



# Third Five-Year Review Report

for

**Bowers Landfill**

**Circleville**

**Pickaway County, Ohio**

**August, 2007**

**Prepared by  
US EPA - Region 5**

**RECEIVED**

**AUG 27 2007**

**OHIO EPA/CDO**

Approved by:

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U.S. EPA, Region 5

*8-15-07*

Date

**Third Five-Year Review Report  
Bowers Landfill Site**

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## List of Acronyms

CERCLA Liability Act	Comprehensive Environmental Response, Compensation, and
DDAGW	Division of Drinking and Ground Waters
HI	Hazard Index
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NPL	National Priorities List
PA/SI	Preliminary Assessment/Site Investigation
O&M	Operation and Maintenance
Ohio EPA	Ohio Environmental Protection Agency
RD/RA	Remedial Design/Remedial Action
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SVOC	Semi-Volatile Organic Compound
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound

## Executive Summary

The remedy for the Bowers Landfill site in Circleville, Ohio, included capping of contaminated soils and debris on site, institutional controls, monitoring of ground and surface water, methane, and Volatile Organic Compounds (VOCs).

The First Five Year Review Report was signed on July 23, 1997. The Second Five Year Review Report was signed on August 23, 2002. The trigger date for this Third Five Year Review Report is five years after the signature date of the Second Five Year Report. The assessment of this Third Five-Year Review report has found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD) document. Construction was completed in September 1993 and some changes in the design were made during the construction.

The operation and maintenance activities for the Bowers Landfill site have been conducted by the PRPs consultant, Cummings/Riter, and the latest annual monitoring report for April 2007 was reviewed. The monitoring event included the sampling and analysis of groundwater from nine locations, surface water from three locations, a site inspection, and landfill gas monitoring. There were no anomalies detected from gas monitoring.

The remedy is functioning as designed. The immediate threats have been addressed and the remedy continues to be protective.

The remedy is expected to continue to be protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled. Institutional controls are in place and were verified as part of this five-year review. Threats at the site have been addressed through capping of contaminated soils and landfill debris, the installation of fencing and warning signs, the implementation of institutional controls, drainage improvements and the installation of sheet piling to control erosion. In addition, maintenance is being performed on a regular basis to ensure that the monitoring wells, gas vents and cap remain in good condition.

Long-term protectiveness of the remedial action will be verified by the continued collection of ground and surface water samples. Current data indicate that barium is the only contaminant above the MCL. However, a conservative mass loading calculation concluded that the estimated in stream concentration of barium entering the Scioto River is well below the OEPA water quality criteria for barium within the Ohio River drainage basin, and that the levels of barium do not appear to be adversely impacting the Scioto River. In addition, there are no actual or potential residential well receptors between the site and the Scioto River where barium was detected. Ground and surface water monitoring will continue on the current schedule.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Bowers Landfill		
EPA ID (from WasteLAN): OHD9805096 16		
Region: 5	State: Ohio	City/County: Circleville/Pickaway
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: <u>12</u> / <u>30</u> / <u>1992</u>	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Sirtaj Ahmed		
Author title: Remedial Project Manager	Author affiliation: U.S.EPA, Region 5	
Review period:** <u>8</u> / <u>24</u> / <u>02</u> to <u>8</u> / <u>23</u> / <u>07</u>		
Date(s) of site inspection: <u>6</u> / <u>28</u> / <u>07</u>		
Type of review: <div style="text-align: right; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA   <input type="checkbox"/> Pre-SARA   <input type="checkbox"/> NPL-Removal only  <input type="checkbox"/> Non-NPL Remedial Action Site   <input type="checkbox"/> NPL State/Tribe-lead  <input type="checkbox"/> Regional Discretion </div>		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): <u>8</u> / <u>23</u> / <u>2002</u>		
Due date (five years after triggering action date): <u>8</u> / <u>23</u> / <u>2007</u>		

\* ["OU" refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

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**Issues:**

1. Barium detected above MCL in Monitoring Well P-5B.
2. Mapping of the area covered by the deed restrictions is needed to assure they are effective.
3. Long term stewardship must be assured which includes maintaining and monitoring effective ICs.

**Recommendations and Follow-up Actions:**

1. Continue annual ground water monitoring program.
2. Prepare maps of deed restrictions area (paper and GIS versions).
3. Develop an IC monitoring plan to oversee and monitor ICs.

**Protectiveness Statement:**

The remedy is expected to continue to be protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled. Institutional controls are in place and were verified as part of this five-year review. Threats at the site have been addressed through capping of contaminated soils and landfill debris, the installation of fencing and warning signs, the implementation of institutional controls, drainage improvements and the installation of sheet piling to control erosion. In addition, maintenance is being performed on a regular basis to ensure that the monitoring wells, gas vents and cap remain in good condition.

**Long-Term Protectiveness:**

Long-term protectiveness of the remedial action will be verified by the continued collection of ground and surface water samples. Current data indicates that barium is the only contaminant above the MCL. However, a conservative mass loading calculation concluded that the estimated in-stream concentration of barium entering the Scioto River is well below the OEPA water quality criteria for barium within the Ohio River drainage basin, and that the levels of barium do not appear to be adversely impacting the Scioto River. In addition, there are no actual or potential residential well receptors between the site and the Scioto River where barium was detected. Ground and surface water monitoring will continue on the current schedule.

**Other Comments:**

Encroaching vegetation from the wetlands on the site will need to be watched. The wetlands have produced an excellent area for tree growth and this is crowding some of the mowed area, but the mowed area is free of vegetation.

## I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in the Five-Year Review reports. The Five-Year Review reports also identify issues found during the review and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 Code of Federal Regulation (CFR) §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The First Five-year Review Report was completed on July 23, 1997 by Ohio EPA and reviewed by USEPA, Region 5. The Second Five-Year Review Report was completed on August 23, 2002 by Ohio EPA and reviewed by USEPA, Region 5.

This is the Third Five-Year Review Report for Bowers Landfill, and it was conducted by USEPA, Region 5, and reviewed by Ohio EPA. Ohio EPA continues to take the lead for oversight of O & M activities at the site under the State Consent Decree with the PRPs. The triggering action for this statutory review is the signature date of the Second Five-Year Review Report on August 23, 2002.

## II. Site Chronology

**Table 1: Chronology of Site Events**

Event	Date
Accepted waste	1958 - 1968
Pre-NPL responses - Ground and surface water were sampled.	1980
NPL listing	September 1983
Remedial Investigation/Feasibility Study initiated	1983
Remedial Investigation/Feasibility Study complete	1989
ROD signature	March 31, 1989
Remedial design start/complete	1990 - 1991
Superfund State Contract	July 5, 1991
Actual remedial action start	February 1992
Construction dates (start, finish)	March 1992/Spring 1993
Construction completion date	September 1993
Remedial Action Report	September 1993
Deletion from NPL	October 29, 1997
First Five-Year Review	July 23, 1997
Second Five-Year Review	August 23, 2002

### **III. Background**

#### **Physical Characteristics**

Bowers Landfill is located in Pickaway County at the junction of Island and Circleville-Florence Chapel Roads, 2.5 miles north of Circleville, Ohio (Attachment 1, Figures 1 and 2). The site lies in the Scioto River flood plain and is L-shaped with its ends abutting the river.

The landfill is approximately twelve acres in size, 3,500 feet long, about 125 feet wide and ten feet above grade. The current owner is a holding company established by the estate of Dr. John M. Bowers.

Bowers Landfill is located in a rural area. At the time of the remedial investigation, fifteen houses were found to be located within a half mile of the site. These homes depended on domestic water wells for drinking water. The wells were sampled and no site related contamination was found.

#### **Land and Resource Use**

Bowers Landfill began operation in 1958 and was closed in 1968. There was no activity at the site after 1968, except for unauthorized dumping of many large items such as appliances and used tires by individuals.

The surrounding area is rural, with some residences, and ponds to the east where quarrying occurred in the past. The Scioto River is to the west and is used for boating, fishing and swimming. There are no future uses intended for the site. The landfill has been capped and the site is partially fenced, with posted warning signs.

The groundwater underlying the site flows towards and discharges to the Scioto River. No drinking water wells are located between the landfill and the river.

#### **History of Contamination**

Information is limited regarding the type and amount of wastes that were deposited at Bowers Landfill. However, an approximation was made that the landfill contains 130,000 cubic yards of waste material.

