Site. This is the only planned response action for this Site.

5. Summary of Site Characteristics

Both landfills contain a large volume of latex sludge that has been compacted and has a laboratory-measured permeability similar to that of clay. The low permeability of the waste serves to minimize the quantities of leachate generated at the Site. An estimated 45,000 yds^3 of waste is present at each landfill, along with a smaller volume of soil mixed with waste (15,000 yds^3 at Landfill #1 and 5,000 yds^3 at Landfill #2). The primary contaminants of concern, styrene, which is a class B2 probable human carcinogen, and ethylbenzene, were found primarily in the waste trenches of both landfills and in the leachate collection system of Landfill #2. Both styrene and ethylbenzene are only slightly soluble in water. Maximum concentrations of the compounds and the media in which they were found are shown in table 1.

At this time, all waste is contained within the cells of either Landfill #1 (unlined) or Landfill #2 (lined). Landfills #1 and #2 are shown in figures 3 and 4 respectively. Ground water in contact with waste at Landfill #1 can transport contaminants offsite to leachate seeps located along the northern border of the landfill. Overland flow of runoff can then carry leachate to the Willis Branch. Biological testing showed some evidence of leachate toxicity to aquatic organisms. Further studies, however, indicated the leachate has no apparent impact on the receiving stream. Although waste cells at Landfill #2 are lined, the potential for future liner failure and subsequent ground water contamination exists.

Most of Kent County is non-urbanized, consisting of lands under cultivation, open fields, wetlands and marsh, and inland waster bodies. Over 90 percent of the open land, excluding marsh areas, is in active agricultural use. Organized land use is primarily residential. The Willis Branch, which is located to the north of Landfill #1, is a tributary of the Leipsic River and discharges into the river approximately 3,000 feet downstream of the Site via a man-made lake named Garrison's Lake. Garrison's Lake is used for recreational purposes. The primary drinking water source for this area of Kent County is the Cheswold aquifer, although the Columbia aquifer is also used for domestic water supplies.

An environmental assessment was conducted as a part of the RI. The results of the qualitative habitat assessment indicate that the wetlands areas and the landfills support a diverse flora and fauna that is apparently unaffected by the Site. There is no known occurrence of any rare, threatened, or endangered species of birds, mammals, fish, reptiles, amphibians, or plants within the Site area.

6. Summary of Site Risks

EPA conducted a baseline risk assessment for the Site. Because the State regulations under which the landfills were closed did not require deed restrictions on the properties, EPA evaluated onsite risk under a hypothetical residential use scenario. Risks to offsite residents resulting from exposure to contaminants released from Landfill #2 waste cells into the shallow ground water following liner failure were also evaluated.

The first step in conducting a risk assessment is to identify contaminants of concern. A total of ten contaminants of concern, including carcinogens and non-carcinogens, were identified for Landfill #1; nineteen contaminants of concern, including carcinogens and non-carcinogens, were identified for Landfill #2. The overall risks quantified in the risk assessment were primarily based upon exposure to the following compounds: benzene, cadmium, chloroform, dibutyl phthalate, manganese,

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FIGURE 3

Delineation of Waste Cells Confirmed in the Soil Boring Investigation

Coker's Landfill No. 1

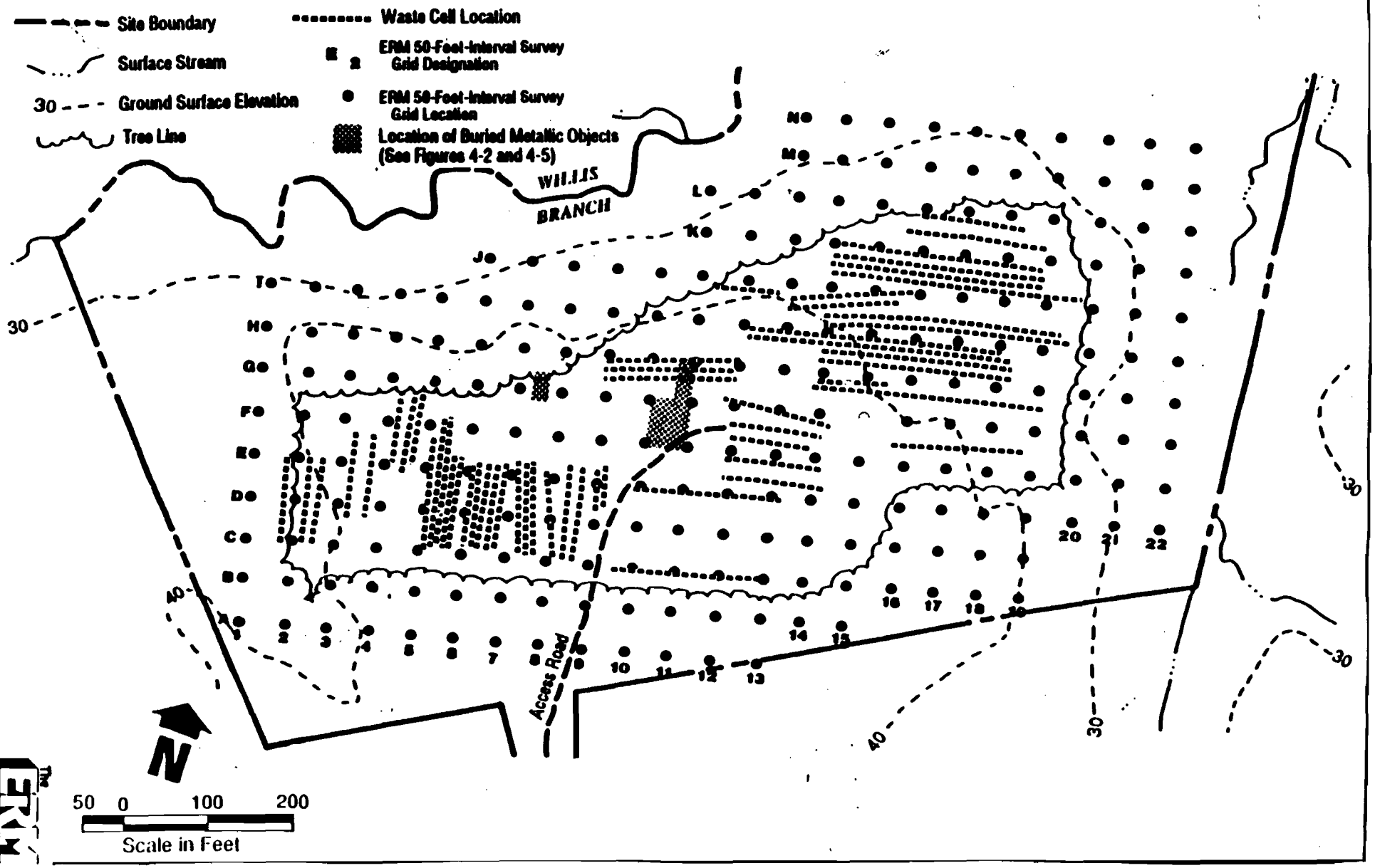
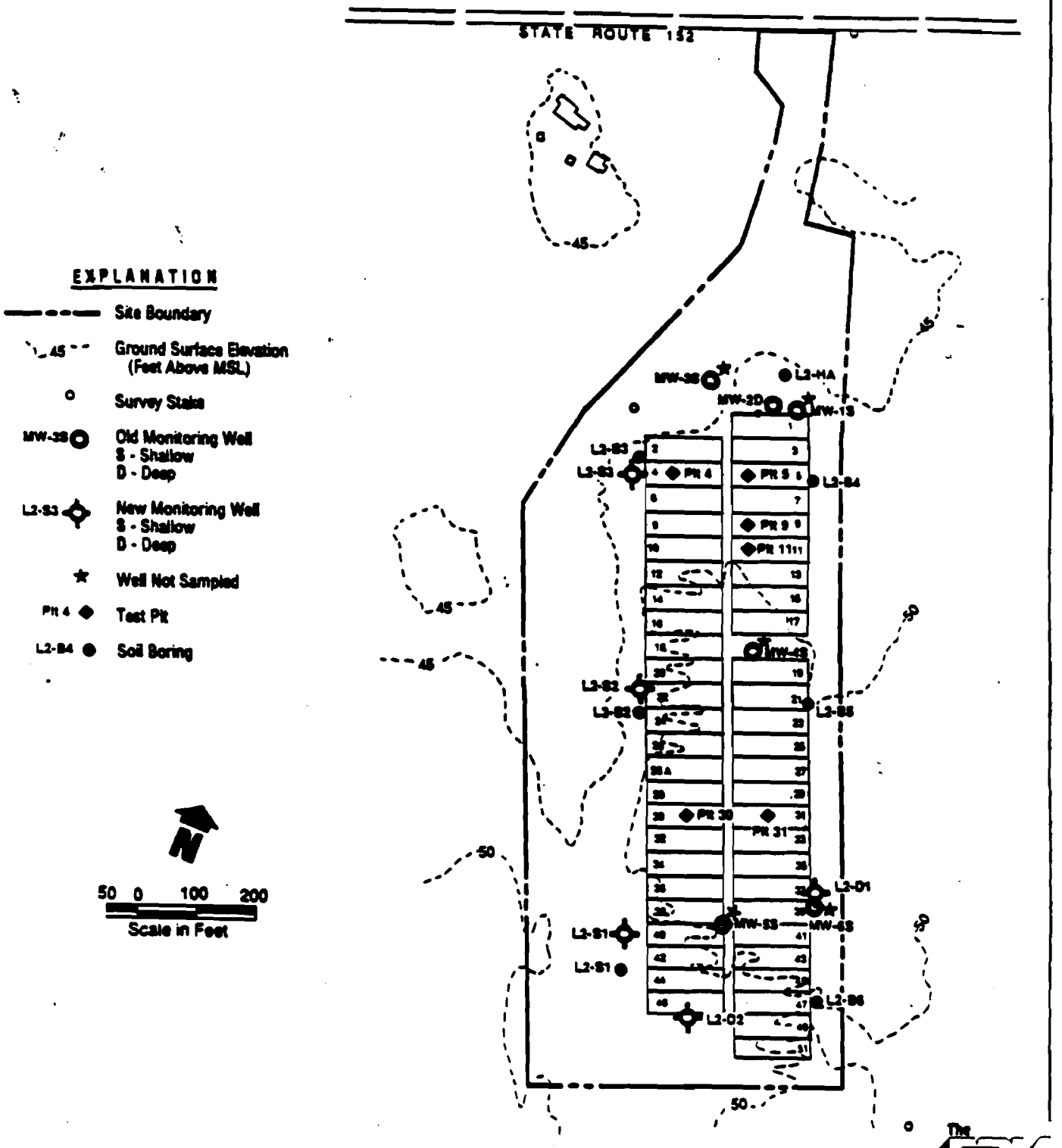


FIGURE 4

Sampling Location Map
Coker's Landfill No. 2



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phenol, cresol, ethylbenzene, and styrene. Table 1 shows the range in concentrations of these contaminants, the number of samples taken, and the number of "hits" in the waste, leachate, and ground water at both landfills. All compounds considered in the risk assessment, along with their respective Cancer Potency Factors and Reference Doses[1] (RfDs) are listed in Table 2.

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, 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 CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors 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 effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are likely to be without an appreciable risk of adverse health effects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., 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.

After the toxicity assessment of contaminants of concern, potential receptors, exposure media, and pathways for exposure are identified. Under the residential use scenario, adults and children living onsite are the potential receptors. The exposure media are soil contaminated with waste disturbed during building, and shallow ground water that is assumed to be contaminated with leachate. The risk estimates consider the following routes of exposure: ingestion of drinking water, inhalation of volatile organic compounds (VOCs) volatilized during bathing or showering, dermal contact with VOCs during bathing, ingestion of residential

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[1] The terms "Cancer Potency Factor" and "Reference Dose" will be comprehensively explained later in this section.

soil, and dermal contact with residential soil. Maximum concentrations of contaminants found in the waste and the leachate were used in the risk calculations. The cancer risks and Hazard Index scores for adults and children for each contaminant of concern in each exposure media for each exposure pathway are given in Tables 3 to 11. Relevant exposure assessment information, as well as all major assumptions about exposure frequency and duration, is given in the caption for each table.

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 (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ 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.

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 reasonably be 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 total cancer risks and Hazard Index scores for all contaminants of concern in all exposure media for all exposure pathways for adults and children are shown in Tables 12 and 13. The cancer risk for a child associated with the residential use scenario at Landfill #1 is 1×10^{-4}, which is the upper bound reach of EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. The Hazard Index for a child is 3.26, which exceeds EPA's preferred guideline of 1.0. The cancer risks for adults and children associated with residential use of Landfill #2 were 6×10^{-4} and 5×10^{-3}, respectively; the Hazard Index scores were 48 and 156. These levels exceed the upper boundary of EPA's acceptable range.

Given the above, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment as set forth in Section 106 of CERCLA, 42 U.S.C § 9606.

7. <u>Description of Alternatives</u>

<u>Alternative 1</u> -- No Action. Section 300.430(e)(6) of the

National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 55 Fed. Reg. 8,849 (March 8, 1990) (to be codified at 40 C.F.R. § 300.430(e)(6)), requires that the "no action" alternative be evaluated at every site to establish a baseline for comparison to other alternatives. Under this alternative, no action would be taken to address current or future exposure to contaminants remaining at the Site. A review would be conducted every five years as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c). This alternative does not address any contaminated media, nor does it result in the reduction of any risks associated with the Site.

Capital Cost:	$	0
Operation & Maintenance Cost:	$	0
Net Present Worth:	$	0

Alternative 2 -- Monitoring. This alternative includes Site inspection, ground water sampling, and leachate sampling from the area of the seeps (Landfill #1 only) on a semi-annual basis. Monitoring wells installed during the RI/FS or other suitable onsite wells would be used for ground water monitoring. A five year review would be conducted to assess the Site's physical condition and ground water data. The primary purpose of the monitoring program is to detect any deterioration of Site conditions. This alternative does not address any contamination found at the Site. Implementation of this alternative would not result in any significant reduction in risks associated with the Site.

Capital Cost:	$	0
Operation & Maintenance Cost:	$	653,000
Net Present Worth:	$	653,000

Alternative 3 -- Limited Action. This alternative includes a site fence, placement of cover material over the seeps at Landfill #1, backfilling and seeding depressed areas of Landfill #2, sealing the Landfill #2 leachate collection system with grout, placement of deed restrictions on both landfill properties, site inspection, monitoring, and a review at least once every five years.

Placement of cover material over the seeps at Landfill #1 would eliminate the potential for direct exposure to the leachate, and reduce potential erosion of the slope along the northern border of the landfill. Backfilling depressed areas of Landfill #2 would eliminate standing water on the landfill surface, provide protection from erosion, and further stabilize the Site. Sealing leachate collection pipes at Landfill #2 would eliminate the potential for contact with leachate from this landfill. Deed restrictions on both properties would eliminate the possibility of future use of the land in a manner that would result in unacceptable exposures to the constituents in the

waste, or disturbance of the closed landfills. Fencing the site and posting the appropriate warning signs would restrict access of unauthorized persons and equipment to the landfills.

In addition to these components, this alternative includes semi-annual Site inspections and ground water monitoring (both landfills) and surface water monitoring (Landfill #1 only). Should ground water monitoring detect any unacceptable levels of contamination, DNREC, in conjunction with Kent County, would develop and implement a Ground Water Management Zone (GWMZ) in the vicinity of the Site. A GWMZ is an area of restricted ground water use developed under state authorities and implemented by the county. Should the shallow aquifer contain levels of contamination that may present a threat to human health, any drinking water wells within the GWMZ drawing from this aquifer would be replaced by deeper wells in the Cheswold aquifer. Should surface water monitoring detect any site-related changes in the quality of the Willis Branch, more detailed environmental studies would be performed to determine whether further action is warranted at the Site. Under the limited action alternative, a review of the remedial action will be conducted at least once every five years, as required under CERCLA.

