UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Explanation of Significant Differences
Tybouts Corner Landfill, Bear, Delaware

FROM: Peter W. Schaul, Chief
Superfund Remedial Branch

TO: Abraham Ferdas, Director
Hazardous Site Cleanup Division

Attached is an "Explanation of Significant Differences" (ESD) for the Tybouts Corner Landfill Superfund Site in Bear, Delaware. The ESD identifies changes to the remedial action selected in the Record of Decision (ROD) dated March 6, 1986. The changes to the remedial action announced in this ESD involve the installation of an active gas venting system to prevent the off-site migration of landfill gas.

The ROD required, among other things, consolidation of the west and main landfills; construction of a multi-layer cap to prevent the infiltration of rain water; construction of an upgradient trench to prevent infiltration of clean water; and construction of a downgradient trench to collect contaminated ground water. On May 14, 1992, EPA issued an ESD in which EPA replaced the upgradient trench with a slurry wall and the downgradient trench with interceptor wells. Construction of the remedy was completed in September 1995.

In October 1996, elevated levels of combustible gas were detected outside the landfill. A temporary gas collection system was installed in November 1996. An investigation has demonstrated that engineering controls are necessary to prevent the off-site migration of landfill gas. The active gas collection system will consist of a series of gas extraction wells connected to an above ground header which will apply a vacuum to the collection system. The modification to the remedy will result in the release of landfill gas to the environment. After the system is constructed, air modeling will be conducted to verify that the remedy is protective of human health and the environment.

The modified remedy will comply with all relevant and appropriate requirements as identified on Table 1 of the ESD. The State of Delaware has been involved as the Support Agency for this project and has reviewed and supported the changes described in the ESD. The State's letter of support is attached to the ESD.

I recommend that you sign the ESD.

Attachments

EXPLANATION OF SIGNIFICANT DIFFERENCES NO. 2
Tybouts Corner Landfill Superfund Site
New Castle County, Delaware

I. INTRODUCTION

This Explanation of Significant Differences (ESD) is issued in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435(c)(2)(i), which require the United States Environmental Protection Agency (EPA) to issue such a document where a remedial action will differ in any significant, but not fundamental, respect from that selected by EPA and described in the Record of Decision.

This ESD relates to remedial action selected by EPA for implementation at the Tybouts Corner Landfill Site in New Castle County, Delaware, in a Record of Decision issued on March 6, 1986 (ROD). The selected remedial action included, among other things, consolidation of the west and main landfills; construction of a multi-layer cap to prevent the infiltration of rain water; construction of an upgradient trench to prevent infiltration of clean ground water; and construction of a downgradient trench to collect contaminated ground water. On May 14, 1992, EPA issued an Explanation of Significant Differences in which EPA replaced the upgradient trench with a slurry wall and the downgradient trench with interceptor wells. In October 1996, elevated levels of combustible gas were detected outside the landfill. An investigation has demonstrated that engineering controls are necessary to prevent the off-site migration of landfill gas. The changes to the remedial action announced in this ESD involve the installation of an active gas venting system to prevent the off-site migration of landfill gas. This ESD does not change the manner in which the release of hazardous substances for which the remedial action was selected will be controlled.

This ESD has been prepared to provide the public with an explanation of the nature of the modification to the selected remedy set forth in the ROD and to summarize the information that supports this modification. The basis for the significant differences is discussed in detail in Sections III and IV of this ESD. These differences to the remedial action do not fundamentally alter the remedy selected in the ROD with respect to scope, performance, or cost. EPA has concluded, and DNREC concurs, that the remedy selected in the ROD, modified by EPA's 1992 ESD, and further modified by this ESD, meets the objectives of the ROD. Public access to the administrative record supporting issuance of this ESD is discussed in Section V of this document.

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

A. Site History

The Tybouts Corner Landfill Superfund Site is located in New Castle County, Delaware, approximately ten miles south of Wilmington and a few miles west of the Delaware River. The Site was a former sand and gravel quarry used by the New Castle County Department of Public Works for the disposal of municipal and domestic refuse from 1969 until 1971. Industrial wastes were disposed there during the active life of the landfill. These industrial wastes included trichlorethylene, 1,2-dichloroethane, benzene, and various organic and inorganic chemicals. The 47-acre landfill was placed on the National Priorities List (NPL) in 1983, making it a Superfund Site.