The type of wastes disposed of at Bowers Landfill consisted mostly of residential waste collected by private haulers from the Circleville area. Beginning in 1963, the site received wastes from local industries. This continued until the landfill was closed in 1968.

## **Initial Response**

Ground and surface water were first sampled in 1980. Three monitoring wells were installed at that time as part of the Preliminary Assessment/Site Investigation (PA/SI) activities. Contamination by VOCs were detected in monitoring wells west of the landfill but not to the east. The VOCs detected were ethylbenzene, toluene and xylene.

Bowers Landfill was added to the NPL in September 1983. The Potentially Responsible Parties (PRPs), E.I. Du Pont de Nemours and Company (Du Pont) and PPG Industries, Inc. (PPG), signed a consent order with Ohio EPA and U.S. EPA to conduct a Remedial Investigation/Feasibility Study (RI/FS). This was conducted from 1985 to 1989.

## **Basis for Taking Action**

Ground water, surface water, sediment and soil were sampled at Bowers Landfill. It was determined that exposure to contaminated ground water and soil were the principal threats to be addressed by the remedial action. Barium and benzene exceeded their MCLs in ground water at one monitoring well. However, ground water down gradient of the landfill is not used as a drinking water source. In addition, residential drinking water wells up-gradient of the site were sampled during the RI and showed no effects from the landfill.

A risk assessment of soil contamination indicated that the Hazard Index (HI) was exceeded using a worst case scenario for ingestion of contaminated soil. In addition, the total cancer risk was  $3 \times 10^{-6}$  (an incremental increased cancer risk of 3 in 1,000,000).

Despite the low levels of contamination found, potential future risks were possible because the landfill was poorly covered in some areas. In other areas, wastes were covered by less than a foot of soil. Other reasons for proposing remedial action were that hazardous substances were placed in the landfill and that frequent flooding of the area occurs.

## **IV. Remedial Actions**

### **Remedy Selection**

The ROD was signed on March 31, 1989. The remedy selected was capping, with gas and ground water monitoring to be conducted subsequent to capping. The Remedial Design (RD) began in 1990 and was completed the following year. The Remedial Action (RA) began in 1992 and was completed in 1993.

The principal objective of the RA was to reduce the infiltration of precipitation into the landfill by installing a low-permeability clay cover on the landfill. The RA for the site

included removing surface debris and vegetation from the landfill, installing a low-permeability clay cover on the landfill, constructing erosion control measures and drainage improvements, restricting site access and use, installing additional ground water monitoring wells and a gas venting system, maintaining the clay cover after construction, and monitoring ground water and surface water.

Two pre-design field investigations were conducted - 1) a geotechnical investigation to evaluate the properties of potential cover materials and 2) a soil gas study to determine whether a gas venting system should be constructed.

The first investigation determined that the material in the field west of the landfill was acceptable for usage as the clay layer. The excavation pits were converted into wetlands. This area is in the Scioto River flood plain and is frequently inundated with flood waters.

The soil gas survey indicated that a gas collection and venting system was needed as part of the landfill cover. Both methane and VOCs were detected.

During August 1990, ground and surface water sampling was conducted to determine if any changes had occurred subsequent to the last sampling event. The sampling results were helpful in determining which monitoring wells to use in the long term Operation and Maintenance (O&M) program.

### **Remedy Implementation**

The following paragraphs highlight the actions taken to complete the requirements of the ROD.

Trees, brush, weeds and exposed/surface debris were removed. Most of the vegetation was burned. Old tires and appliances were decontaminated, removed from the site and properly disposed of off site. Landfilled material was kept on site and placed so that it did not interfere with the capping process.

During the RA, eight additional monitoring wells were installed. Five of these wells were placed in the area west of the landfill. The remaining three were installed off site on the west side of Island Road, about 1500 feet south of the site. In addition, many of the established monitoring wells had risers attached to them and the areas around them were mounded to make access easier during flood events.

The gas venting system was installed in the graded layer, with the gravel layer placed around the header. Gases generated rise through the graded layer and are vented into the atmosphere.

The cover system included the following from bottom to top - graded and gas venting layer one foot thick, low permeability clay cover 2.5 feet thick, and the vegetated topsoil cover is 3.5 feet thick.

The erosion protection and drainage improvements were accomplished by stabilizing the slopes and promoting drainage, installing sheet piling at the ends of the landfill abutting the Scioto River, planting grass on the top and sides of the landfill, reducing the infiltration of surface water through the capping process, and reconfiguring the ditch system.

### Institutional Controls

Institutional controls (ICs) are non-engineered instruments, such as administrative and/or legal controls that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE). The table below summarizes institutional controls for these restricted areas.

**Table 2: Institutional Controls Summary Table**

<b>Media, Engineered Controls, &amp; Areas that Do Not Support UU/UE Based on Current Conditions.</b>	<b>IC Objective</b>	<b>Title of Institutional Control Instrument Implemented (note if planned)</b>
<b><i>Bowers Landfill Site Area and Landfill Cap.</i></b>	Prohibits use of land underlying the site and assures integrity of the landfill cap.	"Bowers Deed Restrictions" attachment to RD/RA CD, recorded at Pickaway County recorder's office on October 16, 1996.
<b><i>RA Components</i></b> such as Landfill gas collection and venting system and monitoring wells	Assures integrity of remedy components	"Bowers Deed Restrictions" attachment to RD/RA CD, recorded at Pickaway County recorder's office on October 16, 1996.
<b><i>Groundwater</i></b> – current area that exceeds groundwater cleanup standards identified at the site. This area is immediately between the landfill and the Scioto River at monitoring well location P-5B.	Prohibits groundwater use until cleanup standards are achieved.	" Bowers Deed Restrictions" attachment to RD/RA CD, recorded at Pickaway County recorder's office on October 16, 1996.

The Site figures and attachments to this document outline the site boundary and groundwater use restriction area for the Bowers Site. In addition, in the near future EPA will be preparing a more detailed map outlining the boundaries of the area covered by the deed restrictions. Based on the Site inspection, interviews, and data, no inappropriate land or groundwater use were observed. No one is exposed to the site related contamination.

Pursuant to a Consent Decree entered on December 14, 1993 between U.S. EPA, the State of Ohio, and a group of potentially responsible parties, United States v. Du Pont de Nemours & Co. and PPG Industries, Inc., 2:91-CV-742 (S.D. OH, E.Div.), the Site owner, the Estate of John N. Bowers, by its agent Ellen J. Bowers, agreed to execute and record an appended document entitled "Bowers Deed Restrictions." The Consent Decree, at Section V, Para. 9, references this document, directs that a copy be filed in the Pickaway County Recorder's Office, and provides that a notice to successors in title be included in any future transfer of the property. The "Bowers Deed Restrictions" document provides a comprehensive list of land use controls to be observed by the landowner, and which covers each of the institutional controls elements described above.

As discussed above, the Site owner recorded a copy of the "Bowers Deed Restrictions" document with the County Recorder's Office on October 16, 1996 (Instrument No. 9600008220, vol. 021, page 468-471). The document states that it "runs with the land" and that the obligation to maintain the enumerated restrictions on property use "shall remain in effect until such time as the Ohio EPA files with the Court a written certification," as specified in the document (Deed Restriction, page 3, County Recorder's Office, vol 021, page 470). In 2006, the Bowers Estate transferred title of the Site to a holding company constituted by the estate agent. The "Bowers Deed Restrictions" document was duly recorded in the Pickaway County Recorder's office (Vol. 0594, pp. 2071-2075). OEPA has reviewed current title records for the site and the scope of the deed restrictions, and has confirmed that the deed restrictions are appropriately recorded and that they are enforceable as a valid prior instrument under the Uniform Environmental Covenants Act (UECA). EPA will continue to work with OEPA to ensure the continued enforceability of the deed restrictions for the Bowers site.

### **Operation and Maintenance (O & M)**

The first year of O&M was overseen and conducted by U.S. EPA. The PRPs agreed to do the ground water monitoring for the first year, with U.S. EPA's contractor, PRC Environmental Management, Inc., being responsible for conducting the remaining tasks.

The specific tasks that were listed for the 30 years of operation and maintenance are as follows: 1) gas monitoring, 2) ground and surface water monitoring, 3) maintenance of the landfill cap, 4) site inspections and 5) repairs.