This alternative would eliminate the possibility of residential development at both landfills. Carcinogenic risk due to exposure to waste and ingestion of leachate under a residential use scenario was calculated to be 1×10^{-4} for children at Landfill #1, and 5×10^{-3} and 6×10^{-3} for children and adults, respectively, at Landfill #2. The Hazard Index score for children at Landfill #1 was 3.26; the Hazard Index scores for adults and children at Landfill #2 were 48 and 156, respectively. This alternative would reduce cancer risk levels to below 1×10^{-6} and Hazard Index scores to below 1.0. Common construction materials and methods would be used to implement this alternative. Institutional controls (deed restrictions and the potential for a GWMZ), which would eliminate the possibility of future development at the Site, would reduce total site risk to below 1×10^{-6}.

No chemical- or location-specific ARARs[2] are violated by the Site in its current condition. All onsite activities would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) requirements for workers at remedial action sites (29 C.F.R. Part 1910). Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2.

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[2]ARARs are applicable or relevant and appropriate requirements of other Federal and State environmental statutes, such as the Safe Drinking Water Act, which EPA must take into consideration when selecting remedial actions for Superfund sites.

However, construction activities along the northern slope of Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. These disturbances should be kept to a minimum, and construction plans should be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State would be contacted to ensure adherence to the National Historic Preservation Act of 1966. The expected time frame for implementation of this alternative is approximately two months. Implementation would begin following approval of a Remedial Action Work Plan.

Capital Cost:	$	555,000
Operation & Maintenance Cost:	$	685,000
Net Present Worth:	$	1,240,000

Alternative 4 -- Soil Cap. This alternative includes all components of Alternative 3 - Limited Action (site fence, leachate cover, backfilling and regrading, leachate system closure, deed restrictions) plus regrading both landfills and importing additional top soil to improve drainage and to provide additional protection against erosion. This alternative would also include semi-annual Site inspection, ground water and surface water monitoring, and Site review every five years as described for Alternative 3.

Both landfills would be regraded using conventional earth moving equipment and existing cover soil to establish improved drainage patterns. Up to 6" of imported top soil would be placed over each landfill, followed by seeding to provide a vegetative cover and erosion control. Drainage swales with erosion controls would be installed to prevent erosion of the soil cap. The northern slope of Landfill #1 would be regraded to facilitate placement of the cover material for the seeps.

Placing a cover over leachate seeps at Landfill #1 and closing the leachate collection system at Landfill #2 under this alternative minimizes the potential for direct contact with leachate. Deed restrictions on both properties would eliminate the possibility of future use of the land in a manner that would result in unacceptable exposures to the waste or constituents of the waste or disturbance of the closed landfills. Fencing the site and posting the appropriate warning signs would restrict access of unauthorized persons and equipment to the landfills. The deed restrictions coupled with the establishment of a GWMZ, as described under Alternative 3, would reduce site-related risks to acceptable levels (i.e., cancer risk below 1×10^{-6} and Hazard Index of less than 1.0). Establishment of drainage patterns and placement of a vegetative cover would enhance the long-term stability of both landfills.

All engineering controls would be easy to implement using

conventional construction methods and materials. The estimated time frame for implementation of this alternative is three months following the approval of Remedial Action Work Plans.

No chemical- or location-specific ARARs are violated by the Site in its current condition. All onsite activities would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) requirements for workers at remedial action sites. Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities along the northern slope of Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. These disturbances should be kept to a minimum, and construction plans should be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State would be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Capital Cost:	$ 1,706,000
Operation & Maintenance Cost:	$ 778,000
Net Present Worth:	$ 2,484,000

Alternative 5 -- Multi-Layer Cap (both landfills) and Subdrain (Landfill #1 only). The primary components of this alternative are multi-layer caps at both landfills and shallow ground water controls at Landfill #1. The purpose of the multi-layer caps is to reduce infiltration of precipitation into the waste to a minimum. The subdrain at Landfill #1 would intercept local ground water flow and lower the water table to a level below the bottom of the waste cells. In addition, this alternative includes Site fencing, deed restrictions, Site inspection, Site maintenance, ground water monitoring, and a review every five years.

In order to implement this alternative, the surfaces of both landfills would be regraded to provide a smooth subgrade for placement of the cap and to provide an adequate grade for establishing surface drainage. A multi-layer, RCRA-type cap would be placed over the entire landfill areas. Surface water control features, such as diversion ditches and erosion control matting, would be placed as needed. At Landfill #1, a subdrain would be placed along the upgradient sides of the Landfill. This subdrain would extend to sufficient depth (10 - 14') to lower the local water table to below the bottom of the waste cells. Intercepted ground water would be discharged by gravity drain to the Willis Branch.

The multi-layer cap at both landfills would reduce the amount of precipitation reaching the waste, thereby limiting the potential for leachate generation. The subdrain at Landfill #1

would prevent ground water contact with the waste, further reducing the potential for leachate generation. This alternative would virtually eliminate the migration of low levels of contaminants into the ground water. Because additional leachate would no longer be generated and the potential for ground water contamination would be minimized, nearly all risks associated with exposure to ground water and leachate would be eliminated. Deed restrictions would prevent future disturbance of the caps, ground water monitoring would allow detection of any failure in the remedy, and regular site inspection and maintenance would provide long-term assurance of the effectiveness of the remedy.

The engineering aspects of this alternative would be fairly easy to implement using conventional construction materials and methods. The estimated time frame for implementation is six months following approval of the Remedial Action Work Plan.

No chemical- or location-specific ARARs are violated by the Site in its current condition. All onsite activities would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) regulations for workers at remedial action sites. Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities at Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. Possible disturbances could include increased sediment yield, clearing of some trees and bushes, and damage resulting from equipment access. These disturbances should be kept to a minimum, and construction plans would be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Ground water discharged from the subdrain to the Willis Branch will have to comply with Delaware Surface Water Quality Standards of 1990. Because the ground water upgradient of the landfill is not contaminated, treatment of the ground water to remove hazardous constituents would not be necessary. However, treatment may still be necessary due to the indigenous high levels of iron in the shallow aquifer. Discharge limitations would be developed based on Delaware Surface Water Quality Standards of 1990. This alternative would comply with all chemical-specific ARARs. Before any remedial actions are conducted at the Site, the Delaware Department of State would be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Capital Cost:	$	4,343,000
Operation & Maintenance Cost:	$	921,000
Net Present Worth:	$	5,264,000

Alternative 6 -- Volatile Organic Compound (VOC) Stripping by Aeration. This alternative involves removal of VOCs from the waste by aeration, first by aggressive agitation within an enclosed space, and second by further aeration outside the shelter. After aeration, the treated material would be

stabilized, if necessary, and disposed of onsite. This alternative also includes a Site fence, a Site maintenance program, deed restrictions on future ground water and land use, ground water and leachate monitoring, and a Site review every five years.

In order to implement this alternative, an enclosed shelter containing air exchange features to control VOC release to the surrounding air would be constructed at Landfill #1. The material in Landfill #2 would be excavated and transported to Landfill #1 for treatment and disposal. Empty Landfill #2 waste cells would be backfilled and graded. The same treatment process would be applied to the material in Landfill #1. Approximately 45,000 yds^3 of waste and 15,000 yds^3 of soil mixed with waste from Landfill #1, and 45,000 yds^3 of waste and 5,000 yds^3 of soil mixed with waste from Landfill #2 would be treated under this alternative. The primary method for reducing the concentration of contaminants of concern is permanent removal of VOCs by aeration. Although no treatability testing has been conducted, a landfarming equation modified by an aeration factor was used to predict the effectiveness of this treatment method. An estimated 95% (two orders of magnitude) reduction in concentrations of total VOCs was predicted.

This alternative would address the waste in the landfills, the potential source of offsite contamination. Since all waste would be removed from Landfill #2, and since the waste residuals resulting from the treatment of the material from both landfills will contain substantially reduced levels of contaminants and would be landfilled in accordance with Delaware Solid Waste Disposal Regulations of March 1990 or RCRA Subtitle C (hazardous waste management), virtually all risk evaluated for the Site would be eliminated. Treatment of all waste material from both landfills would be expected to take one year to eighteen months. Materials required for this alternative are available. However, potential implementation problems include protection of workers' health, air monitoring requirements, and potential for slowdown of the process due to variability in VOC emissions.

No chemical- or location-specific ARARs are violated by the Site in its current condition. All onsite activities would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) regulations for workers at remedial action sites. Because there are no air quality ARARs for the contaminants of concern, a site-specific air quality monitoring program, developed using health-based exposure levels, would be included as a part of the health and safety plan developed for remedial action. Although the waste present at the site is not now considered a hazardous waste or hazardous substance under RCRA, treated waste would be subject to reclassification based upon Toxicity Characteristic Leaching Procedure (TCLP) testing prior to disposal. If the treated waste were reclassified as a

hazardous waste, subsequent disposal of the waste would comply with RCRA Subtitle C (hazardous waste management). If the treated waste was not reclassified, disposal would comply with Delaware Solid Waste Disposal Regulations of March, 1990.

Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities at Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. These disturbances should be kept to a minimum. If disturbance of the wetlands is unavoidable, mitigation measures should be implemented, and construction plans should be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State would be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Capital Cost:	$ 16,281,000
Operation & Maintenance Cost:	$ 427,000
Net Present Worth:	$ 16,708,000

Alternative 7 -- Onsite Incineration. This alternative would involve excavation of all waste from Landfills #1 and #2, incineration of waste material from both landfills at Landfill #1, stabilization of incinerator ash and pollution control system waste, and onsite containment of stabilized materials at Landfill #1. Landfill #2 cells would be backfilled with clean fill and revegetated.

In order to implement this alternative, approximately 10 acres would be cleared at Landfill #1 for incinerator staging and general support activities. Surface water control features, including a diversion ditch and sediment catch basin, would be developed. Approximately 60,000 yds^3 of waste material would be excavated from Landfill #1. Approximately 50,000 yds^3 of additional waste would be excavated from Landfill #2 and transported to Landfill #1 for treatment. A total of 110,000 yds^3 of material would be incinerated. An estimated 79,000 yds^3 of ash and scrubber waste, along with soil mixed with small quantities of waste excavated at Landfill #1, would be stabilized and contained onsite. A Site monitoring and maintenance plan would be implemented and a Site review would be conducted every five years.

This alternative would address the waste material itself, the potential source of offsite contamination. The incinerator would destroy 99.99% of the VOCs in the waste. Residual materials remaining onsite would pose very little threat to human health and the environment (estimated at 0.1% of the current risk). Excavation and incineration of waste materials and closure of the landfills may take as long as seven years from the start of remediation.

No chemical- or location-specific ARARs are violated at the Site. Incinerator operations would comply with RCRA incineration operation regulations (40 C.F.R. Part 264, Subpart O,), including performance standards, and operating, monitoring, and inspection requirements. Water quality requirements for discharge of waste water following treatment of scrubber ash blowdown would be subject to state and federal National Pollution Discharge Elimination System (NPDES) rules (40 C.F.R. Parts 122 through 124, except, in accordance with Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), for permitting requirements). Although the waste present at the site is not now considered a hazardous waste or a hazardous substance under RCRA, treated waste would be subject to reclassification based upon Toxicity Characteristic Leaching Procedure (TCLP) testing prior to disposal. If the treated waste were reclassified as a hazardous waste, subsequent disposal of the waste would comply with RCRA Subtitle C (hazardous waste management). If the treated waste was not reclassified, disposal would comply with Delaware's Solid Waste Disposal Regulations of March 1990.

During Site work, Clean Air Act (CAA), 42 U.S.C. § 7401 et seq., and Delaware Regulations Governing the Control of Air Pollution would have to be met. Compliance with National Ambient Air Quality Standards (NAAQS) for particulate matter (40 C.F.R. Part 50) would also be required. In addition, because excavation and handling of the waste would allow VOCs to be released into the atmosphere, a site-specific air quality monitoring plan would be developed to ensure the health of workers and nearby residents is not threatened by Site activities. All onsite activities would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) regulations for workers at remedial action sites.

Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities at Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. If disturbance of the wetlands is unavoidable, adequate mitigation measures should be implemented, and construction plans should be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State would be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Capital Cost:	$ 82,571,000
Operation & Maintenance Cost:	$ 427,000
Net Present Worth:	$ 82,998,000

8. <u>Summary of Comparative Analysis of Alternatives</u>

The following section provides a brief comparison of each of the alternatives developed for this Site to each of the nine evaluation criteria identified in the National Contingency Plan (NCP). The nine criteria are summarized in Table 14. The first two criteria, overall protectiveness and compliance with ARARs, are considered threshold criteria which any selected alternative must meet. The next five criteria, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume, short-term effectiveness, implementability, and cost, are considered the primary balancing criteria. The final two criteria, state and community acceptance, are referred to as modifying criteria, which are evaluated following the comment period for the RI/FS and the Proposed Plan.

Overall Protection of Human Health and the Environment

No Action: This alternative would not result in any reduction in overall risk posed by the Site. By not preventing contact with onsite contaminants and not preventing future residential use, this alternative is not protective of human health and the environment. Since this alternative does not meet the threshold criteria, it will not be carried through for analysis against the remaining criteria.

Monitoring: Although this alternative would detect changes in Site conditions, it would not restrict access to Site waste and allows future residential use of the Site. Therefore, it would not result in any reduction in overall risk. This alternative is also not protective of human health and the environment and will not be retained for further analysis against the remaining criteria.

Limited Action: By covering leachate seeps and closing the leachate collection system, this alternative would prevent direct contact with the leachate at the Site. Deed restrictions would prevent future residential use of the property. Monitoring would detect any changes in ground water quality, and if necessary, a Ground Water Management Zone can be developed and replacement wells installed. The site fence would restrict access of unauthorized persons to the Site. This alternative virtually eliminates the possibility of exposure to waste and leachate and drives the cancer risk and Hazard Index score below 1×10^{-6} and 1.0, respectively. This alternative is protective of human health and the environment.

Soil Cap: In addition to the protection described under the Limited Action alternative, this alternative would further enhance the long-term stability of the Site and maintain cell cap integrity. This alternative is protective of human health and the environment.

Multi-Layer Cap (both landfills) and Subdrain (Landfill #1

only: This alternative would reduce the amount of leachate generated by both landfills by use of engineering controls, and would further reduce the potential for contact with the waste using institutional controls. The carcinogenic risk and Hazard Index score under this alternative would be well below 1×10^{-6} and 1.0, respectively; therefore, this alternative is protective of human health and the environment.

VOC Stripping: By removing waste from Landfill #2, all risks associated with that portion of the Site would be eliminated. All waste from both landfills would be treated, reducing by 95% the amount of VOCs found in the waste. Treated waste would be disposed of at Landfill #1 in accordance with the requirements for an industrial landfill. During implementation, a significant amount of VOCs would be released into the atmosphere, causing potential problems for site workers and nearby residents. After implementation, this alternative would reduce the carcinogenic risks and Hazard Index scores to below 1×10^{-6} and 1.0, respectively, and is therefore protective.

Onsite Incineration: Removal of waste from Landfill #2 for treatment at Landfill #1 would eliminate all risks posed by Landfill #2. Destruction of 99.99% of the VOCs in the waste and subsequent disposal of stabilized ash as required for an industrial landfill would reduce the carcinogenic risks and Hazard Index scores to below 1×10^{-6} and 1.0, respectively, and is therefore protective.

Compliance with ARARs

Site media do not currently exceed any chemical-specific ARARs, nor do they violate any location-specific ARARs. Onsite activities for all alternatives would be carried out in accordance with the Occupational Safety and Health Administration (OSHA) requirements for workers at remedial action sites (29 C.F.R. Part 1910). Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities along the northern slope of Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. These disturbances will be kept to a minimum, and construction plans will be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State will be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Action-specific ARARs have been identified for both treatment alternatives (VOC Stripping and Incineration). Excavation and treatment of waste could result in release of VOCs above health based standards. Although the waste present at the site is not now considered a hazardous waste or a hazardous substance under RCRA, treated waste would be subject to

reclassification based upon Toxicity Characteristic Leaching Procedure (TCLP) testing prior to disposal. If the treated waste were reclassified as a hazardous waste, subsequent disposal of the waste would comply with RCRA Subtitle C (hazardous waste management). If the treated waste was not reclassified, disposal would comply with Delaware's Solid Waste Disposal Regulations for industrial landfills (March, 1990).