B. Initial Contamination Problems

In 1976 and 1983, two domestic wells in the vicinity of the landfill were found to be contaminated. To date, these are the only two wells to have been impacted by the landfill. In 1984, EPA issued a ROD to install a public water line to 42 residences. Installation of this water line was completed in 1985. Meanwhile, EPA conducted a Remedial Investigation and Feasibility Study to evaluate the nature and extent of contamination and possible remedial alternatives.

C. Selected Remedy

In March 1986, EPA issued a second ROD requiring the consolidation of the west landfill into the main landfill; construction of a multi-layer cap to prevent the infiltration of rain water; installation of an upgradient trench to prevent the infiltration of clean ground water; and installation of a downgradient trench to collect contaminated ground water. The ROD was subsequently modified with an ESD in May 1992 to replace the upgradient trench with a slurry wall, and the downgradient trench with interceptor wells.

In 1988 EPA entered into several Consent Decrees with various parties for performance of the necessary cleanup work and reimbursement of EPA's costs. The so-called Primary Consent Decree requires a group of parties known as the Primary Defendants to design and implement the remedial action selected in the ROD (as later modified by the 1992 ESD). The Primary Defendants have completed construction of the remedial components identified in the ROD and 1992 ESD.

III. BASIS FOR THIS DOCUMENT

In October 1996, methane gas was detected outside the boundaries of the landfill. An immediate investigation revealed that methane gas was present north of Red Lion Road. In November 1996, an active gas venting system was installed along the northern boundary of the landfill that is adjacent to Red Lion Road to prevent the off-site migration of landfill gas. The active gas venting system consisted of 38 vents attached to three blowers. Other measures taken in response to the migrating gas included the following;

- Installation of soil gas monitoring probes around the perimeter of the landfill
- Monitoring soil gas probes
- Monitoring basements in residential dwellings in the vicinity of the landfill
- Installation of an additional blower along Plantation Road

Monitoring performed after installation of the active gas venting system demonstrated that the system was successful in preventing off-site migration of landfill gas along the northern boundary of the landfill.

Investigations to assess the gas migration were conducted in 1997 and 1998. The results of these investigations demonstrated that there are a few localized areas where landfill gas can escape outside the confines of the landfill. Improvements to the active and passive gas venting systems are warranted.

Copies of the reports summarizing the results of the investigations, as well as other supporting documentation for this ESD, are located in the Administrative Record for the Site. *See* Section V of this ESD for information about public access to the Administrative Record.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

This section of the ESD identifies and explains significant changes which are being made to the remedy identified in the 1986 ROD, as modified by the 1992 ESD. While such changes will not fundamentally alter the remedy selected in the ROD with respect to scope and performance, they do constitute a difference in the way certain remedial activities will be performed.

A. Description of Modification and Performance Standards

The 1986 ROD, as modified by the 1992 ESD, required the consolidation of the west landfill onto the main landfill and installation of a multi layer cap; installation of an upgradient slurry wall to prevent infiltration of ground water; and installation of downgradient interceptor wells to capture contaminated ground water. Construction of these components was completed in September 1995. The EPA-approved remedial design included 51 passive gas vents to release landfill gas.

In October 1996, during post-construction activities, combustible gas was detected outside the landfill. In November 1996, an active gas venting system was installed along the northern boundary of the landfill. In 1997 and 1998, investigations were conducted to identify gas migration pathways and to evaluate other permanent actions, if warranted.

The initial investigation focused on the area north of the Site referred to as the Red Lion Road corridor. The results of the investigation are summarized in a report entitled "Landfill Gas Migration Assessment" (Conestoga-Rovers and Associates: January 1998) and are included in the Administrative Record supporting this ESD.

The second investigation was conducted in 1998 and focused on the east and south boundaries of the landfill. The results of the investigation are summarized in a report entitled "Landfill Gas Migration Assessment Phase 2" (Conestoga-Rovers and Associates: January 1999) and are included in the Administrative Record supporting this ESD.

Significant, but not fundamental, changes to the 1986 ROD, as modified by the 1992 ESD, announced in this ESD are as follows:

1. Prevent the uncontrolled release of gases from the landfill into the environment by installing an active venting system at the Site. The system shall utilize as necessary the active gas venting system installed at the Site in November 1996, as modified below.

    a. The temporary active gas venting system installed along the Red Lion Road corridor shall be replaced with a permanent above-ground system that will, in conjunction with other system components described herein, prevent the subsurface migration of gas from the landfill. This system will be extended to capture landfill gases along the eastern and southern perimeters of the Site. The above-ground system will be constructed of durable materials that are resistant to corrosion from landfill gases and will not cause sparks or lead to ignition of the landfill gases. Gas extraction wells shall be installed and connected to a header which will apply a vacuum to the collection system. The gas extraction wells will be

screened from approximately six feet below grade to the water table. The design and placement of extraction wells and operation of the vacuum system shall be sufficient to prevent the release of gas from the landfill except through the landfill vents.