Beginning with the second year of the O&M, the PRPs signed a consent decree with the State of Ohio in September 1996 to conduct all post-construction activities at the site. Early in the second year, the PRPs' contractor abandoned Monitoring Well P15-B because a bailer was caught at the bottom of the well. The well was replaced by Monitoring Well P15-BR.

Initially, ground water sampling was conducted on a quarterly basis and analyzed for VOCs, Semi-Volatile Organic Compounds (SVOCs) and metals. Quarterly sampling

continued through 1998. In March and June of 1999, due to the lack of any organic hits, analysis of ground water was reduced to inorganics. The next sampling event occurred in April 2001 and began annual ground water monitoring of inorganics. Barium is the only constituent above the Maximum Contaminant Level (MCL). Certain other inorganics are statistically elevated compared to background, but do not exceed MCLs or present any concern or threat.

When the areas are not dry, surface water continues to be sampled and analyzed in the wetlands and the east ditch twice a year. Gas monitoring for methane and VOCs occurs on an annual basis.

Cummings-Riter has been using ChemStat by Starpoint Software to statistically analyze the data. In addition, beginning with the September 1998 sampling event, barium has been undergoing statistical analysis using the Sheward-CUSUM control chart. This checks the current results against the established baseline. These statistical analyses were used by the Volpe National Transportation Systems Center as summarized in their statistical analysis report of the Bowers Landfill prepared on behalf of U.S. EPA Region 5 (September 2002).

In 2003, a massive cutting of encroaching vegetation was needed along the sides of the landfill and along the mounded areas. At one point, damage occurred to the front gate and was repaired. Also, the monitoring well casings were stenciled with the identification numbers. This was a particularly high year for O&M costs.

O&M costs include ground and surface water monitoring and analysis, mowing of the cap, repairs, maintenance of monitoring wells, gas vents and fence, inspections, and cutting of brush and saplings growing on the cover. The culvert and east ditch are also being kept free of vegetation to allow flow of water during high precipitation events.

With the decreasing frequency of ground water monitoring, costs associated with operation and maintenance of Bowers Landfill have decreased as noted in Table 3. The original O&M cost in one year in 1997 was \$79,000 and the cost in 2006 had dropped to \$18,314.

**Table 3: Annual System Operations and Maintenance Costs (O&M)**

Dates		Total Cost in \$1,000.00
From	To	
1/1/97	12/31/97	\$79
1/1/98	12/31/98	\$59
1/1/99	12/31/99	\$53
1/1/00	12/31/00	\$19

Dates		Total Cost in \$1,000.00
From	To	
1/1/01	12/31/01	\$22
1/1/02	12/31/02	\$29
1/1/03	12/31/03	\$62
1/1/04	12/31/04	\$31
1/1/05	12/31/05	\$33
1/1/06	12/31/06	\$18

## V. Progress Since the Last Five Year Review

At the conclusion of the second Five Year Review, it was determined that the remedy was protective of human health and the environment.

**Table 4: Actions Taken Since the Last Five-Year Review**

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Lack of drainage layer.	Observe cap for leaks due to lack of drainage layer.	PRPs	Ongoing	Leak in cap discovered in 2002. Subsequently repaired by placement of soil consistent with cap material.	April 2003 October 2003 Observation of cap is ongoing
	Optimize ground water monitoring program and statistical tests.	Ohio EPA	12/31/02	Ground water sampling program optimized.	12/26/02 letter from OEPA.
	Address vegetation in the ditch system.	PRPs	Ongoing	Vegetation in the ditch system is addressed as determined from semiannual inspections.	Ongoing
	Write letters to residents between Island Road and the east slope.	Ohio EPA	12/31/02	Letters sent by OEPA on 11/13/03.	11/13/03.
	Continue addressing repairs.	PRPs	Ongoing	Site inspections conducted semiannually and repairs made as needed.	Ongoing

Minor recommendations were also made following the second Five Year Review. The monitoring well pads periodically need to have animal burrow holes filled. As the grass

has become thicker around the edges of well pads, the number and size of the burrows have decreased over the course of the past five years. Monitoring well tags have been replaced as needed.

A leak in the cap discovered in 2002 was repaired by the PRP's contractor in April and October of 2003, by placement of soil consistent with the cap material. Minor repairs to the cap have been made on an ongoing basis.

A minor amount of trespassing was noted at the time of the first Five-Year Review. Over the last ten years, less trespassing has occurred. This is probably due to the barbed wire that a neighbor had installed around his property. The barbed wire has added extra security to Bowers Landfill by blocking two dirt roads. However, during one winter season, shotgun shells and parts of duck carcasses were noted by OEPA, indicating that some trespassing continues to occur, along with hunting and the illegal disposal of carcasses.

## **VI. Five-Year Review Process**

### **Administrative Components**

The PRPs were notified of the initiation of the five-year review through their contact, Cummings Riter Consultants, Inc. Due to the uncomplicated nature of the review, no review team was established. Ohio EPA had conducted the Second Five Year Review, including the site inspection. The Third Five-Year Review report was written by Sirtaj Ahmed of USEPA, Region 5. This Third Five-Year Review Report picked up where the Second Five-Year Review Report ended. Data summary reports discussing the ground and surface water analyses were reviewed, as well as the site inspection reports.

### **Community Involvement**

It was decided that a news release to the community would be sufficient notice for the Third Five-Year Review. An advertisement of the Five-Year review process appeared in the Circleville Herald on December 18, 2006. December 30, 2006 was given as a deadline for community input to this Third Five-Year Review report. No comments from the public were received.

### **Data Review**

All ground and surface water data has been reviewed. As discussed above, ground water monitoring was subsequently reduced both in parameters analyzed for and the frequency of sampling. At the end of this third five-year review period, annual sampling is being conducted for ground water analysis of metals and semi-annual for surface water for metals analysis.

Barium continues to be the only constituent detected over its MCL (2,000 ug/l) and this

was at one monitoring well, P-5B, at a concentration of 2,330 ug/l. As a result of this exceedance, an additional statistical tool is applied to the data. This is the Shewart-CUSUM control chart. Institutional controls, including deed restrictions that prohibit use of ground water for drinking water use ensure no exposure to contaminated ground water from the site. The level of barium in monitoring well P-5B has fluctuated slightly over the years at just above the MCL. Monitoring well P-5B is located between the landfill and the Scioto River within the restricted area. This location is covered by the site deed restriction and there would not be any groundwater receptors at this location. Barium was also detected in monitoring wells P-7A and W-12, but at levels well below the MCL of 2,000 ug/l.

Some other inorganics are above background but have not significantly increased since the beginning of monitoring. Currently, there are no MCLs for these constituents.

### **Site Inspections**

During the April 2007 monitoring event, the monitoring wells, bumper posts, pads and gas vents were inspected by Ohio EPA. The grass cover, sheet piling and fencing were checked, as well as the two areas that were repaired due to erosion of the cover.

Trees and shrubs were crowding the sides of the landfill and the mounds leading to the down gradient monitoring wells in some areas. The cover itself is clear of brush and saplings. The access road to the landfill is in good condition.

The wetlands/ponds are well covered in vegetation. The inlets to the ponds from the Scioto River are in good condition and are free of vegetation. Some erosion had occurred in the past, but only once, and was not observed to be a current problem. Sediment from the river has been deposited in the ponds during flood events.

The sheet piling, monitoring wells, gas vents and fence are in good condition. Some bumper posts need new caps and some gas vents will need spacer replacement this year. A minor amount of repainting is needed. The grass cover is also in good condition. Repairs are done as needed but have been minor - such as repainting of wells and gas vents, correcting areas of erosion and filling in animal burrow holes.

On June 28, 2007, Donald Bruce of U.S. EPA, Region 5, and Diana Bynum of Ohio EPA visited the site as part of the Five Year Review. The fencing and gate securing the site were in good condition. Signs were posted at the entrance to the site and the access road was also in good condition. However, the lock to the entrance gate was not able to be opened, and appeared to be rusted out. This lock should be repaired or replaced by the maintenance contractor in the near future. There were no indications of any trespassing or violations of established institutional controls.

## Interviews

As Ohio EPA retains the overall lead for the site O & M under the State Consent Decree with the PRPs, both Ohio EPA staff, Project Manager Diana Bynum, and the PRPs representative, Cummings Riter, were interviewed in depth regarding current site conditions.

## VII. Technical Assessment

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

Yes.