Long-term Effectiveness and Permanence

Limited Action: Deterioration of the current capping system is not likely to occur due to the relatively flat topographical profile of the landfills. Locked security fences will limit access to the Site to authorized persons and therefore will limit potential disturbance of the caps. This alternative is rated as moderate in long-term effectiveness and permanence as compared to the other alternatives.

Soil Cap: This alternative further reduces the potential for erosion damage, and was rated as moderate with respect to the long-term effectiveness and permanence criteria.

Multi-Layer Cap and Subdrain: This alternative would provide the most secure source control through containment. This alternative is rated high in long-term effectiveness and permanence.

VOC Stripping: Treated waste contained onsite under this alternative would contain very low levels of VOCs. Wastes would be disposed of in accordance with Delaware Solid Waste Disposal Regulations of March 1990 or RCRA Subtitle C (hazardous waste management), which provide for long-term site maintenance and monitoring. Long-term effectiveness and permanence of this alternative is rated as high.

Onsite Incineration: All organics would be destroyed under this alternative. Residual ash and waste would be disposed of onsite in accordance with applicable sections of the Delaware Solid Waste Disposal Regulations of March 1990 or RCRA Subtitle C (hazardous waste management), which provide for long-term site maintenance and monitoring. Long-term effectiveness and permanence of this alternative is rated as high.

Reduction of Toxicity, Mobility, and Volume (TMV)

Limited Action, Soil cap, and Multi-Layer Cap and Subdrain: Because treatment is not employed as a part of any of these three alternatives, none achieve any reduction in toxicity, mobility or volume.

VOC Stripping: Although the volume of the waste would be the same before and after treatment, the VOC content would be

reduced by an estimated 95%, thereby reducing the toxicity of the waste. Should treated waste require stabilization prior to disposal, mobility of the residual contaminants would be reduced. The overall rating for reduction of TMV is moderate.

Onsite Incineration: Because 99.99% of organic contaminants in the waste would be destroyed, the toxicity of the waste would be reduced significantly. Because of the high ash content of the waste, volume would not be reduced significantly. Should ash residue require stabilization prior to disposal, mobility would be decreased as well. The overall rating for reduction of TMV is high.

Short-term Effectiveness

Limited Action: Because this alternative involves very limited site activities that would result in only limited disturbance of the Site or waste during the two-month time frame required for implementation, its short-term effectiveness is rated as high.

Soil Cap: During implementation of this alternative, the entire Site would be disturbed for regrading. However, no waste would be disturbed during the three-month time frame needed for implementation. Short-term effectiveness is therefore rated as high.

Multi-Layer Cap and Subdrain: The Site surface would be disturbed during placement of the multi-layer caps and Landfill #1 subdrain. However, there would be relatively little potential for disturbance of the waste during site activities. This alternative would take approximately six months to implement; however, the time for implementation would be considerably shorter than for either treatment alternative. Short-term effectiveness is rated as moderate.

VOC Stripping: All waste at both landfills would be disturbed during implementation of this remedy, resulting in the potential for significant VOC emissions. The time necessary for implementation of this remedy is twelve to eighteen months. Due to short-term risk from VOC emissions, short-term effectiveness is rated as low.

Onsite Incineration: This alternative requires excavation and handling of all waste onsite, resulting in the potential for significant VOC emissions and the subsequent threat to site workers and nearby residences during site activities. This alternative would require an estimated seven years for implementation. Due to risk associated with VOC emissions and the long time frame required for implementation, short-term effectiveness is rated as low.

Implementability

Limited Action, Soil Cap: Both of these alternatives are easily implemented because they require relatively simple actions. Implementability of these alternatives is rated as high.

Multi-Layer Cap and Subdrain: Construction of caps at both landfills and a subdrain at Landfill #1 would be relatively easy, using conventional construction materials and methods. When compared to the alternatives Limited Action or Soil Cap, this alternative rates moderate in terms of implementability.

VOC Stripping: The equipment required for this alternative is readily available. However, this operation is not routinely performed, and control of VOC emissions could be difficult. Therefore, this alternative rates low for implementability.

Onsite Incineration: The availability and capacity of mobile incinerators is limited. VOC emission control during site activities, although possible, could be difficult. Because the types of incinerators in use today (rotary kiln, fluidized bed, and infrared thermal treatment) all require relatively small sized feed particles (one to two inches) to function efficiently, the wastes' wet clay-like properties will necessitate substantial pre-feed handling of the waste materials. Because the moisture content of the waste material is high (average for waste samples at both landfills is 40%, compared to 10 to 20% generally seen in soils), longer residence time (and greater amounts of auxiliary fuel) would be needed to incinerate the sludge material than would be needed to incinerate a comparable quantity of soil. Although it may be theoretically possible to incinerate the waste material, the physical characteristics of the waste would render such an operation highly inefficient. Therefore, this alternative rates low with respect to implementability.

Cost

All cost figures assume 30 years of operation, maintenance, and monitoring.

Limited Action

Capital Cost:	$	555,000
Operation & Maintenance Cost:	$	685,000
Net Present Worth:	$	1,240,000

Soil Cap

Capital Cost:	$	1,706,000

Operation & Maintenance Cost:	$ 778,000
Net Present Worth:	$ 2,484,000

Multi-Layer Cap & Subdrain (Landfill #1 only)

Capital Cost:	$ 4,343,000
Operation & Maintenance Cost:	$ 921,000
Net Present Worth:	$ 5,264,000

VOC Stripping

Capital Cost:	$ 16,281,000
Operation & Maintenance Cost:	$ 427,000
Net Present Worth:	$ 16,708,000

Onsite Incineration

Capital Cost:	$ 82,571,000
Operation & Maintenance Cost:	$ 427,000
Net Present Worth:	$ 82,998,000

State Acceptance

The State of Delaware has concurred with the preferred remedy.

Community Acceptance

In order to facilitate public involvement in the decision making process, EPA held a public meeting on September 5, 1990, at the Cheswold Fire Hall to discuss the RI/FS and the Proposed Plan. This meeting was attended by local residents, local officials, and members of the local news media. A summary of the issues raised at the public meeting and in letters received during the public comment period and EPA's responses are provided in the Responsiveness Summary section of this ROD.

In general, the local citizens did not favor EPA's preferred alternative. The citizens expressed a desire for an alternative that would result in total removal of all waste from both landfills. An alternative that called for complete excavation of waste for offsite disposal was considered during the preliminary screening step of the feasibility study, but this alternative did not satisfy the preliminary screening criteria: effectiveness, implementability, and cost-effectiveness. EPA believes that the preferred alternative, the primary component of which is deed restrictions, is consistent with the NCP, 55 Fed. Reg. 8,846 (March 8, 1990) (to be codified at 40 C.F.R. § 300.430(a)(1)(iii)(D)), which states, "EPA expects to use institutional controls such as . . . deed restrictions . . . as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutants, or

contaminants. . . . The use of institutional controls shall not substitute for active response measures . . . as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy."

9. Selected Remedy

The selected remedy for the Site is Alternative 3 - Limited Action. The selected remedy includes the following components:

- Deed restrictions will be placed on each landfill property to limit the future uses of the property. The restrictions would prohibit any type of activity that could disturb the landfill surfaces or the underlying waste, or in any way increase the risk of exposure to Site contaminants.

- The entire waste disposal areas of both landfills will be enclosed by a chain-link security fence with a locked gate to restrict the access of unauthorized persons and equipment onto the landfills. Appropriate warning signs will be placed along the fence.

- Cover material will be placed along the northern slope of Landfill #1 to cover exposed leachate seeps. The cover will be graded to conform with existing drainage patterns. This cover will reduce the potential for direct contact with the leachate, and will reduce potential erosion from surface water runoff along the fairly steep slope.

- Areas of Landfill #2 which have subsided due to uneven settling of waste will be backfilled to grade and seeded.

- Leachate collection wells at Landfill #2 will be sealed with grout to reduce the potential for direct contact with leachate.

- Ground water will be sampled semi-annually at both landfills. Should monitoring detect any significant changes in ground water quality, the State of Delaware and Kent County will establish a GWMZ in the vicinity of the Site to prevent the use of shallow ground water. Any wells affected by the ground water contamination will be replaced with deeper wells.

- The landfills will be inspected semi-annually during ground water sampling events.

- Surface water monitoring will be conducted at the

Willis Branch adjacent to Landfill #1 at the same time as ground water monitoring for a period of no less than five years. Should any changes be detected in the quality of the Willis Branch, more extensive testing, including bioassays, will be conducted to determine whether further remedial actions are necessary.

- A review of this remedial action, including site inspection reports and ground water and surface water data, will be conducted no less often than each five years after the initiation of this alternative as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), for sites where hazardous substances, pollutants, or contaminants remain at the site.

The goal of the remedial action is to reduce the potential for future contact with the waste or with site contaminants, thereby reducing risk to within EPA guidelines. The cancer risks associated with no action at both landfills is at or above EPA's guideline of 1×10^{-4}; after implementation of the selected remedy, cancer risks will be below 1×10^{-6}. The Hazard Index scores associated with no action at both landfills is above EPA's guideline of 1.0; after implementation of the selected remedy, the Hazard Index scores will be below 1.0. The cost summary for the Limited Action alternative is shown in Table 15. Some changes may be made to the remedy as a result of the remedial design and construction process. However, any potential changes are not expected to reduce the effectiveness of the selected remedy.

10. Statutory Determinations

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA, 42 U.S.C § 9621, establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this Site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment.

By preventing future uncontrolled use of the landfill properties, the selected remedy is protective of human health and the environment. Deed restrictions on both properties will prevent future residential development of the Site. Under a scenario of future residential development, EPA found unacceptable health risk. If no action were taken, the cancer risk and Hazard Index score for children at Landfill #1 would be 1×10^{-4} and 3.26, respectively, For Landfill #2, if no action were taken, the cancer risks for adults and children would be 6×10^{-3} and 5×10^{-3}, respectively; the Hazard Index scores would be 48 and 156, respectively. After implementation of the selected remedy, the cancer risks will be less than 1×10^{-6} and the Hazard Index scores will be below 1.0 at both landfills. Placement of a leachate cover at Landfill #1, closure of the leachate collection system at Landfill #2, and backfilling depressed areas of Landfill #2 will improve the long-term stability of the Site. Ground water monitoring, surface water monitoring, and site inspections will detect any deterioration in site conditions. There are no short-term risks associated with the selected remedy. In addition, no cross-media impacts (e.g., release of contaminants in the waste into the air) are expected.

Compliance with Applicable or Relevant and Appropriate Requirements.

No chemical- or location-specific ARARs are violated by the Site in its current condition. All onsite activities will be carried out in accordance with the Occupational Safety and Health Administration (OSHA) requirements for workers at remedial action sites (29 C.F.R. Part 1910). Remedial actions are not expected to disturb the wetlands located to the west of Landfill #2. However, construction activities along the northern slope of Landfill #1 are likely to cause minor disturbances along the periphery of the wetlands located along the Willis Branch. These disturbances will be kept to a minimum, and construction plans will be reviewed and approved by the U.S. Army Corps of Engineers and DNREC. Before any remedial actions are conducted at the Site, the Delaware Department of State will be contacted to ensure adherence to the National Historic Preservation Act of 1966.

Cost-Effectiveness.

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs (Net Present Worth being $1,240,000). The soil capping alternative, although twice as costly as the selected remedy, does not offer a higher degree of protection. While both treatment alternatives would substantially reduce the

treatment residuals, both alternatives would still require onsite disposal and long-term site maintenance, and cost more than ten times as much as the selected remedy, without providing any further reduction of cancer risk below 1×10^{-6}.

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

EPA and DNREC have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Coker's Sanitation Service Landfills Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and the state have determined that this selected remedy provides the best balance of trade-offs in terms of nine evaluation criteria and also considering the statutory preference for treatment as a principal element.

The selected remedy does not offer the degree of permanence either of the treatment alternatives would offer. However, the landfills are at this time in a stable condition, and if they remain undisturbed, should pose no significant threat to human health and the environment. In addition, neither treatment option would significantly reduce the volume of the waste material, and treatment residuals would have to be managed onsite. Unlike the treatment alternatives, the selected remedy poses no short-term threat to site workers or nearby residents. The selected remedy is the easiest of the protective alternatives to implement, and offers the greatest reduction in risk in proportion to cost, of all alternatives considered.

The containment options under consideration all prevent future disturbances of the landfills by providing for deed restrictions. Although the treatment alternatives involve removal of all waste from Landfill #2 for treatment and disposal at Landfill #1, deed restrictions will still be required at Landfill #1. The treatment alternatives were the only alternatives which offered any reduction in toxicity, mobility, or volume; however, because of the potential for VOC emissions above health-based levels, anticipated difficulty in handling the waste material, and the time required for implementation, these alternatives were rated considerably lower in short-term effectiveness than containment options. Onsite incineration would be very difficult to implement efficiently due to the physical characteristics of the waste.

The selected remedy does not employ any treatment or resource recovery technologies. The waste contained onsite is a dense, clay-like material with a low permeability. The material would require substantial handling prior to and during treatment.

Handling of the waste material would cause significant release of VOCs into the atmosphere which would be difficult to control. These VOCs may pose a health threat to site workers and nearby residents. In addition, the high moisture content of the waste and the necessity of creating a small, uniform size feed from a thick, clay-like material would make efficient incinerator operation difficult if not impossible. Upon evaluating the remedial alternatives developed for this Site, EPA has determined that treatment is not practicable under the circumstances associated with this Site.

Preference for Treatment as a Principal Element.

The selected remedy does not satisfy the statutory preference for treatment as a principal element. As stated in the preamble of the NCP, EPA expects that treatment will be the preferred means by which principal threats posed by the Site will be addressed. The preamble characterizes principal threats as "waste that cannot be reliably controlled in place, such as liquids, highly mobile materials . . . and high concentrations of toxic compounds. . . . Treatment is less likely to be practicable when sites have large volumes of low concentrations of material, or when the waste is very difficult to handle and treat." (55 Fed. Reg. 8,703 (March 8, 1990)). The waste material found at this Site is neither liquid nor highly mobile, and can be reliably controlled in place. Concentrations of contaminants are similar in all waste trenches at both landfills. The Site contains a large volume of material (110,000 yds^3 of waste) that would be very difficult to handle and treat due its high moisture content and clay-like physical properties as well as the potential risk posed by VOC emissions. EPA and the state have therefore determined onsite containment of waste is an appropriate remedial action.

11. Documentation of Significant Changes

The preferred alternative described in the Proposed Plan was the selected remedy, Limited Action. This alternative was described in the Proposed Plan as follows:

> This alternative calls for installation of a cover over any leachate seeps present at landfill #1, closure of the landfill #2 leachate collection system with grout, regrading (backfilling and seeding) depressed areas on the surface of landfill #2, and deed restrictions on both landfills. This alternative includes Site inspections, ground water monitoring at both landfills, and surface water monitoring at landfill #1. Should ground water monitoring detect any developing plume in the Cheswold aquifer, the state could develop a Ground Water Management Zone (an area of restricted ground water use established under state authority) in the vicinity of the Site to control use of

local ground water. If surface water monitoring detects any changes in the water quality of the Willis Branch, in depth biological testing of surface water and leachate would be performed.

The Proposed Plan was released for public comment on August 22, 1990. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, EPA determined that no significant changes to the remedy, as it was originally proposed in the Proposed Plan, were necessary. However, in response to public comment, EPA has amended the remedy to include secure fences and posted warning signs at both landfills.

Table 1

Data summary for Landfill #1: contaminants of concern, number of samples taken, number of hits, and ranges of concentrations of contaminants for waste, leachate, and ground water. Maximum contaminant levels (MCLs) set under the Safe Drinking Water Act are given along with ground water data. All values given in parts per billion.