2. Measure the release of landfill gas at all existing off site gas monitoring points (gas probes 66 through 94 and TY 204). The existing off-site gas monitoring points will be monitored on at least a weekly basis for the first month following startup of the active gas collection system required herein. Monitoring frequency will thereafter be conducted at least monthly until data confirms that the landfill gas concentrations, detected at all monitoring points outside the landfill, are below the threshold limit of 20% of the LEL (Lower Explosive Limit). Thereafter, monitoring shall continue on a quarterly basis.

3. Operate the gas collection and monitoring systems until landfill gas is no longer detected at all off-site monitoring points for four consecutive monitoring events. When landfill gas is not detected at all off-site monitoring points for four consecutive monitoring events, the active gas collection system may be shut down in accordance with a plan approved by EPA. At a minimum, the plan will include procedures to monitor all off-site monitoring points on a weekly basis for the first month following shut down of the system. Monitoring frequency will thereafter be conducted at least monthly for six (6) months. If the data confirms that landfill gas concentrations detected at all off-site monitoring points are not detectable, monitoring shall continue on a quarterly basis. In the event that post-shut down quarterly monitoring of off-site monitoring points shows greater than 20% of the LEL, monitoring shall be conducted on a weekly basis until 12 consecutive monitoring events show less than 20% LEL. Thereafter monitoring will be performed on a quarterly basis. If EPA determines that there is an increasing trend of elevated concentrations of the landfill gas in the off-site monitoring points, the active gas collection system will be restarted and operated as described in this paragraph.

4. In the event that monitoring data reflects an increase or buildup of landfill gas in any perimeter area, appropriate response measures, which may include extension of the active gas collection system, will be undertaken to prevent the uncontrolled subsurface migration of gases from the landfill.

5. Collect air samples from all vents at least once following construction and operation of the active vent system. The active gas venting system shall operate for at least two months but no more than six months prior to collecting samples from all vents. Within one year following construction, analytical data shall be incorporated into an atmospheric model designed to evaluate threats to human

health and the environment from gases vented from the landfill. Air emission controls will be installed if the atmospheric model predicts an exposure greater than 1 X 10^{-6} risk.

6. In the event that the land to the east, south, and/or west is developed, additional off-site monitoring points will be installed in accordance with a plan approved by EPA.

7. Revise the Operation and Maintenance Plan as well as other plans as necessary to incorporate the changes announced in this ESD.

B. Analysis of Modification

This ESD modifies the ROD by requiring an active gas vent system to prevent the subsurface migration of landfill gas. The modified remedy will use proven technology to vent the landfill gas.

The results of the 1997 and 1998 investigations indicate that landfill gas has the potential to migrate or is currently present in subsurface boundaries east and south of the Site. Test results demonstrated that landfill gas can migrate around the end of and through localized areas of the slurry wall. Active controls are necessary to prevent the subsurface migration of landfill gas.

An active gas control system, consisting primarily of extraction wells screened below grade to the surface of the water table, will be installed along the north, east and south boundaries of the Site (See Figure 1). These extraction wells will be connected to a header (piping system connected to a blower) which will apply a vacuum to the landfill gases.

The modification to the remedy will result in the release of landfill gas to the environment. Air samples were collected from the existing 51 passive gas vents and the three blowers. The analytical results of these samples were incorporated into an air model to determine the concentration of landfill gas contaminants in the atmosphere at and around the Site. The results of the air modeling demonstrated that the current release of landfill gas does not present an unacceptable risk.

After the modifications to the remedy are implemented, another round of air sampling and air modeling will be conducted to verify that the remedy is protective of human health and the environment.

This gas migration control component of the remedy will not impact the scope or performance of the remedy as selected in the 1986 ROD as modified by the 1992 ESD. The capital costs for the additional gas migration controls proposed in this ESD are estimated to be approximately $900,000, with an annual operation and maintenance cost of approximately

$20,000.