The remedial action is operating and functioning as designed. The capping of the landfill continues to achieve the containment of waste and the prevention of the migration of precipitation to ground water. Institutional controls have prevented ready access to the landfill and remain protective and in place. Fencing is in good condition and the warning signs are in place.

Operation and Maintenance has been effective. Animal burrowing occurs around some of the monitoring well pads but appears to be lessening as the grass becomes thicker. While these burrows are shallow, they have been refilled with soil and reseeded after discovery. There may be a future problem due to the lack of a drainage layer between the clay layer/topsoil layer. So far, one erosion hole has occurred, but was small and was readily patched. The erosional areas that were repaired were at the ends of the landfill. The grass cover is well maintained. Maintenance activities, such as painting of monitoring wells, are conducted as needed.

Barium concentrations in Monitoring Well P-5B continue to be above the MCL. The results from the latest data in April 2007, showed barium in Monitoring Well P-5B at a concentration of 2,330 ug/l. However, there are no potential drinking water wells at this location between the site and the Scioto River, and the area is covered by the site deed restriction. Based on the site inspections, monitoring, and interviews, compliance with the land and groundwater use restrictions was observed and the remedy is functioning as intended with regard to the institutional controls.

At the request of the OEPA, the effect of barium concentrations reported in Monitoring Well P-5B was evaluated using a conservative mass loading calculation. This calculation assumed that ground water monitored in Monitoring Well P-5B contributes base flow to the Scioto River. The calculation concluded that the estimated concentration of barium entering the Scioto River was 0.04 ug/l, which is well below the OEPA water quality criteria for barium within the Ohio River drainage basin (1,000 ug/l).

There has been a steady drop in O&M costs. As the monitoring well sampling has gone from quarterly to yearly, there has been a corresponding drop in costs.

The Ohio EPA Division of Drinking and Ground Waters (DDAGW) conducted a ground water monitoring optimization study that was completed in December of 2002. One monitoring well (Monitoring Well P-5B) continues to show barium over the MCL. However, this well is located between the landfill and the Scioto River, and there is no adverse impact on the River.

**Question B: Are the exposure assumptions, toxicity data, cleanup levels, and Remedial Action Objectives (RAOs) used at the time of the remedy selection still valid?**

Yes.

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

There have been no changes in standards or to be considered for Bowers Landfill.

Land use has not changed near the landfill. No new exposure pathways or receptors have been identified. The remedy is progressing as expected.

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

No.

No additional information was discovered to call into question the protectiveness of the remedy.

### **Technical Assessment Summary**

According to the data reviewed and the site inspections, the remedy is functioning as intended. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. Barium concentrations in ground water have not been reduced, but they are detected in only one monitoring well above the MCL and appear not to be adversely impacting surface water. There have been no changes in the MCL standard for barium. Other substances that have been detected are not a concern. There is no other information that calls into question the protectiveness of the remedy.

## VIII. Issues

Table 5: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Barium detected above MCL in Monitoring Well P-5B.	N	Y
2. Mapping of the area covered by the deed restrictions is needed to assure they are effective.	N	Y
3. Long term stewardship must be assured which includes maintaining and monitoring effective ICs.	N	Y

## IX. Recommendations and Follow-up Actions

**Table 6: Recommendations and Follow-up Actions**

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Barium detected above MCL in Monitoring Well P-5B.	Continue annual ground water monitoring program.	PRPs	Ohio EPA	Ongoing	N	Y
Mapping of the area covered by the deed restrictions is needed to assure they are effective.	Prepare maps of deed restrictions area (paper and GIS versions).	PRPs, OEPA, and/or U.S.EPA	OEPA and U.S.EPA	November 2007	N	Y
Long term stewardship must be assured which includes maintaining and monitoring effective ICs.	Develop an IC monitoring plan to oversee and monitor ICs.	PRPs	OEPA and U.S.EPA	August 2008	N	Y

## X. Protectiveness Statement

The remedy is expected to continue to be protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled. Institutional controls are in place and were verified as part of this five-year review. Threats at the site have been addressed through capping of contaminated soils and landfill debris, the installation of fencing and warning signs, the implementation of institutional controls, drainage improvements and the installation of sheet piling to control erosion. In addition, maintenance is being preformed on a regular basis to

ensure that the monitoring wells, gas vents and cap remain in good condition.

Long-term protectiveness of the remedial action will be verified by the continued collection of ground and surface water samples. Current data indicates that barium is the only contaminant above the MCL. However, a conservative mass loading calculation concluded that the estimated in stream concentration of barium entering the Scioto River is well below the OEPA water quality criteria for barium within the Ohio River drainage basin, and that the levels of barium do not appear to be adversely impacting the Scioto River. In addition, there are no actual or potential residential well receptors between the site and the Scioto River where barium was detected. Ground and surface water monitoring will continue on the current schedule.

## **XI. Next Review**

The next Five-Year Review for Bowers Landfill is required five years from the signature date of this review.

**ATTACHMENT 1**  
List of Documents Reviewed

First Five Year Review Report, Bowers Landfill, July 23, 1997

Second Five Year Review Report, Bowers Landfill, August 23, 2002

Bowers Landfill Work Plan Groundwater Monitoring/Operations and Maintenance Plan, March 6, 1996.

Data Summary Report, Phase IV Monitoring Program, Year 10, June 2005.

Data Summary Report, Phase IV Monitoring Program, Year 11, June 2006.

Data Summary Report. Phase IV Monitoring Program. Year 12. June 2007.

Preliminary (30 percent) Design for Bowers Landfill, November 1990.

**ATTACHMENT 2 – NEWSPAPER AD OF FIVE YEAR REVIEW NOTICE**

Circleville  
Herald  
12/18/06

**INS**  
**JAN. 8**

**Register Now!**

**Pickaway Co. Family YMCA**  
**477-1661**  
Space donated by Savings Bank 842026

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We have  
minors from  
firearms. We have a  
holds adults accountable  
a child is in possession of a  
firearm. Those are three that

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**EPA Reviews**  
**Bowers Landfill Superfund Site**  
**Pickaway County, Ohio**

U.S. Environmental Protection Agency is conducting a status review of the Bowers Landfill Superfund site in Circleville, Ohio. The Superfund law requires a review at least every five years at sites where a cleanup action has been completed and hazardous substances remain at the site. These reviews are done to ensure the cleanup continues to protect human health and the environment.

This review includes an evaluation of background information, cleanup requirements, sampling results, effectiveness of the cleanup and possible future actions.

- EPA selected several cleanup actions for the site:
- Capping contaminated soil and debris
  - Imposing deed restrictions, permanent easements, agricultural use and site access
  - Monitoring ground and surface water

This is the third review of the Bowers Landfill. The next one is scheduled for 2011.

To provide input or get more information, contact:

Susan Pastor or Sirtaj Ahmed  
EPA Community Involvement Coordinator  
(312) 353-1325 pastor.susan@epa.gov

or  
Sirtaj Ahmed  
EPA Remedial Project Mgr.  
(312) 886-4445 ahmed.sirtaj@epa.gov

(800) 621-8431, 10 a.m. – 5:30 p.m., weekdays

The five-year-review report and other site-related documents will be available for review at:  
Pickaway County District Public Library  
1160 N. Court St., Circleville

The report will also be available at  
[www.epa.gov/R5Super/fiveyear/fyr\\_index.html](http://www.epa.gov/R5Super/fiveyear/fyr_index.html)