Media	Contaminant	No. of samples	No. of hits	Range	MCL
Waste	Benzene	8	0	---	
	Chloroform	8	1	n.d. - 1100000J	
	Ethylbenzene	8	8	61000J - 2300000	
	Styrene	8	6	n.d. - 5000000	
	Cresol	8	0	---	
	Dibutyl Pthalate	8	2	n.d. - 2100J	
	Phenol	8	0	---	
	Cadmium	6	2	n.d. - 3.4	
	Manganese	6	6	15J - 33J	
Leachate	Benzene	2	2	1J - 2J	
	Chloroform	2	0	---	
	Ethylbenzene	2	2	4J - 77	
	Styrene	2	1	n.d. - 11	
	Cresol	2	0	---	
	Dibutyl Pthalate	2	0	---	
	Phenol	2	0	---	
	Cadmium	2	0	---	
	Manganese	2	2	673 - 696	
Ground water	Benzene	7	1	n.d. - 1J	5
	Chloroform	7	0	---	--
	Ethylbenzene	7	1	n.d. - 4J	700
	Styrene	7	0	---	--
	Cresol	7	0	---	--
	Dibutyl Pthalate	7	1	n.d. - 2B	--
	Phenol	7	0	---	--
	Cadmium	7	1	n.d. - 5.6	10
	Manganese	7	7	20J - 297J	--

n.d.: Not detected
J: Indicates data was quantitatively estimated
B: Indicates similar concentration was found in a laboratory blank sample.

Table 1 - continued

Data summary for Landfill #2: contaminants of concern, number of samples taken, number of hits, and ranges of concentrations of contaminants for waste, leachate, and ground water. Maximum contaminant levels (MCLs) set under the Safe Drinking Water Act are given along with ground water data. All values given in parts per billion.

Media	Contaminant	No. of samples	No. of hits	Range	MCL
Waste	Benzene	8	2	27 - 44J	
	Chloroform	8	1	n.d. - 10B	
	Ethylbenzene	8	8	24000 - 1900000J	
	Styrene	8	8	21000 - 5500000	
	Cresol	8	5	n.d. - 4000	
	Dibutyl Pthalate	8	8	4000J - 120000J	
	Phenol	8	7	n.d. - 38000J	
	Cadmium	8	1	n.d. - 1.7	
	Manganese	8	8	9780J - 15600J	
Leachate	Benzene	3	1	n.d. - 10J	
	Chloroform	3	0	---	
	Ethylbenzene	3	3	1100 - 28000J	
	Styrene	3	2	n.d. - 5000J	
	Cresol	3	3	160J - 2800J	
	Dibutyl Pthalate	3	2	n.d. - 550J	
	Phenol	3	3	1000J - 12000J	
	Cadmium	3	0	---	
	Manganese	3	3	127J - 519J	
Ground water	Benzene	8	0	---	5
	Chloroform	8	0	---	--
	Ethylbenzene	8	1	n.d. - 5	700
	Styrene	8	0	---	--
	Cresol	8	0	---	--
	Dibutyl Pthalate	8	0	---	--
	Phenol	8	1	n.d. - 11J	--
	Cadmium	8	0	---	10
	Manganese	8	8	12J - 359J	--

n.d.: Not detected
J: Indicates data was quantitatively estimated
B: Indicates similar concentration was found in a laboratory blank sample.

Table 2 Cokers Sanitation Landfill Site. Contaminants of concern, reference doses, and carcinogenic potency slopes.

Pollutant	Oral RfD: (mg/kg/d)	Inhaled RfD: (mg/kg/d)	Oral Potency Factor: (1/(mg/kg/d))	Inhaled Potency Factor: (1/(mg/kg/d))
LANDFILL NO. 1				
Barium and compounds	5.00E-02	1.40E-04		
Benzene			2.90E-02	2.90E-02
Butyl benzyl phthalate	2.00E-01			
Chloroform	1.00E-02		6.10E-03	8.10E-02
Di-n-butyl phthalate	1.00E-01			
Ethylbenzene	1.00E-01			
Manganese and compounds	2.00E-01	3.00E-04		
Styrene	2.00E-01		3.00E-02	
Trichloroethylene (TCE)			1.10E-02	1.70E-02
Xylene (mixed)	2.00E+00	4.00E-01		
LANDFILL NO. 2				
Aluminum	2.90E+00			
Antimony and compounds	4.00E-04			
Barium and compounds	5.00E-02	1.40E-04		
Benzene			2.90E-02	2.90E-02
Benzoic acid	4.00E+00			
Benzyl alcohol	3.00E-01			
Beryllium and compounds	5.00E-03		4.30E+00	8.40E+00
Butyl benzyl phthalate	2.00E-01			
Carbon disulfide	1.00E-01			
Cresol(m-)	5.00E-02	1.00E-01		
Cresol(o-)	5.00E-02			
Di-n-butyl phthalate	1.00E-01			
Ethylbenzene	1.00E-01			
Manganese and compounds	2.00E-01	3.00E-04		
Phenol	4.00E-02	2.00E-02		
Styrene	2.00E-01		3.00E-02	
Toluene	3.00E-01	1.50E+00		
1,2,3-Trichloropropane	6.00E-03		1.00E-01	
Xylene (mixed)	2.00E+00	4.00E-01		

Table 3 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with ingestion of drinking water by adults. Estimates assume a body weight of 70 kg, 30 years of exposure during a 70-year lifetime, and ingestion of 2 liters of tap water per day.

Pollutant	DRINKING WATER Ambient Conc. (ug/l)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: ADULT					
Barium and compounds	7.50E+01	9.18E-04	2.14E-03		4.29E-02
Benzene	2.00E+00	2.45E-05	5.71E-05	7.10E-07	
Butyl benzyl phthalate					
Chloroform					
Di-n-butyl phthalate					
Ethylbenzene	7.70E+01	9.43E-04	2.20E-03		2.20E-02
Manganese and compounds	6.96E+02	8.52E-03	1.99E-02		9.94E-02
Styrene	1.10E+01	1.35E-04	3.14E-04	4.04E-06	1.57E-03
Trichloroethylene (TCE)	3.00E+00	3.67E-05	8.57E-05	4.04E-07	
Xylene (mixed)	3.00E+00	3.67E-05	8.57E-05		4.29E-05
			Sum:	5.16E-06	1.66E-01
LANDFILL NO. 2: ADULT					
Aluminum	2.94E+03	3.60E-02	8.40E-02		2.90E-02
Antimony and compounds	1.51E+02	1.85E-03	4.31E-03		1.08E+01
Barium and compounds	2.94E+02	3.60E-03	8.40E-03		1.68E-01
Benzene	1.00E+01	1.22E-04	2.86E-04	3.55E-06	
Benzoic acid	9.20E+03	1.13E-01	2.63E-01		6.57E-02
Benzyl alcohol	2.40E+03	2.94E-02	6.86E-02		2.29E-01
Beryllium and compounds	1.30E+00	1.59E-05	3.71E-05	6.84E-05	7.43E-03
Butyl benzyl phthalate					
Carbon disulfide	1.70E+02	2.08E-03	4.86E-03		4.86E-02
Cresol(m-)	2.80E+03	3.43E-02	8.00E-02		1.60E+00
Cresol(o-)	1.60E+02	1.96E-03	4.57E-03		9.14E-02
Di-n-butyl phthalate	5.50E+02	6.73E-03	1.57E-02		1.57E-01
Ethylbenzene	2.80E+04	3.43E-01	8.00E-01		8.00E+00
Manganese and compounds	5.10E+02	6.36E-03	1.48E-02		7.41E-02
Phenol	1.20E+04	1.47E-01	3.43E-01		8.57E+00
Styrene	5.80E+03	6.12E-02	1.43E-01	1.84E-03	7.14E-01
Toluene	1.20E+01	1.47E-04	3.43E-04		1.14E-03
1,2,3-Trichloropropane	2.90E+01	3.55E-04	8.29E-04	3.55E-05	1.38E-01
Xylene (mixed)	1.10E+02	1.35E-03	3.14E-03		1.57E-03
			Sum:	1.94E-03	3.07E+01

Table 4 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with ingestion of drinking water by children Estimates assume a body weight of 17 kg, 5 years of exposure during a 70-year lifetime, and ingestion of 2 liters of drinking water per day.

Pollutant	DRINKING WATER Ambient Conc. (ug/l)	(Cancer) Lifetime Intake ng/kg/d	(Non-cancer) Chronic Intake ng/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD					
Barium and compounds	7.50E+01	6.30E-04	8.82E-03		1.76E-01
Benzene	2.00E+00	1.68E-05	2.35E-04	4.87E-07	
Butyl benzyl phthalate					
Chloroform					
Di-n-butyl phthalate					
Ethylbenzene	7.70E+01	6.47E-04	9.06E-03		9.06E-02
Manganese and compounds	6.96E+02	5.85E-03	8.19E-02		4.09E-01
Styrene	1.10E+01	9.24E-05	1.29E-03	2.77E-06	6.47E-03
Trichloroethylene (TCE)	3.00E+00	2.52E-05	3.53E-04	2.77E-07	
Xylene (mixed)	3.00E+00	2.52E-05	3.53E-04		1.76E-04
			Sum:	3.54E-06	6.83E-01
LANDFILL NO. 2: CHILD					
Aluminum	2.94E+03	2.47E-02	3.46E-01		1.19E-01
Antimony and compounds	1.51E+02	1.27E-03	1.78E-02		4.44E+01
Barium and compounds	2.94E+02	2.47E-03	3.46E-02		6.92E-01
Benzene	1.00E+01	8.40E-05	1.18E-03	2.44E-06	
Benzoic acid	9.20E+03	7.73E-02	1.08E+00		2.71E-01
Benzyl alcohol	2.40E+03	2.02E-02	2.82E-01		9.41E-01
Beryllium and compounds	1.30E+00	1.09E-05	1.53E-04	4.70E-05	3.06E-02
Butyl benzyl phthalate					
Carbon disulfide	1.70E+02	1.43E-03	2.00E-02		2.00E-01
Cresol(m-)	2.80E+03	2.35E-02	3.29E-01		6.59E+00
Cresol(o-)	1.60E+02	1.34E-03	1.88E-02		3.76E-01
Di-n-butyl phthalate	5.50E+02	4.62E-03	6.47E-02		6.47E-01
Ethylbenzene	2.80E+04	2.35E-01	3.29E+00		3.29E+01
Manganese and compounds	5.19E+02	4.36E-03	6.11E-02		3.05E-01
Phenol	1.20E+04	1.01E-01	1.41E+00		3.53E+01
Styrene	5.00E+03	4.20E-02	5.88E-01	1.26E-03	2.94E+00
Toluene	1.20E+01	1.01E-04	1.41E-03		4.71E-03
1,2,3-Trichloropropane	2.90E+01	2.44E-04	3.41E-03	2.44E-05	5.69E-01
Xylene (mixed)	1.10E+02	9.24E-04	1.29E-02		6.47E-03
			Sum:	1.33E-03	1.26E+02

Table 5 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with incidental soil ingestion by adults. Estimates assume a body weight of 70 kg, 30 years of exposure during a 70-year lifetime, and ingestion of 60 mg of residential soil per day.

Pollutant	SOIL INGESTION Ambient Conc. (mg/kg)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: ADULT					
Barium and compounds					
Benzene					
Butyl benzyl phthalate	2.00E+02	7.35E-05	1.71E-04		8.57E-04
Chloroform	1.10E+03	4.04E-04	9.43E-04	2.46E-06	9.43E-02
Di-n-butyl phthalate	2.10E+00	7.71E-07	1.80E-06		1.80E-05
Ethylbenzene	2.30E+03	8.45E-04	1.97E-03		1.97E-02
Manganese and compounds					
Styrene	3.40E+03	1.25E-03	2.91E-03	3.75E-05	1.46E-02
Trichloroethylene (TCE)					
Xylene (mixed)	1.20E+02	4.41E-05	1.03E-04		5.14E-05
			Sum:	3.99E-05	1.29E-01
LANDFILL NO. 2: ADULT					
Aluminum					
Antimony and compounds					
Barium and compounds					
Benzene	4.40E+01	1.62E-05	3.77E-05	4.69E-07	
Benzoic acid					
Benzyl alcohol	1.40E+01	5.14E-06	1.20E-05		4.00E-05
Beryllium and compounds					
Butyl benzyl phthalate	9.50E+01	3.49E-05	8.14E-05		4.07E-04
Carbon disulfide	1.10E-01	4.04E-08	9.43E-08		9.43E-07
Cresol(m-)	4.00E+00	1.47E-06	3.43E-06		6.86E-05
Cresol(o-)					
Di-n-butyl phthalate	1.20E+02	4.41E-05	1.03E-04		1.03E-03
Ethylbenzene	1.90E+03	6.98E-04	1.63E-03		1.63E-02
Manganese and compounds					
Phenol	3.80E+01	1.40E-05	3.26E-05		8.14E-04
Styrene	5.50E+03	2.02E-03	4.71E-03	6.06E-05	2.36E-02
Toluene	2.40E-01	8.82E-08	2.06E-07		6.86E-07
1,2,3-Trichloropropane					
Xylene (mixed)	4.40E-01	1.62E-07	3.77E-07		1.89E-07
			Sum:	6.11E-05	4.22E-02

Table 6 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with incidental ingestion of soil by children. Estimates assume a body weight of 17 kg, 5 years of exposure during a 70-year lifetime, and incidental ingestion of 200 mg of residential soil per day.

Pollutant	SOIL INGESTION Ambient Conc. (mg/kg)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD					
Barium and compounds					
Benzene					
Butyl benzyl phthalate	2.00E+02	1.68E-04	2.35E-03		1.18E-02
Chloroform	1.10E+03	9.24E-04	1.29E-02	5.64E-06	1.29E+00
Di-n-butyl phthalate	2.10E+00	1.76E-06	2.47E-05		2.47E-04
Ethylbenzene	2.30E+03	1.93E-03	2.71E-02		2.71E-01
Manganese and compounds					
Styrene	3.40E+03	2.86E-03	4.00E-02	8.57E-05	2.00E-01
Trichloroethylene (TCE)					
Xylene (mixed)	1.20E+02	1.01E-04	1.41E-03		7.06E-04
			Sum:	9.14E-05	1.78E+00
LANDFILL NO. 2: CHILD					
Aluminum					
Antimony and compounds					
Barium and compounds					
Benzene	4.40E+01	3.70E-05	5.18E-04	1.07E-06	
Benzoic acid					
Benzyl alcohol	1.40E+01	1.18E-05	1.65E-04		5.49E-04
Beryllium and compounds					
Butyl benzyl phthalate	9.50E+01	7.98E-05	1.12E-03		5.59E-03
Carbon disulfide	1.10E-01	9.24E-08	1.29E-06		1.29E-05
Cresol(m-)	4.00E+00	3.36E-06	4.71E-05		9.41E-04
Cresol(o-)					
Di-n-butyl phthalate	1.20E+02	1.01E-04	1.41E-03		1.41E-02
Ethylbenzene	1.90E+03	1.60E-03	2.24E-02		2.24E-01
Manganese and compounds					
Phenol	3.80E+01	3.19E-05	4.47E-04		1.12E-02
Styrene	5.50E+03	4.62E-03	6.47E-02	1.39E-04	3.24E-01
Toluene	2.40E-01	2.02E-07	2.82E-06		9.41E-06
1,2,3-Trichloropropane					
Xylene (mixed)	4.40E-01	3.70E-07	5.18E-06		2.59E-06
			Sum:	1.40E-04	5.79E-01

Table 7 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with dermal contact with residential soil by adults. Estimates assume a body weight of 70 kg, 30 years of exposure during a 70-year lifetime, dust adherence of 2.77 mg/cm², and dermal absorption of 1%.