Section 300.435(e)(9)(iii) of the NCP, 40 C.F.R. § 300.435(e)(9)(iii), identifies nine criteria to be used to evaluate remedial alternatives (overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements (ARARs); long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance). While consideration of these criteria is not required in this ESD, EPA has analyzed those criteria most likely affected by the remedy change described in this document as follows:

Overall Protection of Human Health and the Environment

The modifications called for in this ESD will ensure the remedy remains protective of human health and the environment by eliminating the threats associated with the subsurface migration of landfill gas onto adjacent properties.

Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs associated with the active gas venting system are identified in Table 1 of this ESD. The additional work identified in this ESD will comply with all ARARs.

Cost Effectiveness

The additional cost of $900,000 is less than 3% of the total cost of the remedy and is considered a reasonable expenditure to abate the potential threat posed by the landfill gas.

State Acceptance

EPA has notified DNREC of the modification to the remedial action announced in this ESD. By letter dated May 31, 2000, DNREC notified EPA of the State's support for the modification.

V. PUBLIC PARTICIPATION

A notice of availability of this ESD and a brief explanation of its contents will be published in local newspapers following execution of this ESD in accordance with the requirements set forth in Section 300.435(c)(2)(i) of the NCP, 40 C.F.R. § 300.435(c)(2)(i).

A copy of this ESD, together with information supporting the changes described herein, will be included in the Administrative Record for the Site. The Administrative Record File is available at the following locations:

U.S. EPA Region III Docket Room
c/o Anna Butch
1650 Arch St.
Philadelphia, Pennsylvania, 19103-2029
215-814-3157

Delaware Department of Natural Resources and Environmental Control
391 Lukens Drive
New Castle, Delaware 19720-2774
302-395-2600

The index to the Administrative record is available to the public on the EPA Region III website (www.epa.gov/reg3hwmd/).

VI. STATUTORY DETERMINATIONS

EPA believes that the remedial action announced in the March 1986 ROD, as modified by the May 1992 ESD and the changes announced herein, remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the revised remedy utilizes treatment technologies that permanently and significantly reduce the toxicity, mobility, or volume of the hazardous substances to the maximum extent practicable for this Site.

Abraham Ferdas, Director
Hazardous Site Cleanup Division
EPA Region III

7/26/00
Date

TABLE 1
Relevant and Appropriate Regulations for the Active Gas Collection System for the Tybouts Corner Landfill Superfund Site

Delaware Regulations Governing Control of Air Pollution, Regulation No. 20, Section Title: 28 Embodies the Federal Regulations from 40 CFR Part 60 Subpart WWW Standards of Performance for Municipal Solid Waste Landfills:	
§60.759(b)(1)	Landfill gas collection and control system components shall be constructed of PVC, HDPE, or other nonporous corrosion resistant material. Landfill gas collection and control system components shall have suitable dimensions to convey the maximum landfill gas flow rate and withstand future settlement, overburden, and traffic loads. Expansion of the landfill gas collection and control system will occur as needed to meet landfill gas emission and migration standards. Vertical well and horizontal collector perforations will control head loss and air infiltration throughout the system.
§60.759(b)(2)	Vertical wells must not endanger the landfill base liner and must address the occurrence of water in the landfill. Landfill gas collection and control system components must be designed to control air intrusion, prevent landfill gas from escaping the collection system, and prohibit refuse from entering the collection system. Gravel backfill in the extraction wells and trenches shall not obstruct pipe perforations.
§60.759(c)	The collection header pipes must be adequate to handle the maximum landfill gas flow rate.
§60.753(d)	The gas collection and control system will be operated in a manner conducive to limiting surface emissions of methane to less than 500 ppm.
From 40 CFR Part 258 Subpart D - Criteria for Municipal Solid Waste Landfills	
§258.23	Methane gas does not exceed 25% of the LEL in facility structures, and does not exceed the LEL at the facility property boundary. Implement a routine monitoring program.