**THE**  
**THE FO**  
**KROGI**

February 14, 2007

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Circleville

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**DuPont Circleville**

**The Savings B**  
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842910

**ATTACHMENT 3 – FIVE YEAR REVIEW SITE INSPECTION CHECKLIST**

**FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST (Template)**

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION										
Site name: <u>Bowers Landfill</u>	Date of inspection: <u>6-28-07</u>									
Location and Region: <u>5</u>	EPA ID: <u>OHD980509616</u>									
Agency, office, or company leading the five-year review: <u>U.S. EPA, Region 5 / OEPA</u>	Weather/temperature: <u>77°F Cloudy</u>									
Remedy Includes: (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Landfill cover/containment  <input checked="" type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input type="checkbox"/> Other _____                             </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls                             </td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls							
<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls									
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached										
II. INTERVIEWS (Check all that apply)										
1. O&M site manager <u>Cummings / Ritter</u> <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 50%; text-align: center;">Name</td> <td style="width: 20%; text-align: center;">Title</td> <td style="width: 30%; text-align: center;">Date</td> </tr> <tr> <td colspan="3">                             Interviewed <input type="checkbox"/> at site    <input type="checkbox"/> at office    <input checked="" type="checkbox"/> by phone    Phone no. _____                         </td> </tr> <tr> <td colspan="3">                             Problems, suggestions; <input type="checkbox"/> Report attached _____                         </td> </tr> </table>		Name	Title	Date	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input checked="" type="checkbox"/> by phone    Phone no. _____			Problems, suggestions; <input type="checkbox"/> Report attached _____		
Name	Title	Date								
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input checked="" type="checkbox"/> by phone    Phone no. _____										
Problems, suggestions; <input type="checkbox"/> Report attached _____										
2. O&M staff _____ <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 50%; text-align: center;">Name</td> <td style="width: 20%; text-align: center;">Title</td> <td style="width: 30%; text-align: center;">Date</td> </tr> <tr> <td colspan="3">                             Interviewed <input type="checkbox"/> at site    <input type="checkbox"/> at office    <input type="checkbox"/> by phone    Phone no. _____                         </td> </tr> <tr> <td colspan="3">                             Problems, suggestions; <input type="checkbox"/> Report attached _____                         </td> </tr> </table>		Name	Title	Date	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____			Problems, suggestions; <input type="checkbox"/> Report attached _____		
Name	Title	Date								
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. _____										
Problems, suggestions; <input type="checkbox"/> Report attached _____										



III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	<b>O&amp;M Documents</b> <input checked="" type="checkbox"/> O&M manual G As-built drawings G Maintenance logs Remarks _____	G Readily available G Readily available G Readily available	<input checked="" type="checkbox"/> Up to date G Up to date G Up to date G N/A G N/A G N/A
2.	<b>Site-Specific Health and Safety Plan</b> <input checked="" type="checkbox"/> Contingency plan/emergency response plan Remarks _____	G Readily available G Readily available	<input checked="" type="checkbox"/> Up to date G Up to date G N/A G N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	G Readily available	<input checked="" type="checkbox"/> Up to date G N/A
4.	<b>Permits and Service Agreements</b> G Air discharge permit G Effluent discharge G Waste disposal, POTW G Other permits Remarks _____	G Readily available G Readily available G Readily available G Readily available	G Up to date G Up to date G Up to date G Up to date <del>G N/A</del> <del>G N/A</del> <del>G N/A</del> <del>G N/A</del>
5.	<b>Gas Generation Records</b> Remarks _____	G Readily available	G Up to date G N/A
6.	<b>Settlement Monument Records</b> Remarks _____	G Readily available	G Up to date <del>G N/A</del>
7.	<b>Groundwater Monitoring Records</b> Remarks _____	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date G N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	G Readily available	<input checked="" type="checkbox"/> Up to date G N/A
9.	<b>Discharge Compliance Records</b> G Air G Water (effluent) Remarks _____	G Readily available G Readily available	G Up to date G Up to date <del>G N/A</del> <del>G N/A</del>
10.	<b>Daily Access/Security Logs</b> Remarks _____	G Readily available	<input checked="" type="checkbox"/> Up to date G N/A



<b>C. Institutional Controls (ICs)</b>				
<b>1. Implementation and enforcement</b>				
Site conditions imply ICs not properly implemented		G Yes	<input checked="" type="checkbox"/> No	G N/A
Site conditions imply ICs not being fully enforced		G Yes	<input checked="" type="checkbox"/> No	G N/A
Type of monitoring (e.g., self-reporting, drive by) <u>drive by.</u>				
Frequency _____				
Responsible party/agency _____				
Contact _____				
	Name	Title	Date	Phone no.
Reporting is up-to-date		<input checked="" type="checkbox"/> Yes	G No	G N/A
Reports are verified by the lead agency		<input checked="" type="checkbox"/> Yes	G No	G N/A
Specific requirements in deed or decision documents have been met		<input checked="" type="checkbox"/> Yes	G No	G N/A
Violations have been reported		G Yes	<input checked="" type="checkbox"/> No	G N/A
Other problems or suggestions: G Report attached		_____		
_____		_____		
_____		_____		
<b>2. Adequacy</b>				
	<input checked="" type="checkbox"/> ICs are adequate	G ICs are inadequate	G N/A	
Remarks _____				
_____				
<b>D. General</b>				
<b>1. Vandalism/trespassing</b>				
G Location shown on site map		<input checked="" type="checkbox"/> No vandalism evident		
Remarks _____				
_____				
<b>2. Land use changes on site</b>				
		<input checked="" type="checkbox"/> N/A		
Remarks _____				
_____				
<b>3. Land use changes off site</b>				
		<input checked="" type="checkbox"/> N/A		
Remarks _____				
_____				
<b>VI. GENERAL SITE CONDITIONS</b>				
<b>A. Roads</b>				
<input checked="" type="checkbox"/> Applicable		G N/A		
<b>1. Roads damaged</b>				
G Location shown on site map		<input checked="" type="checkbox"/> Roads adequate		G N/A
Remarks _____				
_____				

<b>B. Other Site Conditions</b>			
Remarks _____ _____ _____ _____			
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Landfill Surface</b>			
1.	<b>Settlement (Low spots)</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input type="checkbox"/> Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depths _____	<input type="checkbox"/> Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input type="checkbox"/> Erosion not evident
4.	<b>Holes</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input type="checkbox"/> Holes not evident
5.	<b>Vegetative Cover</b> G Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	<input type="checkbox"/> Grass <input type="checkbox"/> Cover properly established	<input type="checkbox"/> No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<input type="checkbox"/> N/A	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Height _____	<input type="checkbox"/> Bulges not evident

8.	<b>Wet Areas/Water Damage</b> <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____ _____	<input type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	<b>Slope Instability</b> Areal extent _____ Remarks _____ _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
<b>B. Benches</b> <input type="checkbox"/> Applicable <input type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	<b>Flows Bypass Bench</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
2.	<b>Bench Breached</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
3.	<b>Bench Overtopped</b> Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
<b>C. Letdown Channels</b> <input type="checkbox"/> Applicable <input type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	<b>Settlement</b> Areal extent _____ Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2.	<b>Material Degradation</b> Material type _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Areal extent _____	<input type="checkbox"/> No evidence of degradation
3.	<b>Erosion</b> Areal extent _____ Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion

4.	<b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	<input type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Good condition
	<input type="checkbox"/> N/A		<input type="checkbox"/> Needs Maintenance
	Remarks _____		
2.	<b>Gas Monitoring Probes</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
3.	<b>Monitoring Wells (within surface area of landfill)</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed
			<input type="checkbox"/> N/A
	Remarks _____		

<b>E. Gas Collection and Treatment</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Gas Treatment Facilities</b>	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	
	Remarks	_____		
	_____			
2.	<b>Gas Collection Wells, Manifolds and Piping</b>	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	
	Remarks	_____		
	_____			
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
	Remarks	_____		
	_____			
<b>F. Cover Drainage Layer</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Outlet Pipes Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
	Remarks	_____		
	_____			
2.	<b>Outlet Rock Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
	Remarks	_____		
	_____			
<b>G. Detention/Sedimentation Ponds</b>			<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Siltation</b> Areal extent _____	Depth _____	<input type="checkbox"/> N/A	
	<input checked="" type="checkbox"/> Siltation not evident			
	Remarks	_____		
	_____			
2.	<b>Erosion</b> Areal extent _____	Depth _____		
	<input checked="" type="checkbox"/> Erosion not evident			
	Remarks	_____		
	_____			
3.	<b>Outlet Works</b>	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
	Remarks	_____		
	_____			
4.	<b>Dam</b>	<input type="checkbox"/> Functioning	<input checked="" type="checkbox"/> N/A	
	Remarks	_____		
	_____			