Pollutant	DERMAL CONTACT WITH SOIL Ambient Conc. (mg/kg)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: ADULT					
Barium and compounds					
Benzene					
Butyl benzyl phthalate	2.00E+02	3.08E-05	7.18E-05		3.59E-04
Chloroform	1.10E+03	1.69E-04	3.95E-04	1.03E-06	3.95E-02
Di-n-butyl phthalate	2.10E+00	3.23E-07	7.54E-07		7.54E-06
Ethylbenzene	2.30E+03	3.54E-04	8.26E-04		8.26E-03
Manganese and compounds					
Styrene	3.40E+03	5.23E-04	1.22E-03	1.57E-05	6.10E-03
Trichloroethylene (TCE)					
Xylene (mixed)	1.20E+02	1.85E-05	4.31E-05		2.15E-05
			Sum:	1.67E-05	5.43E-02
LANDFILL NO. 2: ADULT					
Aluminum					
Antimony and compounds					
Barium and compounds					
Benzene	4.40E+01	6.77E-06	1.58E-05	1.96E-07	
Benzoic acid					
Benzyl alcohol	1.40E+01	2.15E-06	5.03E-06		1.68E-05
Beryllium and compounds					
Butyl benzyl phthalate	9.50E+01	1.46E-05	3.41E-05		1.71E-04
Carbon disulfide	1.10E-01	1.69E-08	3.95E-08		3.95E-07
Cresol(m-)	4.00E+00	6.16E-07	1.44E-06		2.87E-05
Cresol(o-)					
Di-n-butyl phthalate	1.20E+02	1.85E-05	4.31E-05		4.31E-04
Ethylbenzene	1.90E+03	2.92E-04	6.82E-04		6.82E-03
Manganese and compounds					
Phenol	3.80E+01	5.85E-06	1.36E-05		3.41E-04
Styrene	5.50E+03	8.46E-04	1.98E-03	2.54E-05	9.88E-03
Toluene	2.40E-01	3.69E-08	8.62E-08		2.87E-07
1,2,3-Trichloropropane					
Xylene (mixed)	4.40E-01	6.77E-08	1.58E-07		7.90E-08
			Sum:	2.56E-05	1.77E-02

Table 8 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with dermal contact with residential soil by children. Estimates assume a body weight of 17 kg, 5 years of exposure during a 70-year lifetime, dust adherence of 2.77 mg/cm², and dermal absorption of 1%.

Pollutant	DERMAL CONTACT WITH SOIL Ambient Conc. (mg/kg)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD					
Barium and compounds					
Benzene					
Butyl benzyl phthalate	2.00E+02	1.22E-05	1.71E-04		8.53E-04
Chloroform	1.10E+03	6.70E-05	9.38E-04	4.09E-07	9.38E-02
Di-n-butyl phthalate	2.10E+00	1.28E-07	1.79E-06		1.79E-05
Ethylbenzene	2.30E+03	1.40E-04	1.96E-03		1.96E-02
Manganese and compounds					
Styrene	3.40E+03	2.07E-04	2.90E-03	6.21E-06	1.45E-02
Trichloroethylene (TCE)					
Xylene (mixed)	1.20E+02	7.31E-06	1.02E-04		5.12E-05
			Sum:	6.62E-06	1.29E-01
LANDFILL NO. 2: CHILD					
Aluminum					
Antimony and compounds					
Barium and compounds					
Benzene	4.40E+01	2.68E-06	3.75E-05	7.77E-08	
Benzoic acid					
Benzyl alcohol	1.40E+01	8.53E-07	1.19E-05		3.98E-05
Beryllium and compounds					
Butyl benzyl phthalate	9.50E+01	5.79E-06	8.10E-05		4.05E-04
Carbon disulfide	1.10E-01	6.70E-09	9.38E-08		9.38E-07
Cresol(m-)	4.00E+00	2.44E-07	3.41E-06		6.82E-05
Cresol(o-)					
Di-n-butyl phthalate	1.20E+02	7.31E-06	1.02E-04		1.02E-03
Ethylbenzene	1.90E+03	1.16E-04	1.62E-03		1.62E-02
Manganese and compounds					
Phenol	3.80E+01	2.32E-06	3.24E-05		8.10E-04
Styrene	5.50E+03	3.35E-04	4.69E-03	1.01E-05	2.35E-02
Toluene	2.40E-01	1.46E-08	2.05E-07		6.82E-07
1,2,3-Trichloropropane					
Xylene (mixed)	4.40E-01	2.68E-08	3.75E-07		1.88E-07
			Sum:	1.01E-05	4.20E-02

Table 9 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with inhalation of VOCs volatilized from tap water by adults during showering. Estimates assume a body weight of 70 kg, 30 years of exposure during a 70-year lifetime, inhalation of 20 m^3/d, shower temperature of 45°C, droplet diameter of 1 mm, drop time of 2 s, shower stall volume of 2940 liters, shower water volume of 100 liters, and shower duration of 20 min. Exposure was estimated by the model of Foster and Chrostowski (1986).

Pollutant	INHALATION DURING SHOWERING (Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: ADULT				
Barium and compounds				
Benzene	5.35E-05	1.25E-04	1.55E-06	
Butyl benzyl phthalate				
Chloroform				
Di-n-butyl phthalate				
Ethylbenzene	1.85E-03	4.31E-03		4.31E-02
Manganese and compounds				
Styrene	2.66E-04	6.21E-04	7.98E-06	3.10E-03
Trichloroethylene (TCE)	6.70E-05	1.56E-04	1.14E-06	
Xylene (mixed)	7.22E-05	1.68E-04		4.21E-04
		Sum:	1.07E-05	4.67E-02
LANDFILL NO. 2: ADULT				
Aluminum				
Antimony and compounds				
Barium and compounds				
Benzene	2.68E-04	6.25E-04	7.76E-06	
Benzoic acid				
Benzyl alcohol				
Beryllium and compounds				
Butyl benzyl phthalate				
Carbon disulfide	4.67E-03	1.09E-02		1.09E-01
Cresol(m-)	3.91E-04	9.12E-04		9.12E-03
Cresol(o-)	2.23E-05	5.21E-05		1.04E-03
Di-n-butyl phthalate	1.23E-05	2.87E-05		2.87E-04
Ethylbenzene	6.72E-01	1.57E+00		1.57E+01
Manganese and compounds				
Phenol	7.43E-04	1.73E-03		8.67E-02
Styrene	1.21E-01	2.82E-01	3.63E-03	1.41E+00
Toluene	3.04E-04	7.08E-04		4.72E-04
1,2,3-Trichloropropane	6.08E-04	1.42E-03	6.08E-05	2.37E-01
Xylene (mixed)	2.65E-03	6.18E-03		1.54E-02
		Sum:	3.70E-03	1.76E+01

Table 10 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with inhalation of VOCs volatilized from tap water by children during bathing. Estimates assume a body weight of 17 kg, 5 years of exposure during a 70-year lifetime, inhalation of 15 m^3/d, bath temperature of 45°C, enclosed volume of 2940 liters, bath water volume of 100 liters, bath depth of 20 cm, and bath duration of 20 min. Exposure was estimated by the model of Foster and Chrostowski (1986).

Pollutant	INHALATION DURING BATHING (Cancer) Lifetime Intake ug/kg/d	(Non-cancer) Chronic Intake ug/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD				
Barium and compounds				
Benzene	8.36E-06	1.17E-04	2.43E-07	
Butyl benzyl phthalate				
Chloroform				
Di-n-butyl phthalate				
Ethylbenzene	2.82E-04	3.94E-03		3.94E-02
Manganese and compounds				
Styrene	4.06E-05	5.68E-04	1.22E-06	2.84E-03
Trichloroethylene (TCE)	1.01E-05	1.41E-04	1.71E-07	
Xylene (mixed)	1.10E-05	1.54E-04		3.85E-04
		Sum:	1.63E-06	4.26E-02
LANDFILL NO. 2: CHILD				
Aluminum				
Antimony and compounds				
Barium and compounds				
Benzene	4.18E-05	5.85E-04	1.21E-06	
Benzoic acid				
Benzyl alcohol				
Beryllium and compounds				
Butyl benzyl phthalate				
Carbon disulfide	7.35E-04	1.03E-02		1.03E-01
Cresol(m-)	5.03E-05	7.05E-04		7.05E-03
Cresol(o-)	2.88E-06	4.03E-05		8.05E-04
Di-n-butyl phthalate	1.59E-06	2.22E-05		2.22E-04
Ethylbenzene	1.02E-01	1.43E+00		1.43E+01
Manganese and compounds				
Phenol	9.57E-05	1.34E-03		6.70E-02
Styrene	1.84E-02	2.58E-01	5.53E-04	1.29E+00
Toluene	4.68E-05	6.55E-04		4.37E-04
1,2,3-Trichloropropane	9.03E-05	1.26E-03	9.03E-06	2.11E-01
Xylene (mixed)	4.03E-04	5.65E-03		1.41E-02
		Sum:	5.63E-04	1.60E+01

Table 11 Cokers Sanitation Landfill Site. Estimated daily intakes of contaminants of concern, upper bound lifetime excess cancer risks, and hazard indexes associated with dermal absorption of contaminants in tap water by children during bathing. Estimates assume a body weight of 17 kg, 5 years of exposure during a 70-year lifetime, 80% of body surface immersed, bath temperature of 45°C, enclosed volume of 2940 liters, bath water volume of 100 liters, bath depth of 20 cm, and bath duration of 20 min. Exposure was estimated by the model of Foster and Chrostowski (1986).

Pollutant	DERMAL INTAKE DURING BATHING Average Bathwater Concentration (ug/l)	Octanol: Water Part. Coeff. (Kow)	(Cancer) Lifetime Intake mg/kg/d	(Non-cancer) Chronic Intake mg/kg/d	Upper Bound Lifetime Cancer Risk	Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD						
Barium and compounds	7.50E+01					
Benzene	1.72E+00	1.32E+02	3.83E-06	5.36E-05	1.11E-07	
Butyl benzyl phthalate						
Chloroform		9.33E+01				
Di-n-butyl phthalate		3.98E+05				
Ethylbenzene	6.75E+01	1.41E+03	1.61E-03	2.26E-02		2.26E-01
Manganese and compounds	6.96E+02					
Styrene	9.64E+00	1.41E+03	2.30E-04	3.22E-03	6.90E-06	1.61E-02
Trichloroethylene (TCE)	2.66E+00	2.40E+02	1.08E-05	1.51E-04	1.19E-07	
Xylene (mixed)	2.63E+00	1.82E+03	8.09E-05	1.13E-03		5.66E-04
				Sum:	7.13E-06	2.42E-01
LANDFILL NO. 2: CHILD						
Aluminum	2.94E+03					
Antimony and compounds	1.51E+02					
Barium and compounds	2.94E+02					
Benzene	8.60E+00	1.32E+02	1.91E-05	2.68E-04	5.55E-07	
Benzoic acid	9.20E+03					
Benzyl alcohol	2.40E+03					
Beryllium and compounds	1.30E+00					
Butyl benzyl phthalate						
Carbon disulfide	1.45E+02	1.00E+02	2.45E-04	3.44E-03		3.44E-02
Cresol(m-)	2.80E+03	9.33E+01	4.41E-03	6.18E-02		1.24E+00
Cresol(o-)	1.60E+02	9.33E+01	2.52E-04	3.53E-03		7.06E-02
Di-n-butyl phthalate	5.50E+02	1.41E+03	1.31E-02	1.84E-01		1.84E+00
Ethylbenzene	2.46E+04					
Manganese and compounds	5.19E+02					
Phenol	1.28E+04	2.88E+01	5.84E-03	8.18E-02		2.05E+00
Styrene	4.30E+03	1.41E+03	1.05E-01	1.46E+00	3.14E-03	7.32E+00
Toluene	1.04E+01	5.37E+02	9.46E-05	1.32E-03		4.42E-03
1,2,3-Trichloropropane	2.68E+01	2.00E+02	8.77E-05	1.23E-03	8.77E-06	2.05E-01
Xylene (mixed)	9.65E+01	1.82E+03	2.96E-03	4.15E-02		2.08E-02
				Sum:	3.15E-03	1.28E+01

Table 12 Cokers Sanitation Landfill Site. Sums of upper bound lifetime excess cancer risks and hazard indexes across routes of exposure and across contaminants for adults. Summation assumes that all carcinogenic and non-carcinogenic effects are additive.

Pollutant	RISKS COMBINED ACROSS CHEMICALS AND EXPOSURE ROUTES: Total Upper Bound Lifetime Cancer Risk	Total Hazard Index (Intake/RfD)
LANDFILL NO. 1: ADULT		
Barium and compounds		4.29E-02
Benzene	2.26E-06	
Butyl benzyl phthalate		1.10E-03
Chloroform	3.15E-06	1.21E-01
Di-n-butyl phthalate		2.30E-05
Ethylbenzene		9.03E-02
Manganese and compounds		9.94E-02
Styrene	6.00E-05	2.33E-02
Trichloroethylene (TCE)	1.54E-06	
Xylene (mixed)		5.30E-04
	6.69E-05	3.78E-01
LANDFILL NO. 2: ADULT		
Aluminum		2.90E-02
Antimony and compounds		1.08E+01
Barium and compounds		1.68E-01
Benzene	1.19E-05	
Benzoic acid		6.57E-02
Benzyl alcohol		2.29E-01
Beryllium and compounds	6.84E-05	7.43E-03
Butyl benzyl phthalate		5.21E-04
Carbon disulfide		1.58E-01
Cresol(m-)		1.61E+00
Cresol(o-)		9.25E-02
Di-n-butyl phthalate		1.59E-01
Ethylbenzene		2.37E+01
Manganese and compounds		7.41E-02
Phenol		8.66E+00
Styrene	5.54E-03	2.15E+00
Toluene		1.62E-03
1,2,3-Trichloropropane	9.63E-05	3.75E-01
Xylene (mixed)		1.70E-02
	5.72E-03	4.83E+01

Table 13 Cokers Sanitation Landfill Site. Sums of upper bound lifetime excess cancer risks and hazard indexes across routes of exposure and across contaminants for children. Summation assumes that all carcinogenic and non-carcinogenic effects are additive.

Pollutant	RISKS COMBINED ACROSS CHEMICALS AND EXPOSURE ROUTES: Total Upper Bound Lifetime Cancer Risk	Total Hazard Index (Intake/RfD)
LANDFILL NO. 1: CHILD		
Barium and compounds		1.76E-01
Benzene	8.41E-07	
Butyl benzyl phthalate		1.52E-02
Chloroform	7.27E-06	1.67E+00
Di-n-butyl phthalate		3.19E-04
Ethylbenzene		7.05E-01
Manganese and compounds		4.09E-01
Styrene	1.21E-04	2.83E-01
Trichloroethylene (TCE)	5.67E-07	
Xylene (mixed)		2.04E-03
	1.30E-04	3.26E+00
LANDFILL NO. 2: CHILD		
Aluminum		1.19E-01
Antimony and compounds		4.44E+01
Barium and compounds		6.92E-01
Benzene	5.59E-06	
Benzoic acid		2.71E-01
Benzyl alcohol		9.42E-01
Beryllium and compounds	4.70E-05	3.06E-02
Butyl benzyl phthalate		7.21E-03
Carbon disulfide		3.37E-01
Cresol(m-)		7.83E+00
Cresol(o-)		4.48E-01
Di-n-butyl phthalate		2.50E+00
Ethylbenzene		4.76E+01
Manganese and compounds		3.05E-01
Phenol		3.74E+01
Styrene	5.13E-03	1.20E+01
Toluene		9.57E-03
1,2,3-Trichloropropane	4.22E-05	9.84E-01
Xylene (mixed)		4.13E-02
	5.22E-03	1.56E+02

TABLE 14

The nine criteria for the evaluation of remedial alternatives are summarized below.

Overall Protection of Human Health and the Environment: whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs: whether each alternative will meet all of the Applicable or Relevant and Appropriate Requirements (ARARs) of Federal and State environmental laws and/or justifies invoking a waiver; whether a remedy complies with advisories, criteria and guidance that EPA and PADER have agreed to follow.

Long-term Effectiveness and Permanence: the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met.

Reduction of Toxicity, Mobility, or Volume through Treatment: addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce the toxicity, mobility or volume of hazardous substances.

Short-term Effectiveness: the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved.

Implementability: the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost: estimated capital, operation & maintenance (O&M), and net present worth costs.

State/Support Agency Acceptance: whether the state concurs with, opposes, or has no comment regarding the preferred alternative.