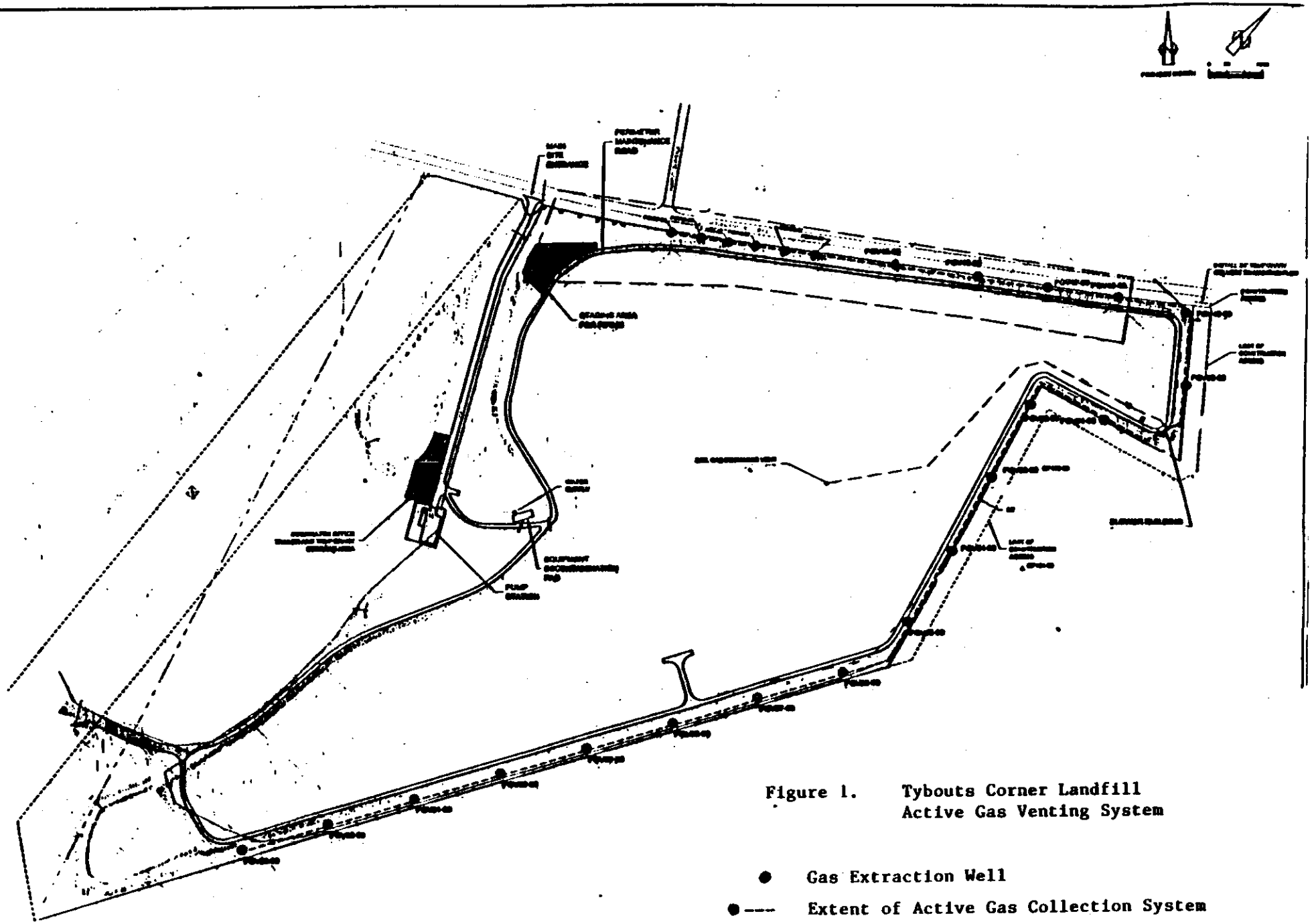

Figure 1. Tybouts Corner Landfill
Active Gas Venting System

● Gas Extraction Well

●--- Extent of Active Gas Collection System

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF AIR AND WASTE MANAGEMENT
391 LUKENS DRIVE
NEW CASTLE, DELAWARE 19720-2774

WASTE MANAGEMENT SECTION
SITE INVESTIGATION &
RESTORATION BRANCH

TELEPHONE: (302) 395-2600
FAX: (302) 395-2601

May 31, 2000

Abe Ferdas, Director
Hazardous Site Cleanup Division
US EPA Region III
1650 Arch Street
Philadelphia, PA 19103-2029

RE: Tybouts Corner Landfill Superfund Site
Explanation of Significant Differences No. 2

Dear Mr. Ferdas:

Thank you for the opportunity of reviewing the draft Explanation of Significant Differences (ESD) amending the 1986 Record of Decision (ROD) for the Tybouts Corner Site.

The ESD concerns the installation of active and passive venting systems to prevent the off-site migration of landfill gases. The State of Delaware supports this change in the original ROD and is pleased to concur with the ESD.

Sincerely,

Denise Ferguson-Southard, Director
Division of Air and Waste Management

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pc: Alex Rittberg, Program Manager
Stephen F. Johnson, Project Manager
Kate Lose, EPA, Region III