<b>H. Retaining Walls</b>			G Applicable	<del>X</del> N/A
1.	<b>Deformations</b>	G Location shown on site map	G Deformation not evident	
	Horizontal displacement _____		Vertical displacement _____	
	Rotational displacement _____			
	Remarks _____			
2.	<b>Degradation</b>	G Location shown on site map	G Degradation not evident	
	Remarks _____			
<b>I. Perimeter Ditches/Off-Site Discharge</b>			G Applicable	G N/A
1.	<b>Siltation</b>	G Location shown on site map	G Siltation not evident	
	Areal extent _____		Depth _____	
	Remarks _____			
2.	<b>Vegetative Growth</b>	G Location shown on site map	G N/A	
	G Vegetation does not impede flow			
	Areal extent _____		Type _____	
	Remarks _____			
3.	<b>Erosion</b>	G Location shown on site map	G Erosion not evident	
	Areal extent _____		Depth _____	
	Remarks _____			
4.	<b>Discharge Structure</b>	G Functioning	G N/A	
	Remarks _____			
<b>VIII. VERTICAL BARRIER WALLS</b>			G Applicable	<del>X</del> N/A
1.	<b>Settlement</b>	G Location shown on site map	G Settlement not evident	
	Areal extent _____		Depth _____	
	Remarks _____			
2.	<b>Performance Monitoring</b>	Type of monitoring _____		
	G Performance not monitored			
	Frequency _____		G Evidence of breaching	
	Head differential _____			
	Remarks _____			

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____ _____	<input type="checkbox"/>	<input type="checkbox"/>
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____	<input type="checkbox"/>	<input type="checkbox"/>
3.	<b>Spare Parts and Equipment</b> <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____	<input type="checkbox"/>	<input type="checkbox"/>
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____	<input type="checkbox"/>	<input type="checkbox"/>
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____	<input type="checkbox"/>	<input type="checkbox"/>
3.	<b>Spare Parts and Equipment</b> <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____	<input type="checkbox"/>	<input type="checkbox"/>

<b>C. Treatment System</b>		G Applicable	<del>X</del> N/A
1.	<b>Treatment Train (Check components that apply)</b>		
	G Metals removal	G Oil/water separation	G Bioremediation
	G Air stripping	G Carbon adsorbers	
	G Filters _____		
	G Additive (e.g., chelation agent, flocculent) _____		
	G Others _____		
	G Good condition	G Needs Maintenance	
	G Sampling ports properly marked and functional		
	G Sampling/maintenance log displayed and up to date		
	G Equipment properly identified		
	G Quantity of groundwater treated annually _____		
	G Quantity of surface water treated annually _____		
	Remarks _____		
2.	<b>Electrical Enclosures and Panels (properly rated and functional)</b>		
	G N/A	G Good condition	G Needs Maintenance
	Remarks _____		
3.	<b>Tanks, Vaults, Storage Vessels</b>		
	G N/A	G Good condition	G Proper secondary containment G Needs Maintenance
	Remarks _____		
4.	<b>Discharge Structure and Appurtenances</b>		
	G N/A	G Good condition	G Needs Maintenance
	Remarks _____		
5.	<b>Treatment Building(s)</b>		
	G N/A	G Good condition (esp. roof and doorways)	G Needs repair
	G Chemicals and equipment properly stored		
	Remarks _____		
6.	<b>Monitoring Wells (pump and treatment remedy)</b>		
	<del>X</del> Properly secured/locked	<del>X</del> Functioning	<del>X</del> Routinely sampled
	<del>X</del> All required wells located	G Needs Maintenance	<del>X</del> Good condition
			G N/A
	Remarks _____		
<b>D. Monitoring Data</b>			
1.	<b>Monitoring Data</b>		
	<del>X</del> Is routinely submitted on time	G Is of acceptable quality	
2.	<b>Monitoring data suggests:</b>		
	<del>X</del> Groundwater plume is effectively contained	<del>X</del> Contaminant concentrations are declining	

D. Monitored Natural Attenuation	
1.	<p><b>Monitoring Wells (natural attenuation remedy)</b></p> <p><input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition</p> <p><input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A</p> <p>Remarks _____</p>
X. OTHER REMEDIES	
<p>If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.</p>	
XI. OVERALL OBSERVATIONS	
A.	Implementation of the Remedy
<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p>Containment remedy for Powers Landfill.  Cover system, monitoring wells inspected by  OEPA twice a year (April, October).  GW monitoring once a year.  Last monitoring report from April, 2007.</p>	
B.	Adequacy of O&M
<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p>Monitoring adequate.  Need to continue monitoring wells between the  site and Scioto River. Cadmium level in one well  exceeds MCL.</p>	

**C. Early Indicators of Potential Remedy Problems** *N/A*

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

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**D. Opportunities for Optimization** *N/A*

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

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**ATTACHMENT 4 – BOWERS DEED RESTRICTIONS**

BOWERS DEED RESTRICTIONS

The record owner, Ellen J. Bowers as Executrix for the Estate of John N. Bowers ("Owner"), hereby imposes restrictions on the real property, which real property includes the Bowers Landfill Superfund Site and adjacent property, and which real property is located in rural Pickaway County, Ohio, approximately 2.5 miles north of the City of Circleville, Ohio (hereafter "the Real Property"). The Real Property is more fully described as follows:

Situated in the Township of Circleville, County of Pickaway, State of Ohio and being part of Fractional Section 3, Township 4, Range 22 bounded and described as follows:

Being part of the residue of the 202 acres and 4 pole tract conveyed to John N. Bowers by deed recorded in Deed Book 156, Page 339 in the Pickaway County Recorder's Office.

Beginning at a 1/2" rebar found in the North line of section 3 being Northwest corner of a 3.16 acre tract of S. & D. Properties, Inc. and said to be 931.52 westerly from the point of intersection of the North line of Section 3 with the centerline of Island Rd; thence with the West line of said 3.16 acre tract S7°20'49"E. 156.34 feet to an iron pin found at the Southwest corner to said 3.16 acre tract; thence on a new line S17°15'58" E. 526.56 feet to an iron pin found at the corner of S. & D. Properties, Inc. 6.449 acre tract; thence with the West line of same S14°24'57" E. 627.23 feet to an iron pin found at the Southwest corner of said 6.449 acre tract; thence with nine new lines through said tract the following calls; S13°40'48" E. 340.79 feet to an iron pin set; thence S25°38'10" E. 134.52 feet to an iron pin set; thence S11°26'06" E. 426.80 feet to an iron pin set; thence S21°27'56" E. 494.61 feet to a 3" steel fence post; thence N59°07'19" W. 734.20 feet to an iron pin set; thence N74°32'05" W. 288.44 feet to an iron pin set; thence N46°51'53" W. 395.10 feet to an iron pin set; thence N29°16'27" W. 1220.48 feet; thence N 17°32'23" W. 917.67 feet to a 1/2" x 15" long bolt found on the East bank of the Scioto River being in the North line of Section 3 and the above referenced 202 acres and 4 pole tract; thence with said North line S87°07'10" E. 1334.66 feet to the place of beginning. Containing 60.404 acres, more or less. Subject to all existing valid rights-of-way of record.

The following restrictions are imposed upon the Real Property, its present and any future owners (including the heirs to the Estate of John N. Bowers), their

authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health and the environment, preventing interference with the performance and the maintenance, of any response action selected and/or undertaken by the United States Environmental Protection Agency ("U.S. EPA"), or any action under the oversight of U.S. EPA and/or the Ohio Environmental Protection Agency ("OEPA"), pursuant to Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), 42 U.S.C. Section 9601 et seq. Specifically, the following deed restrictions shall apply to the Real Property:

A. There shall be no consumptive or other use of the groundwater underlying the Real Property that could cause exposure of humans or animals to the groundwater underlying the Real Property;

B. There shall be no use of, or activity at, the Real Property that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof, including, without limitation, operation and maintenance of such response action) selected and/or undertaken by U.S. EPA and/or Ohio Environmental Protection Agency (Ohio EPA), or any party acting under the oversight of U.S. EPA and/or Ohio EPA, except with the written approval of U.S. EPA, and Ohio EPA, and consistent with all statutory and regulatory requirements;

C. There shall be no residential, commercial, agricultural or recreational use of the Real Property including, but not limited to, any construction of residences, excavation, grading, filling, drilling, mining or other construction or development, farming, placing of any waste material at any portion of the property or any other activity. Upon the written request of Owner, the Ohio EPA, in its unreviewable discretion, may provide written permission to Owner for recreational use of the Real Property, subject to any limitations established by Ohio EPA, provided that no permission allowing a use shall override a prohibition against such use established by the U.S. EPA, or otherwise established by federal, state or local law.