Community Acceptance: the public's general response to the alternatives which will be assessed in the Record of Decision following a review of the public comments received on the administrative record and the proposed plan.

Table 15

Cost Summary for the Selected Remedy, Limited Action

Landfill #1	Cost
Leachate Cover	$10,000
Site Fence	$60,000
Indirect Cost (25%)	$17,500
Design and Other Cost	$80,000
Total Capital Cost	$167,500
Capital Plus 30% Contingency	$217,500
Landfill #2	
Backfill Cells, Seal Wells	$85,900
Site Fence	$57,200
Indirect Cost	$35,775
Design, Other Cost	$80,000
Total Capital Cost	$258,875
Capital Plus 30% Contingency	$336,538
O&M including site inspection and semi-annual groundwater and surface monitoring	$527,257
Total Cost	$1,081,295

RESPONSIVENESS SUMMARY

The following discussion summarizes the comments raised during the public comment period for the Proposed Plan for the Coker's Sanitation Service Landfills Site (Coker's site). This responsiveness summary is divided into two sections. The first section describes the comments received at the public hearing that was held to present the Proposed Plan. The second section summarizes the written comments received during the public comment period.

OVERVIEW

Prior to the public comment period, EPA published its preferred alternative for the Coker's Site, located in Kent County, Delaware. EPA's preferred alternative involves covering Landfill #1 leachate seeps, grouting Landfill #2 leachate collection pipes, implementing deed restrictions, and inspecting and monitoring the landfills. EPA's recommended alternative minimizes the potential for exposure to site contaminants.

BACKGROUND

Community interest and concern about the Coker's site has been relatively low over the past several years, with more interest focused on the nearby Chem-Solv site. The Greater Cheswold Environmental Safety Committee, the citizens' group that formed immediately after the 1984 explosion at the Chem-Solv site, has focused the community on local environmental and public health issues. Several citizens are concerned about the safety of the local aquifers and their ground water.

To obtain public input on the Remedial Investigation/ Feasibility Study (RI/FS) reports, the Proposed Plan, and the administrative record file for the Coker's site, EPA opened a public comment period from August 22, 1990 to September 21, 1990.

EPA's community relations efforts include on-site community interviews held in June 1990 to keep citizens and officials informed of developments and activities regarding the Coker's site and to identify current community issues and concerns; a public meeting notice that appeared in the Delaware State News and Wilmington News Journal on August 22, 1990, announcing EPA's Proposed Plan and public comment period; and a public meeting that was held on September 5, 1990 to present the Proposed Plan. A Proposed Plan Fact Sheet was distributed at the meeting, which approximately 60 people attended. EPA also placed the RI/FS reports, the Proposed Plan fact sheet, and other relevant documents in the administrative record file at the EPA Docket Room in Region III and at the information repository located at the Clayton Post

Office, Railroad Ave., Clayton, Delaware 19938.

SECTION I(A): SUMMARY OF MAJOR ISSUES AND CONCERNS RAISED AT THE PUBLIC MEETING

This section provides a summary of commentors' major issues and concerns, and expressly acknowledges and responds to those raised by the local community. The major issues and concerns on the proposed remedy for the Coker's site raised at the September 5, 1990 public meeting:

A. The Proposed Remedy and the Remedy Selection Process

B. Implementation of Remedy

C. Leachate Seeps

D. Ground Water

E. Health and Environmental Risks

F. Liners

G. Miscellaneous.

A summary of the comments and EPA's response to them is provided below.

A. The Proposed Remedy and the Remedy Selection Process

A meeting attendee asked how EPA's preferred alternative would prevent potential contamination from occurring in the Cheswold aquifer.

EPA Response. The contamination that EPA modeled in the RI/FS is in the Columbia aquifer, not the Cheswold aquifer. All of EPA's past investigations reveal that there is no potential for contamination in the Cheswold aquifer. EPA will conduct monitoring in the future to detect any change in these findings.

A citizen inquired about the cover that EPA would install over the leachate seeps, as described in Alternative 3. The citizen wanted to know the type of cover that EPA would install and how effective it will be.

EPA Response. EPA will determine the type of cover during the remedial design phase. The over will be designed with the intent of preventing human contact with the seeps.

A meeting attendee commented that EPA is determined to select

one alternative, whether there is public input or not, and is not concerned with the problems that the community is raising. The attendee also recommended that EPA inform the community of places where they can get site information.

EPA Response. The investigations conducted as part of the RI found that there is little contamination on the land immediately in contact with the landfill. To provide the public with site-related information, EPA has established an information repository at the Clayton Post Office. The repository contains the complete text of the RI report, as well as other site-related documents in the administrative record file. Comments received from the public will be taken into account in selecting the remedial alternative for this Site.

A local official commented that the two landfills are different and, therefore, probably have different needs. He asked if EPA must propose the same alternative for both landfills, and commented that he prefers Alternative 3 for Landfill #1 but not for Landfill #2.

EPA Response. The same alternative need not be proposed for both landfills. It is possible that EPA would take a different approach at Landfill #1 than at Landfill #2.

An attendee asked what EPA would do if the Agency finds something at the Site that presents a health hazard to the community.

EPA Response. There are two parts to the Superfund program: the removal program and the remedial program. The removal program enables EPA to take immediate site action when a situation presents immediate threats to human health and the environment. For sites that do not present immediate threats to human health and the environment, EPA takes action under the remedial program, which begins with a RI/FS, as the Agency has done at the Coker's site.

A citizen inquired what EPA would do with the waste if it is removed from the Site.

EPA Response. Removing waste from the site would present potential short-term health risks by excavating the waste, agitating it, and releasing contaminants as the waste is handled. In this case, EPA would need to find a place to dispose of approximately 110,000 cubic yards of materials. Basically, this would result in cleaning up one dump site and creating another. Such action, therefore, is not generally considered to be an acceptable alternative.

A commentor stated that, if monitoring wells detected

contamination in the Columbia aquifer, new, deeper wells would probably need to be drilled into other aquifers, which would not address the cause or the problem. He added that the problem at the Coker's site will remain unresolved until EPA finds a way to remove the waste or to control it to prevent further contamination.

EPA Response. For hazardous waste sites where EPA determines that treatment is impracticable, the Agency considers containment options. EPA evaluated several treatment alternatives for the Coker's site and found that it would be difficult to treat the waste to a point where it would be significantly less harmful than in its present condition in a cost-effective manner that also would not pose undue short-term risks to site workers and local residents. EPA, therefore, recommends a containment option for the Coker's site, rather than treatment. EPA recommends a containment option rather than removal of the waste from the site for the reasons stated above in the previous response.

A meeting attendee commented that the consensus of community opinion shows dissatisfaction with Alternative 3, and he asked how much input the community is going to have in the final decision before EPA selects an alternative. The attendee also asked whether EPA would rule out Alternative 3 if everyone assembled tonight voted against it.

EPA Response. Community input is important to EPA and no decision on the final remedy selection will be made until all comments and questions are addressed. The objective of the decision-making process is to determine which potential remedial alternative best addresses site problems, not to simply rule out which alternative is not going to solve the problem. The final decision will be made based upon EPA's nine criteria, one of which is community acceptance.

A citizen commented that she does not like Alternative 3, nor Alternatives 6 and 7. She and several attendees commented that the only alternative EPA should select is to completely remove the waste.

EPA Response. During the feasibility study, removal of all waste materials for offsite disposal was one of the options considered. However, this alternative was screened out early in the study because it did not compare favorably to the preliminary screening criteria: effectiveness, implementability, and cost. While complete removal of waste material would essentially render the land areas of Landfills #1 and #2 clean, a significant volume of waste material would have to be handled in an appropriate manner at another site. Offsite disposal of waste without treatment is EPA's least preferred manner of handling a Superfund site.

A meeting attendee asked what the community can do to stop EPA from selecting Alternative 3 as the remedy for the Coker's site. She also asked whether EPA will respond to the community's input and who, specifically, will make the ultimate decision regarding the selected alternative.

EPA Response. EPA listens to the community's input and addresses their comments, questions, and concerns in the Responsiveness Summary portion of the Record of Decision (ROD). Written comments can be submitted to the addresses provided in the Proposed Plan and fact sheet, postmarked no later than September 21, 1990. EPA will consider all of the public's comments and the information in the administrative record in making a decision about the remedy for the Coker's site. Edwin B. Erickson, the Regional Administrator of EPA Region III, is responsible for signing the ROD, which will be EPA's choice of the remedy for the Site.

A citizen asked whether EPA would provide for a community appeal process if, once the final alternative is decided, the community does not agree with EPA's decision.

EPA Response. There is no provision for appealing the final remedy selected by EPA. The community's opportunity to provide comment and to make suggestions is limited to the public comment period. The public comment period for the Coker's site ends on September 21, 1990, and EPA will consider all of the concerns expressed during this period.

An attendee asked, if the community is dissatisfied with EPA's decision, whether the community should contact the U.S. Senators or go to higher levels in the U.S. government for support.

EPA Response. EPA cannot suggest to you who you should call.

A media representative asked EPA to explain the steps that will take place between now and the final remedy decision.

EPA Response. The public comment period will close on September 21, 1990. At that time, EPA will begin preparing the ROD, part of which includes the preparation of the Responsiveness Summary. The completed ROD will be reviewed by EPA Region III staff and, ultimately, be signed by the Regional Administrator who makes the final decision regarding the remedy selected for the site. EPA plans to have the ROD issued within approximately one month.

A citizen asked how the community will be informed of the final decision regarding the remedy selected for the Site.

EPA Response. EPA will place advertisements in the local newspaper and notify everyone on the mailing list of area residents. If anyone requests a meeting to discuss the ROD further, EPA will provide a meeting. When the remedy reaches the implementation phase, EPA will arrange a meeting to describe the work that will be conducted and the specific work plan.

B. Implementation of Remedy

A representative of the Greater Cheswold Environmental Safety Committee commented that the long-term effectiveness of the remedy depends on the long-term site inspection and monitoring program, and asked about EPA's commitment to the monitoring program. The representative expressed specific concerns that Federal, State, or County budget cuts could affect the monitoring program, suggesting that EPA's proposed 30-year monitoring program may not be guaranteed but, rather, may go on for only 10 or 15 years.

EPA Response. EPA plans to offer several potentially responsible parties the opportunity to implement the remedial action under the terms of a consent decree which would be entered in court. Should the parties fail to conduct scheduled monitoring activities, EPA could fine the parties. If the parties do not agree to conduct the remedial action, the responsibility for long-term site monitoring would fall upon the State. In either event, EPA and the State are committed to fully implement the remedial action.

A representative of the Greater Cheswold Environmental Safety Committee expressed concern that EPA's preferred alternative does not reduce toxicity, mobility, or volume of the waste.

EPA Response. The specific criterion, "reduction of toxicity, mobility, and volume," refers to reduction of the waste through treatment. Based on EPA's evaluation of treatment alternatives, the Agency has found that there is no treatment technology available today that will effectively destroy the Coker's waste in a cost-effective manner and without creating a potential for short-term health risks to the site workers and to local residents. It is EPA's policy to examine containment options for sites, such as Coker's, where treatment is not practical at this time.

A representative of the Greater Cheswold Environmental Safety Committee requested more information about the five-year reviews that will be conducted at the Site, as required by the Superfund Amendments and Reauthorization Act (SARA).

EPA Response. A five-year review is necessary at sites where

hazardous substances, pollutants, or contaminants remain. No less often than each five years after the initiation of remedial action, EPA is required to return to the site to determine whether or not the remedy is still protective. For the Coker's site, such a review would be conducted every five years.

C. Leachate Seeps

A representative of the Greater Cheswold Environmental Safety Committee wanted to know the depth of the leachate seeps that are in Landfill #1, along the northeast corner.

EPA Response. The amount of leachate present varies according to how high the ground water table is at a certain time and whether or not there has been recent precipitation. EPA has not observed any actual streams of leachate flowing from the Site. Leachate seeps form along the relatively steep bank which borders the landfill; however, these seeps dissipate into a marshy area before reaching the Willis Branch.

A meeting attendee inquired whether Landfill #2 is sealed and not leaking.

EPA Response. EPA has not detected anything in the ground water that indicates that the cells are leaking. When the cells were originally constructed, the waste was not in a totally settled condition and, therefore, wastewater leached out. The leachate was collected on a regular basis throughout the 1980s and treated in the Reichhold Chemicals, Inc. plant. The leachate collection was phased out when smaller and smaller amounts of leachate were generated at the site. In fact, EPA had a difficult time finding any leachate to test at Landfill #2 during the RI.

An attendee asked whether any leachate is leaking and asked specifically about the toluene and ethylbenzene found in one well in the Columbia aquifer.

EPA Response. The leachate collection systems within the landfill cells are generally dry, which suggests the waste is not generating appreciable quantities of leachate. The toluene and ethylbenzene present in the shallow well may have come from a small tear in a liner, or may be an artifact of past waste disposal practices (old reports indicate that in some instances, waste was dumped onto the ground and then bulldozed into the waste cells). However, the levels present are well below the proposed maximum contaminant levels (MCLs) set under the Safe Drinking Water Act (700 parts per billion

(ppb) ethylbenzene and 2,000 ppb toluene).

A citizen asked whether it is possible that the site has some leaks and that the sealed systems could be leaking now.

EPA Response. Since it is impossible to physically examine the integrity of the liners without removing the waste, it is impossible to say for certain that the liners are not leaking. However, ground water monitoring data suggests that this is not occurring to any significant extent. It is expected that, over time, the liners at Landfill #2 will fail.

D. Ground Water

A citizen commented that most people in the area use shallow wells and asked if these wells would be affected by the Coker's site contamination.

EPA Response. The areas where shallow ground water could be affected are directly downgradient of the site, located between Landfill #2 and the Willis Branch. Currently, there are no wells located in that area.

A commentor wanted to know whether the ground water of the Cheswold aquifer, which flows to the Willis Branch, continues up to County Route 29.

EPA Response. EPA's ground water investigation was limited to the immediate vicinity of the two landfills. In this area, both the Columbia and the Cheswold aquifers were found to flow north-northeast toward the Willis Branch, although in most other areas, both aquifers flow in the opposite direction. EPA did not determine the direction of ground water flow on the opposite side of the Willis Branch. However, any potential threat to wells along Route 29 would first be detected onsite.

A meeting attendee asked whether the people living along County Route 29 would eventually have contaminated ground water if some contaminants leaked into the Cheswold aquifer.

EPA Response. EPA's ground water models did not predict any significant human health risk associated with use of the Cheswold aquifer at a location 1200 feet from the site even after assuming complete liner failure at Landfill #2. EPA does not expect any health threats to exist from use of wells located even further from Landfill #2.

A citizen wanted to know how many wells are located in the Cheswold aquifer at Landfills #1 and #2 and asked if any of

these wells contain contaminants. He also asked about where the wells were placed.

EPA Response. There are three wells in the deep aquifer at each landfill, none of which reveal contamination. The wells are both upgradient and downgradient wells, located above the landfills and below the landfill in the direction of ground water flow.

A citizen asked whether the Cheswold aquifer continues further south than the Willis Branch.

EPA Response. Yes, it does.

A representative of the Greater Cheswold Environmental Safety Committee commented that, from the RI/FS report, it appears that the ground water is flowing back and forth between the Cheswold aquifer and the Columbia aquifer. She expressed concern about the nearby shallow wells since the RI/FS report states that EPA's preferred alternative does not reduce the mobility, toxicity, or the volume of the waste constituents.

EPA Response. It does appear that the clay-silt bed between the two aquifers is somewhat permeable. This has been taken into consideration in determining whether there is a significant threat of contamination of the Cheswold aquifer. The modeling effort, which assumed that there was no confining layer between the two aquifers, found that the levels of styrene in the Cheswold aquifer would be below detection limits.

A citizen commented that EPA's preferred alternative does nothing to allay his fears regarding the ground water contamination, as he does not find the preferred alternative to be a preventive one. He also requested EPA to explain the possible development of a ground water management zone in the event that the ground water in the Cheswold area becomes contaminated.