D. There shall be no use of the Real Property that would allow the

continued presence of humans at the Real Property, other than any presence necessary for implementation of any response actions (or any component thereof, including, without limitation, operation and maintenance of such response action) selected and/or undertaken by U.S. EPA and/or the Ohio EPA, or any party acting under the oversight of U.S. EPA and/or OEPA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the Real Property includes, but is not limited to, recreational use;

E. There shall be no installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the Real Property except as approved, in writing, by Ohio EPA and U.S. EPA; and

F. There shall be no tampering with, or removal of, the containment or monitoring systems that remain on the Real Property as a result of the performance of any response action (or any component thereof, including, without limitation, operation and maintenance of such response action) which is selected and/or undertaken by U.S. EPA and/or the Ohio EPA, or any party acting under the oversight of U.S. EPA and/or OEPA

The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as the Ohio EPA files with the Court a written certification stating:

1. The response action required at, under or adjacent to the Real Property by any consent decree or judicial or administrative order, entered pursuant to CERCLA, has been fully performed;
2. No other response actions are planned for the Real Property; and
3. The above restrictions are no longer necessary to meet the purposes of the consent decree filed in State of Ohio ex rel. Betty D. Montgomery v. E.I. DuPont De Nemours and Company, et.al, Case No. C2 96-783, United States District Court for the Southern District of Ohio.

FOR THE ESTATE OF JOHN N. BOWERS:

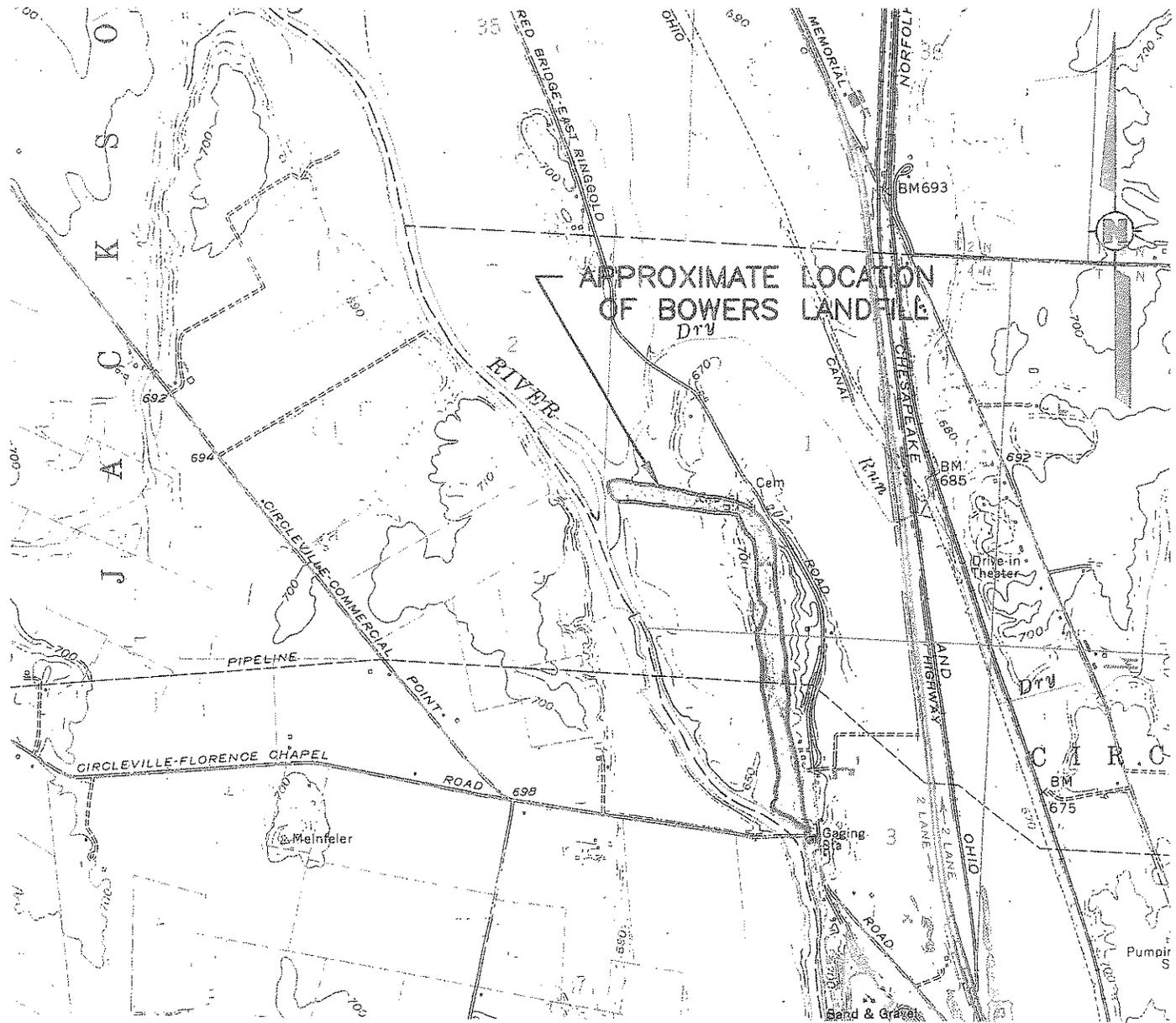
*Ellen J. Bowers, Executrix*  
ELLEN J. BOWERS, as Executrix of The Estate  
of John N. Bowers

IN WITNESS WHEREOF, has caused these Deed Restrictions to be executed this 16<sup>th</sup>  
day of October, 1996.

STATE OF OHIO, PICKAWAY COUNTY Sworn to and subscribed before me, a  
Notary Public in and for said State and County this 16<sup>th</sup> day of October, 1996



John E. Brown  
NOTARY PUBLIC STATE of Ohio  
MY COMMISSION EXPIRES:  
lifetime Commission



**FIGURE 1**  
**SITE LOCATION MAP**  
**BOWERS LANDFILL**  
**CIRCLEVILLE, OH**

PREPARED FOR  
**E.I. du PONT de NEMOURS AND CO.**  
**WILMINGTON, DE**  
 AND  
**PPG INDUSTRIES, INC.**  
**PITTSBURGH, PA**

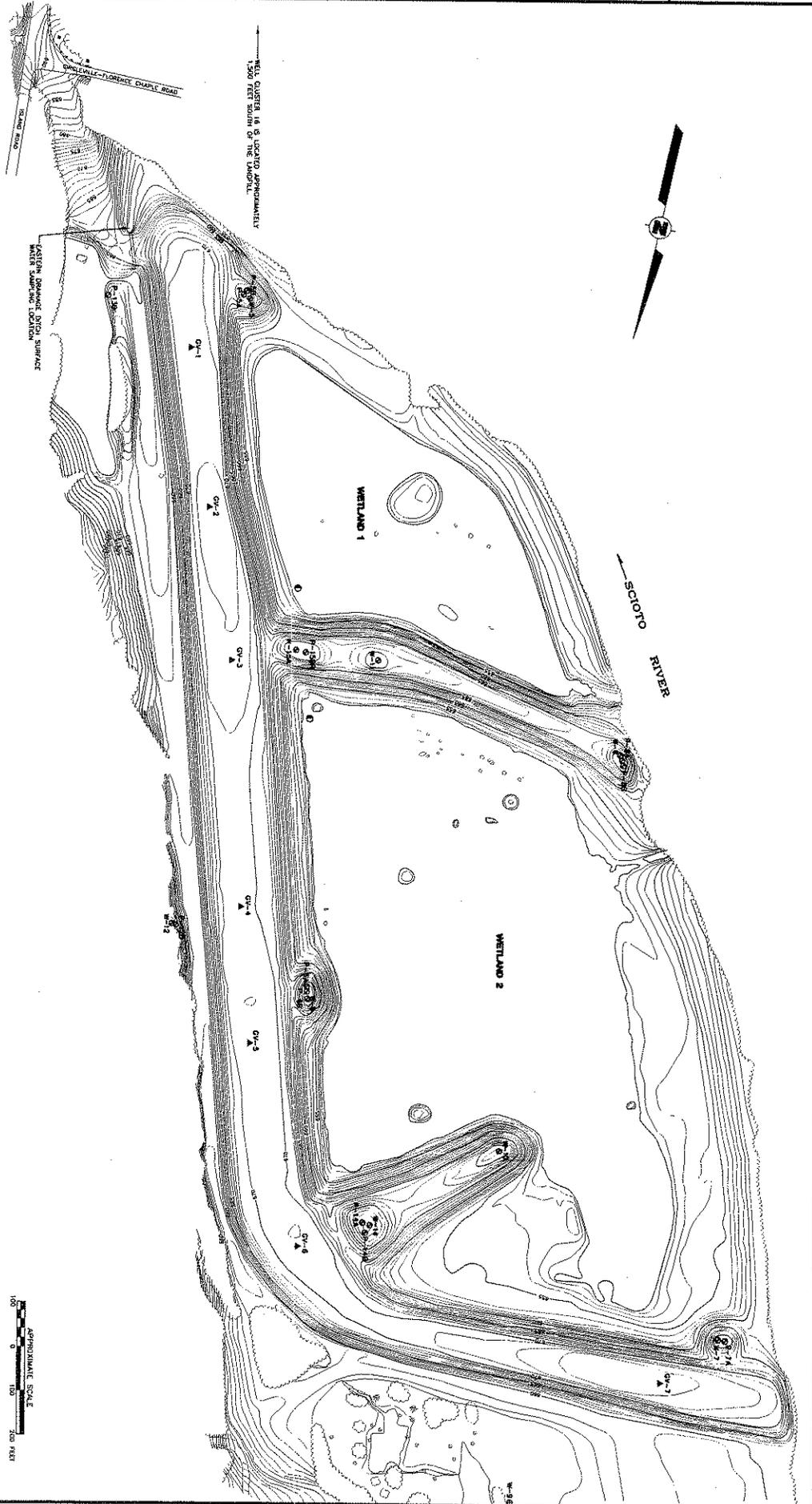
**CUMMINGS**  
**RITER**  
**CONSULTANTS, INC.**