EPA Response. A ground water management zone is an area that is defined, and actually implemented, by the County in conjunction with the State. It is an area in which regulating authorities agree that no wells of certain depths will be drilled. In this case, no wells would be drilled in the vicinity of the site or in the Columbia aquifer. It is true that EPA's alternative does not attempt to prevent any leakage of Landfill #2 liners. However, it should be noted that even at Landfill #1, which is unlined and where waste is in direct contact with the Columbia aquifer, the few contaminants which were detected do not pose a significant health threat.

A meeting attendee asked how the ground water management zone would affect landowners if their respective wells are contaminated. In addition, he asked who would take responsibility for drilling new wells and who would pay for and monitor wells.

EPA Response. Any contamination plume which may develop in the future would move from the landfills toward the Willis Branch and, therefore, would affect ground water between the landfills and the creek only. (EPA's model predicted no detectable levels of contamination would be detected in the Cheswold aquifer.) If, however, new wells had to be drilled, it would be a State responsibility. The State, however, would attempt to find a potentially responsible party (PRP) to replace the wells, but would replace these wells itself if a PRP would not agree to do so.

A citizen asked whether there is any chance that the wells in the Cheswold aquifer could become contaminated by seepage or leachate from the site.

EPA Response. The Cheswold aquifer is the lower aquifer underlying the site, and, at this time, there is no evidence of any contamination moving into it. Modeling conducted during the feasibility study indicates the Cheswold aquifer will not become contaminated in the future.

A citizen commented that a ground water monitoring system would detect a problem after it has occurred, providing no chance for preventive action.

EPA Response. It is true that monitoring will not prevent any potential future ground water contamination. However, wells located onsite will allow EPA to detect any ground water contamination before it becomes a threat to offsite users. Based upon the scientific evidence available to EPA, the landfills do not appear to pose a significant threat to offsite users of shallow or deep ground water, and will not pose a threat in the future. If, at the time of a review, it is determined that this is not the case, EPA will take further action to mitigate the threats posed by the Site.

Several attendees wanted to know the direction in which the ground water is moving.

EPA Response. In the area of the Site, the ground water is flowing north northeast toward the Willis Branch.

A citizen requested the name and address of the responsible party that conducted the study on the Willis Branch, which had concluded that the creek was not polluted. The citizen also wanted to know what could cause the bubbles that have

been seen and the apparent lifeless condition of the Willis Branch.

EPA Response. The PRP consultant was Environmental Resources Management (ERM) from Exton, Pennsylvania. Their work was conducted under EPA oversight. EPA found no evidence of contamination from the Site in the Willis Branch. The bubbles in the Willis Branch could be caused by anaerobic decomposition by bacteria, which releases hydrogen sulfide gas. This is common in swamp environments.

A citizen commented that there is nothing living in the Willis Branch that could deteriorate.

EPA Response. This is incorrect. Although no fish studies were conducted on the Willis Branch, a benthic invertebrate (i.e., worms and larvae living in sediment) survey was conducted. Areas adjacent to and downstream of Landfill #1 were actually found to have a greater number and diversity of species, including some pollution-intolerant species, than locations upstream, although this is believed to be related to differences in habitat (i.e., stream width and depth) than environmental conditions. Additional organic matter can be contributed to the stream through leaf litter from overhanging trees and from overland flow of precipitation.

An attendee inquired whether the City of Dover draws water from the Cheswold aquifer and, if so, have they been alerted to the possible contamination from the landfills.

EPA Response. Yes, the City of Dover draws water from the Cheswold aquifer. However, since there is no current ground water problem, and because the ground water in the aquifers in the area of the Coker's site flows toward the Willis Branch, it is believed that any potential future contamination would not affect the city.

A citizen expressed surprise that EPA had not tested the wells of residents living in the immediate area of the Coker's site.

EPA Response. EPA tested the wells of the residents living on the landfill property and found no elevated levels of contaminants. Since no significant levels of contamination were found on site (where the highest contaminant levels would be expected), it was determined that no further well testing was needed. The state has agreed to sample several additional residential wells during the week of September 24, 1990.

A citizen asked whether he should install a deeper well on his property for safety reasons.

EPA Response. There is no need to drill a deeper well at this time for reasons related to the Coker's site.

A meeting attendee asked when EPA began monitoring the ground water.

EPA Response. EPA began monitoring the ground water at Landfill #1 when the Agency conducted the remedial investigation. Monitoring the ground water at Landfill #2 began with the commencement of landfilling operations in 1976.

E. Health and Environmental Risks

A citizen asked for an explanation of EPA's earlier statements regarding cancer risks.

EPA Response. EPA's calculation of cancer risks posed by contaminants is based on an extremely conservative exposure scenario. In developing these figures, EPA used the worst case exposure scenario of total liner failure and a hypothetical person who lives on the property line with a well in the overburden (shallow) aquifer. The calculated cancer risk, based on this scenario, just barely exceeds EPA's established guideline, which is a one in 10,000 cancer risk. This means that, using the highest amount of exposure possible to site-related contaminants, the site poses a risk of one additional case of cancer per 10,000 exposed people.

An attendee asked if the nearby site residents are in danger of breathing and drinking the pollutants and whether or not the pollutants have settled in the Willis Branch.

EPA Response. EPA has not detected any contamination in the air, has found only very low levels of organics in the shallow ground water (which, at current levels, do not pose any significant health threat), and has not found any evidence of contamination in the Willis Branch.

A citizen asked EPA to explain both why no fish, crayfish, or water frogs live in the Willis Branch and, based on this, how EPA can claim that the water is not contaminated.

EPA Response. EPA conducted an environmental assessment and a human health risk assessment during site investigations. In assessing the water quality of the Willis Branch, EPA found that the water and the sediments do not contain any concentration of any substances from the Site that would cause a problem for either human health or the environment. EPA does not know why the Willis Branch is degraded. It may

be due to substances that came from the Site in the past or it may be the result of some source upstream of the Site.

Several citizens who live near the landfills complained of animal health problems. One farmer lost four cows to acute leukemia in a period of two years; another lost eight or nine cats to strange leukemias and cancer in the last two or three years; and another, over a ten-year period, lost animals to illness, unusual cancers, leukemia, and different types of tumors. These citizens requested that their water be tested and, if necessary, their wells replaced by the State, the County, or the PRPs.

EPA Response. Bovine and feline leukemias are caused by viruses, which leads EPA to believe the site had no impact on the animals' ill health. The State has agreed to have the concerned citizens' wells tested.

A meeting attendee asked whether EPA has evaluated the possibility that site residents may contract other health-related illnesses beside cancer, such as respiratory illnesses or allergies.

EPA Response. In addition to assessing human health risks posed by carcinogens, EPA also evaluated risks posed by non-carcinogens, such as ethylbenzene. EPA did not find any elevated health risk associated with any current or future scenario except future residential use of the Sites. Offsite residents are not expected to experience any adverse health problems as a result of exposure to site-related contaminants.

A representative of the Greater Cheswold Environmental Committee and other citizens requested that EPA, under the Superfund program, test the wells of those residents living in the immediate area of the Coker's site, specifically those people who reported animal health problems.

EPA Response. The State has indicated that they will sample the wells of residents who have had animal problems.

A citizen asked whether there is a toxic waste threat, or any kind of hazard, to the community's health or to the land.

EPA Response. There are substances on site that are hazardous substances as defined under CERCLA. EPA believes that future residential development of the Site would result in an unacceptable health risk to adults and children living onsite as a result of exposure to these substances. Offsite residents are not at any unacceptable risk of experiencing adverse health effects because of the Site.

A commentor stated that vegetation and animals existed on the site property before the property became a dumping site but that, since the dumping began, everything in the site area has died. She added that, only within the last five years, signs of vegetation growth have appeared. Based on her own observations, the commentor questioned EPA's statement that the Site presents no threat to human health and the environment.

EPA Response. It is difficult for EPA to comment on activities that took place twenty years ago and of which EPA has no records. It is likely that clearing and trenching activities caused disturbance of the topsoil and therefore hindered vegetative growth. EPA can only address site conditions which exist now or may exist in the future. At this time, the Site does not pose any threats to human health or the environment; if EPA implements the preferred alternative, EPA does not expect the Site to pose any threat in the future.

A media representative asked about the air pollution risks involved if EPA conducts a removal at the site, and asked how far downwind the air pollution problem would pose a risk.

EPA Response. The risks would depend on how people would be exposed. The risks to a person without any kind of respirator apparatus standing on the property line during excavation activities could be significant. The geographic extent of the risks would depend on the weather conditions, wind turbulence, temperature, and cloud cover. Under some conditions, particularly in the morning and evening, the plume could remain concentrated for the better part of a mile. It is possible that substantial exposures could occur during the excavation activities.

F. Liners

A representative of the Greater Cheswold Environmental Safety Committee asked about the likelihood of the liner failing in Landfill #2.

EPA Response. EPA has assumed varying degrees of liner failure in the assessment of risk associated with Landfill #2. Even under a scenario that assumed all liners would fail completely at the same time (100% liner failure), EPA did not find an unacceptable health risk associated with use of shallow ground water.

The representative followed the above question with an inquiry regarding whether or not the liner could fail tomorrow.

EPA Response. EPA believes a certain percentage of liner failure can be expected per year, based upon evaluation of similar liners in similar situations.

An attendee asked whether EPA has visually examined the liner.

EPA Response. EPA does not believe it would be prudent or practical to actually dig up and inspect the 50 waste cell liners. Such activities would carry a high risk of damaging the liners and would be time consuming (each liner is approximately 21,000 cubic feet in size). EPA has instead considered a worst case scenario, under which all liners would fail completely and simultaneously, and another scenario, which assumes percentage of liner failure based upon historical performance of similar types of liners.

A local official asked whether EPA would still recommend Alternative 3 in the event of a total liner failure.

EPA Response. Yes. The preferred alternative was chosen with consideration of the 100 percent liner failure scenario.

G. Miscellaneous

A representative of the Greater Cheswold Environmental Safety Committee expressed concern about the deed restrictions for the Coker's property. She wanted to know 1) whether EPA contacted the County government and, if so, whether the County government was willing to implement deed restrictions for the Coker's property; 2) on how much of the property would the County government place deed restrictions; and 3) whether the deed restrictions would apply to the landfills alone or to a larger portion of property.

EPA Response. The purpose of placing deed restrictions on the property would be to prevent future residential development of the Site. The determination of the specific deed restrictions and their placement would be made during the remedial design or remedial action, at which time EPA would coordinate its efforts with the County or other appropriate parties.

A meeting attendee asked what is the PRPs' responsibility in cleaning up the landfill.

EPA Response. In the past, EPA offered several PRPs the opportunity to conduct the RI/FS under an administrative order with EPA. EPA will offer the PRPs the opportunity to implement the remedial action after the Agency signs the

Record of Decision.

- A citizen asked whether EPA obtained the records of Reichhold Chemical, Inc. to determine how much waste was generated by the company. If so, the citizen wanted to know whether EPA had compared this amount to the amount of waste in the landfills and whether future comparative analyses would be made if one had not already been made.

  EPA Response. Yes. EPA has obtained Reichhold's records, but the Agency has not used the records to compare the amount of waste in the landfills to the amount of waste generated by the company. This analysis is not one that EPA will make.

- A meeting attendee asked if his site property will depreciate in value because of the problems at the Coker's site.

  EPA Response. It is possible. Historically, properties adjacent to Superfund sites have had their values adversely impacted.

- A citizen wanted to know whether EPA had found any heavy metals, such as zinc or chromate, in the landfill.

  EPA Response. EPA found elevated levels of iron in the leachate at Landfill #1, but cannot attribute that finding to the waste. The shallow aquifer has a naturally high concentration of iron that cannot be attributed to the landfill.

- An attendee commented that zinc is used in the manufacturing of latex.

  EPA Response. EPA has not found any elevated levels of zinc in the landfills.

- A citizen asked what is being done with the latex waste that the PRPs are generating.

  EPA Response. Waste generated by the manufacturing plant is an industrial waste, not a hazardous waste. Its disposal is regulated by Delaware Solid Waste Disposal Regulations. (Had the waste at Coker's landfills been handled in accordance with current state law, no further action by EPA would be required.)

- A meeting attendee inquired whether any of the PRPs have records of how much waste they generated at the landfills. If so, the attendee wanted to know if their records account for all of the waste that was disposed of at the site.

  EPA Response. EPA has volumetric estimates of the quantity

of waste that is at the Site. It is the Agency's understanding that the landfills were intended to hold all of the waste that the companies generated during the period of time that the landfills were active.

A citizen asked whether hazardous waste must be registered and if the waste at the site is hazardous.

EPA Response. Yes, hazardous wastes must be registered. Waste that is generated by the latex manufacturing facility today does not qualify as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) but is, rather, an industrial waste. This particular waste, however, includes constituents that allow EPA, under Superfund, to address risks posed by the site.

A citizen described the problems at the Chem-Solv site that the community faced a few years ago and expressed concern over the unnecessary cleanup expense that resulted from waiting too long to clean up the site. He suggested that EPA had waited too long to clean up Chem-Solv and that EPA was slow to clean up the Coker's site as well.

EPA Response. The Chem-Solv site is a different type of site than the Coker's site. Unlike the Chem-Solv site, the waste at the Coker's site is difficult to handle and treat. For this reason, EPA is recommending a containment, rather than a treatment, alternative.

An attendee raised a complaint that she had tried to get her water tested but no one from EPA responded to her requests.

EPA Response. As a general rule, the Federal government does not test the water for the two hundred million residents of the United States.

A citizen asked where community residents can seek help for two problems that are not site-related: 1) finding someone to test the individual wells for which the affected residents have concerns and 2) determining the cause of the lack of life in the Willis Branch.

EPA Response. The residents that want their wells tested may hire a private testing lab to perform water sampling. The other concern, regarding the quality of the water in the Willis Branch, may be handled by the Delaware Department of Natural Resources and Environmental Control (DNREC). DNREC had a group of individuals that deal specifically with discharges to streams and the water quality in streams.

An attendee asked whether EPA plans to fence the site so that people and animals cannot have access to it.

EPA Response. EPA's Proposed Plan did not include fencing the landfills to restrict access. In response to public comment, however, EPA has included security fences and the posting of warning signs in the selected remedy.

A commentor requested that the information repository be established at the Cheswold Post Office.

EPA Response. An information repository can be placed immediately at the Cheswold Post Office and any additional location that the community suggests.

SECTION I(B): COMPREHENSIVE RESPONSE TO COMPLEX COMMENTS RAISED AT THE PUBLIC MEETING

This section provides a comprehensive response to the more complex comments on the Coker's site received at the public hearing held September 5, 1990. Some of the information presented in this section elaborates with technical detail on answers covered in Part I of this Responsiveness Summary. Concerns and questions presented in this section can be grouped in two categories:

A. Health and Environmental Risks

B. Liners.

A summary of the comments and EPA's response to them is provided below.

A. Health and Environmental Risks

A citizen asked for an explanation of EPA's earlier statements regarding cancer risks.

EPA Response. The cancer risk for the site was calculated based on an extremely conservative exposure scenario. The exposure supposition that EPA made included total liner failure and a hypothetical person who lives on the property line with a well in the overburden (shallow) aquifer. The hypothetical person drinks two liters of water, bathes in it, and uses it for all of his household uses, every day over an entire 70-year lifetime. The cancer risk, based on this scenario, barely exceeds EPA's criterion for an acceptable level, which is a one in 10,000 cancer risk.

The background cancer risk over a lifetime in human populations is that one out of every four people will get cancer. The scenario described above results in the hypothetical person (who already has a one in four, or 25

percent, chance of getting cancer) having a 25.01 percent chance.

A citizen asked EPA to explain both why no fish, crayfish, or water frogs live in the Willis Branch and, based on this, how EPA can claim that the water is not contaminated.

EPA Response. EPA conducted an environmental assessment and a human health risk assessment. In assessing the water quality of the Willis Branch, EPA found that the water and the sediments do not contain any concentration of any substance from the Site that would cause a problem for either human health or the environment. EPA does not know why the Willis Branch is degraded. It may be due to something that came from the Site in the past or it may be the result of some source upstream of the Site.

In conducting the human health risk assessment, EPA determined that a number of contaminants from Landfill #1 have leached out, moved through the ground water into the Willis Branch and, over a period of years, evaporated into the air, possibly traveled downstream to the estuary; however, EPA can not find them in the Willis Branch. EPA also evaluated the wetlands along the north side of the Willis Branch and, still, found nothing.

B. Liners

A representative of the Greater Cheswold Environmental Safety Committee asked about the likelihood of the liner failing in Landfill #2.

EPA Response. Because EPA cannot precisely predict when or at what rate liners may fail, EPA looked at several liner failure scenarios during the RI and during the FS, and used extremely conservative assumptions when developing ground water models. The failure scenario evaluated under the RI resulted in a risk corresponding to 1×10^{-4} or a one in 10,000 excess risk of cancer. As a part of the FS, a revised liner failure scenario, which took into account data collected after the RI report was written, was evaluated. The percentage liner failure was based upon studies of liner performance in field conditions. Under this scenario, the risk associated with use of shallow ground water was 4×10^{-6}, or a four in one million excess risk of cancer.

SECTION II: RESPONSES TO WRITTEN COMMENTS

During the public comment period, EPA received 6 letters containing written comments. EPA received letters from U.S.

Senator William V. Roth and U.S. Congressman Thomas R. Carper containing a petition from local residents; this same petition was submitted directly by the citizens to EPA Region III Regional Administrator Edwin B. Erickson and to the EPA Community Relations Coordinator for the Coker's site, Ms. Francesca DiCosmo. EPA also received letters from the Greater Cheswold Environmental Safety Committee, The Honorable Mr. Kim Gilson, Mayor of Cheswold, and from Dr. Albert Vickers, Chairman of the PRP steering committee.

A. Petition from Local Residents

EPA received four copies of a petition from area residents. One copy was sent to Mr. Edwin Erickson, the Regional Administrator; the other was sent to Ms. Francesca DiCosmo. Two additional copies of the petition were mailed to Senator William V. Roth and Congressman Thomas R. Carper and subsequently sent to the Regional Administrator. EPA responded directly to Senator Roth and Congressman Carper. The citizens' concerns and EPA's responses are summarized below.

1. The first section of the petition's stated concerns addresses ground water contamination. The letter expresses a belief that car ɔgenic compounds are "leaking" from the site.

   EPA Response: Sampling data collected during the site investigation does not support the belief that the landfills are leaking waste constituents at levels that are a threat to human health. Organic compounds of potential concern, none of which are carcinogenic, were detected in low concentrations in one well at each landfill. The compounds detected, ethylbenzene, toluene, and xylenes, were found at Landfill #2 at 5 parts per billion (ppb), 7 ppb, and 44 ppb respectively. The proposed maximum contaminant levels (MCLs) for these compounds under the Safe Drinking Water Act are 700 ppb ethylbenzene, 2000 ppb toluene, and 10,000 ppb xylenes. The levels found onsite are well below the proposed MCLs and are not considered to be a threat to human health.

2. The letter also states that EPA has not tested residential wells, and infers that the deaths of several domestic pets and farm animals may be linked to the site.

   EPA Response. The contention that EPA did not test residential wells is incorrect. Four residential wells located in proximity to the landfills were tested on August 9, 1988. The sampling results, as shown in the RI report, indicate no evidence of Site-related contamination in the residential wells. In addition, the owners of the deceased animals in question, who were present at a public meeting held on September 5, 1990 indicated that their animals had died of leukemia. Because both feline and bovine leukemia

are highly contagious viral infections, EPA does not believe the presence of the landfills adversely affected the health of these animals. However, the State of Delaware has agreed to sample the wells of those residents whose animals had died.

3. Another section of the petition discusses human health risk. The petition raises concern for any potential community health risk associated with the Site and the potential for lower property values.

   EPA Response. At the Coker's site, EPA found unacceptable health risks only under an extremely conservative residential use scenario which assumed daily exposure to maximum concentrations of waste and ingestion of leachate over a lifetime. (The Proposed Plan calls for deed restrictions that would prevent any such future use of the Site.) Ground water modeling does not indicate that residents living offsite are at an excess risk of experiencing ill health effects or of developing cancer as a result of exposure to site contaminants. Onsite ground water monitoring will detect any contaminant plume before it could affect local residents.

4. The petition goes on to state, "we possess the methodology . . . to remove this toxic health risk."

   EPA Response. While it is technically possible to excavate and remove all waste from the Site, EPA considers offsite disposal of waste without treatment to be the least preferable strategy for handling sites under the Superfund law. Removal of the more than 110,000 cubic yards of waste contained at the site would not only be costly (approximately $84,000,000), but also could result in significant short term risks to workers and nearby residents associated with release of volatile organic compounds during excavation and handling of waste. Another short-term impact on the community would be a significant increase in truck traffic, and the risk of a truck accident and subsequent spill. An alternative involving removal for offsite disposal was ruled out early in the Feasibility Study because it did not compare favorably to EPA's preliminary screening criteria of effectiveness, implementability, and cost-effectiveness.

5. The next section of the petition addresses environmental contamination. The citizens are concerned because EPA has stated that although the leachate from landfill #1, which borders the Willis Branch of the Leipsic River (the Willis Branch), has some observed toxicity to aquatic organisms, there is no evidence of contamination of the Willis Branch.

   EPA Response. Because the leachate theoretically reaches the

Willis Branch, these statements may appear contradictory. However, the leachate does not actively run from the Site to the creek. Rather, leachate is found in seeps located along the sloping land which borders Landfill #1 to the north. These seeps dissipate into a flat, marshy area which borders the Willis Branch. Because the chemicals of concern are found only in very low concentrations and are readily released to the air, it is likely that these contaminants vaporize before they can reach the Willis Branch. Even if a significant flow of leachate did reach the stream, the larger volume of the stream would quickly dilute the leachate and further reduce the already low levels of contaminants. Chemical and biological testing have shown no evidence of site-related contamination in the Willis Branch.

6. The citizens expressed concern because EPA does not know where Reichhold Chemicals, Inc., the current owner of the facility that produced the waste contained at the Coker's landfills, currently disposes of its waste.

   EPA Response. This waste material is considered an industrial waste, not a hazardous waste as defined under RCRA; therefore, its disposal is not regulated by EPA. Industrial waste is handled under Delaware Solid Waste Disposal Regulations. In addition, the Superfund program is only authorized to respond to abandoned sites, not operating facilities.

7. The citizens expressed concern that EPA's preferred alternative does not call for treatment or removal of the waste material.

   EPA Response. EPA's preference, as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), is to utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. However, for this Site, EPA and the State believe that limited action meets all of EPA's statutory requirements, and is protective of human health and the environment.

B. Letter from the Greater Cheswold Environmental Safety Committee

A letter was sent by Mrs. Dorothy Dempsey, Chairman of the Greater Cheswold Environmental Safety Committee to Ms. Francesca DiCosmo, EPA's Community Relations Coordinator for the site. Mrs. Dempsey's letter expresses dissatisfaction with EPA's preferred alternative, stating that any threat of ground water contamination and any resultant risk to human health are unacceptable to her committee, and also expresses concern over potential threat to the water supply of the City of Dover, and a preference for complete

removal of all waste by PRPs.

1. Mrs. Dempsey's letter states that the committee does not believe the remedy "goes far enough to protect the citizens that live in the area."

   EPA Response. According to EPA's risk calculations, implementation of the preferred alternative will result in a risk below the lower boundary of EPA's acceptable risk range. This risk range is used nationwide by EPA to manage risks and select remedial actions at Superfund sites; therefore, the preferred alternative is as protective as, if not more protective than, any other remedial action EPA has selected at any other Superfund site.

2. Mrs. Dempsey's letter expresses concern over the potential threat to the Cheswold aquifer, which is the primary drinking water source not only for the Cheswold area, but also for the City of Dover.

   EPA Response. Ground water modelling conducted during the Feasibility Study indicates the landfills do not pose a threat to the Cheswold aquifer and therefore do not pose a threat to the drinking water supply of either the local residents or the City of Dover. Further, an onsite ground water monitoring program will detect any changes in water quality before contamination moves offsite in the Cheswold aquifer.

3. The letter states, "[The committee's] solution to this extremely complex problem is to remove the material completely."

   EPA Response. As was explained previously in this Responsiveness Summary, EPA did examine a complete removal option; however, this alternative was screened out early in the Feasibility Study because it did not pass the preliminary screening criteria of effectiveness, implementability, and cost-effectiveness. Please refer to EPA's response to the citizen's petition for further discussion of this issue.

4. Mrs. Dempsey's letter implies a preference for PRP implementation of the selected remedy.

   EPA Response. EPA does intend to offer the PRPs the opportunity to implement the selected remedy. If the PRPs decline, EPA may order the PRPs to implement the remedy, or EPA may elect to implement the remedy and pursue cost recovery against the PRPs.

C. Letter from the Mayor of Cheswold

Ms. Francesca DiCosmo of EPA received a letter from the Honorable Mr. Kim Gilson, Mayor of Cheswold. Mayor Gilson's letter reiterated the concerns of the citizens present at the public meeting held at the Cheswold Fire Hall on September 5, 1990. These concerns, as listed in the letter, involve the following issues: residential ground water testing and mortality of local animals; the condition of the Willis Branch; similar treatment of both landfills although they are quite different; securing the properties from human and animal incursion; EPA's preferred alternative. Please refer to EPA's responses to issues raised during the public meeting for discussion of residential well testing, mortality of local animals, and condition of the Willis Branch.

1. During the public meeting, some residents expressed a concern (repeated in Mayor Gilson's letter) over the fact that the site is not fenced and that EPA's Proposed Plan does not include fencing the site.

   EPA Response. EPA's Proposed Plan did not include fencing the landfills to restrict access. In response to public comment, however, EPA has included security fences and the posting of warning signs in the selected remedy.

2. Mayor Gilson's letter indicates the town council prefers a remedy which would allow unrestricted use of the land in the future, but does not indicate a firm preference for any of the alternatives presented in the Proposed Plan.

   EPA Response. None of the alternatives under consideration provide for unrestricted future use of both landfill properties. Alternatives 6 and 7 (VOC stripping and incineration) call for consolidation of all treated waste at Landfill #1. However, while this would allow for unrestricted future use of Landfill #2 property, the laws under which the treated waste would be disposed would preclude unrestricted use of Landfill #1 property. EPA's primary criteria for selecting remedial actions are protection of human health and the environment and compliance with environmental laws. EPA's preferred alternative satisfies these criteria, and provides the best balance of long-term effectiveness, reduction of toxicity, mobility and volume, short-term effectiveness, implementability, and cost of all alternatives presented in the Proposed Plan.

3. Mayor Gilson's letter indicates a belief, predicated upon a statement made in the Proposed Plan regarding the total number of alternatives evaluated in the feasibility study, that some alternatives were "not made available" to the community.

   EPA Response. There are three stages to a feasibility study:

identification and screening of remedial technologies, development and screening of remedial alternatives, and detailed evaluation of alternatives. Only alternatives which pass detailed evaluation are presented in the Proposed Plan. All of these alternatives were presented to the community.

D. Letter from Dr. Albert Vickers

Ms. Lesley Brunker, the Remedial Project Manager for the Coker's site, received a letter from Dr. Albert Vickers, the Coker Steering Committee Executive. The letter, in general, indicated concurrence with EPA's preferred alternative, with several modifications. The letter also expresses concern for potential difficulties in securing deed restrictions on the landfill properties, and states that it is inappropriate to compare risks evaluated during the EA and FS to EPA's residential use scenario.

1. The letter states that there is no mechanism under CERCLA which allow for imposition of involuntary deed restrictions on owners of real property.

EPA Response. When a determination is made under Section 106 of CERCLA, 42 U.S.C. § 9606, as has been made for the Coker's site, that there may be an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance, Section 106 grants authority to secure such relief as may be necessary to abate such danger or threat. The authority exists under CERCLA, therefore, to impose institutional controls such as deed restrictions on the Site property.

Deed restrictions are an integral component of the preferred remedy, in that they will prevent future use of the property in a manner that will result in unacceptable risk to human health and the environment. All remedies which were considered to be protective included deed restrictions on one or both properties. As Dr. Vickers' letter acknowledges, EPA has left the exact nature and extent of the deed restrictions subject to definition during the remedial design phase in order to develop the most reasonable, yet protective, strategy for implementation.

Section 300.510(c)(1) of the NCP, 55 Fed. Reg. 8,854 (March 8, 1990) (to be codified at 40 C.F.R. § 300.510(c)(1)), provides that, when appropriate, as part of the operation and maintenance assurance provided by a state pursuant to Section 104(c)(3)(A) of CERCLA, 42 U.S.C. § 104(c)(3)(A), and prior to a Superfund financed remedial action, the state must assure that any institutional controls implemented as part of the remedial action at a site are in

place, reliable, and will remain in place after the initiation of the operation and maintenance. In addition, Section 300.510(f) of the NCP, 55 Fed. Reg. 8,855 (March 8, 1990) (to be codified at 40 C.F.R. § 300.510(f)), provides that, if EPA determines that an interest in real property must be acquired in order to conduct a response action, then as a general rule, a state must agree to acquire and hold any property interest needed to ensure the reliability of institutional controls restricting the use of that property.

2. Dr. Vickers' letter supports EPA's statement, made in the Proposed Plan, that the residential use scenario is extremely conservative. However, the letter objects to the comparison of the assessment risks under this scenario to the assessments made during the RI/FS.

   EPA Response. Because the RI/FS risk assessment was conducted in accordance with guidance that has been superceeded, and the future use scenario was conducted in accordance with current EPA guidance, EPA agrees that it is not appropriate to strictly compare results (as was done in the Proposed Plan). The ROD is based solely upon the residential use scenario.

3. Dr. Vickers' letter expresses some confusion over EPA's proposed monitoring plan and plans for potential restrictions on future ground water use.

   EPA Response. EPA intends to monitor the Columbia and the Cheswold aquifers to detect any changes in ground water quality. It is expected that any contamination would first be detected in the Columbia (shallow) aquifer. Although significant contamination is not anticipated, EPA has proposed implementation of a Ground Water Management Zone should restrictions on ground water use be deemed necessary. The details of the monitoring program will be defined during the remedial design stage.

4. Dr. Vickers' letter suggests modifying the preferred remedy to eliminate surface water monitoring and to instead gauge the potential for impacts on the Willis Branch on changes detected in shallow ground water. The letter suggests that external factors could cause changes in the water quality, and that because shallow ground water is essentially the same as the water that makes up the leachate seeps, ground water monitoring could provide an "early warning system" for potential changes in the Willis Branch.

   EPA Response. EPA agrees that external factors can, and likely will, result in overall changes in the quality of the surface water. However, EPA believes that the surface water sampling program can be designed to minimize the effects of

these external factors on the evaluation of the impacts from the landfill on the Willis Branch (i.e., sampling immediately upgradient of, adjacent to, and downgradient of, the landfill). It is not likely that the effects of oiling or salting nearby roadways could be misconstrued as effects from the leachate characterized during the RI/FS. Furthermore, the concentrations of contaminants found in the leachate and in the shallow ground water were dissimilar. No styrene was detected in the shallow ground water, although it was detected in the leachate, and the concentration of ethylbenzene detected in the ground water was an order of magnitude lower than the level detected in the leachate.

5. Dr. Vickers' letter suggests that covering leachate seeps at Landfill #1, sealing the leachate collection pipes at Landfill #2, and regrading the depressed area of Landfill #2 be eliminated from the preferred remedy because these components do not result in a significant reduction in risk posed by the site.

   EPA Response. Although EPA acknowledges that placement of deed restrictions and establishment of a Ground Water Management Zone, if needed, will have the greatest impact on reducing risk associated with this Site, EPA believes the other components (covering leachate seeps at Landfill #1, closing the leachate collection system at Landfill #2, and backfilling depressed areas of Landfill #2) should still be implemented because they contribute to the overall effectiveness of the selected remedy.