**DRAWING NUMBER**  
**93115A4**

<b>DRAWN BY:</b>	<i>B. HEINACK</i>	<b>DATE:</b>	6-24-93
<b>CHECKED BY:</b>	<i>D. SPICUZZA</i>	<b>DATE:</b>	6-24-93
<b>APPROVED BY:</b>	<i>P. O'HARA</i>	<b>DATE:</b>	6-24-93

**REFERENCE:**  
 7.5 MIN. U.S.G.S. TOPOGRAPHIC MAP  
 OF ASHVILLE, OH QUADRANGLE,  
 DATED: 1958, PHOTOREVISED: 1970,  
 SCALE: 1"=2000'

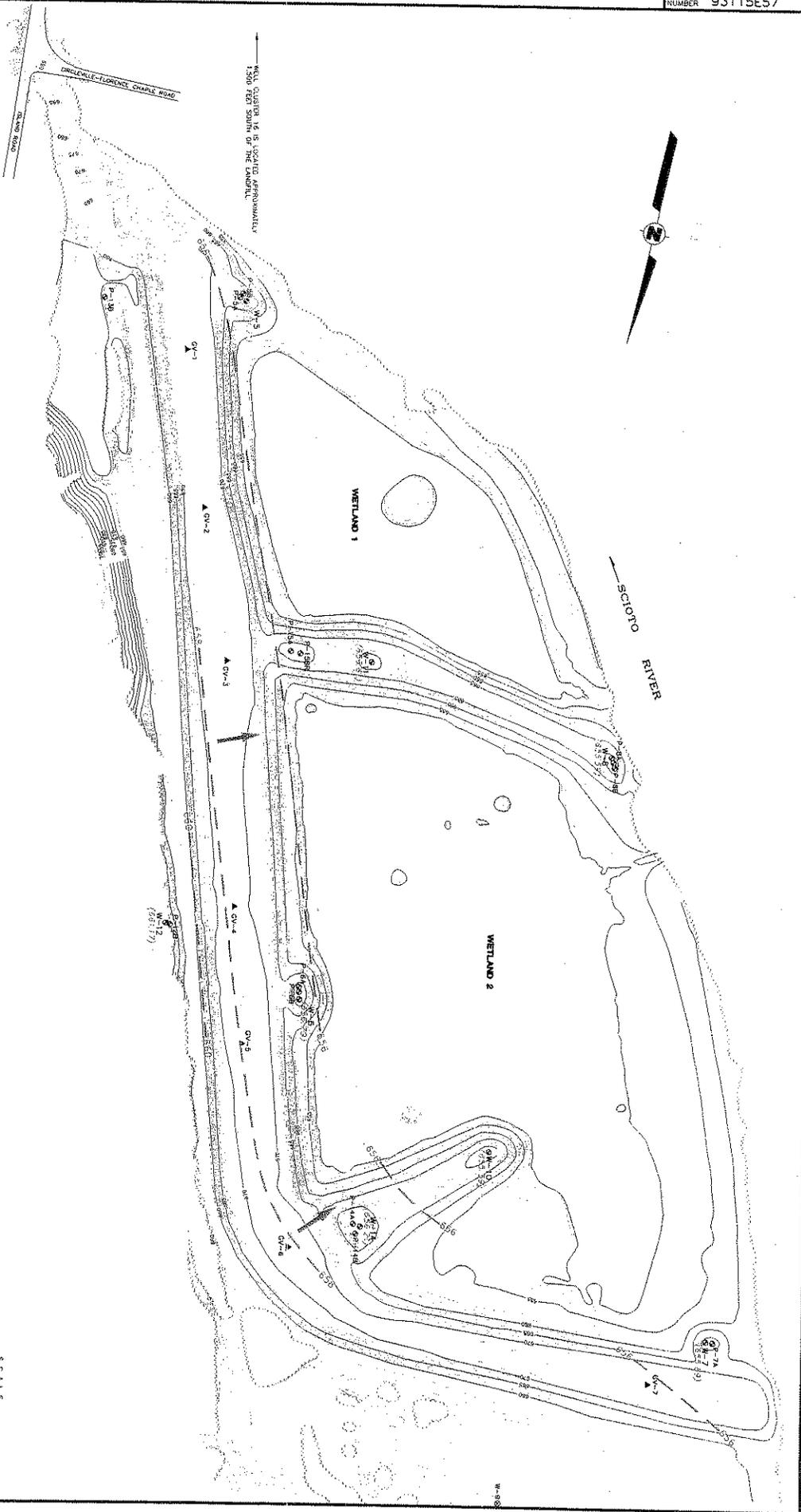
REVISION	DATE	DESCRIPTION



**LEGEND**

- P-100 APPROXIMATE MONITORING WELL LOCATION
- OW-1 APPROXIMATE GAS PORT LOCATION
- M-88 ABANDONED MONITORING WELL
- APPROXIMATE LOCATIONS OF WETLAND 1 AND WETLAND 2 SURFACE WATER SAMPLES

REFERENCE:  
 FEDERAL REGISTER, VOLUME 58, NUMBER 100, APRIL 23, 1993, 27000-27001, 27002-27003, 27004-27005, 27006-27007, 27008-27009, 27010-27011, 27012-27013, 27014-27015, 27016-27017, 27018-27019, 27020-27021, 27022-27023, 27024-27025, 27026-27027, 27028-27029, 27030-27031, 27032-27033, 27034-27035, 27036-27037, 27038-27039, 27040-27041, 27042-27043, 27044-27045, 27046-27047, 27048-27049, 27050-27051, 27052-27053, 27054-27055, 27056-27057, 27058-27059, 27060-27061, 27062-27063, 27064-27065, 27066-27067, 27068-27069, 27070-27071, 27072-27073, 27074-27075, 27076-27077, 27078-27079, 27080-27081, 27082-27083, 27084-27085, 27086-27087, 27088-27089, 27090-27091, 27092-27093, 27094-27095, 27096-27097, 27098-27099, 27100-27101, 27102-27103, 27104-27105, 27106-27107, 27108-27109, 27110-27111, 27112-27113, 27114-27115, 27116-27117, 27118-27119, 27120-27121, 27122-27123, 27124-27125, 27126-27127, 27128-27129, 27130-27131, 27132-27133, 27134-27135, 27136-27137, 27138-27139, 27140-27141, 27142-27143, 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W-11 0 APPROXIMATE CENTER POINT OF WELL CLUSTER WITH SEA LEVEL  
 (9331677)  
 W-12 0 APPROXIMATE GAS TAP LOCATION  
 W-13 0 APPROXIMATE WELL LOCATION  
 W-14 0 APPROXIMATE WELL LOCATION  
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 W-100 0 APPROXIMATE WELL LOCATION

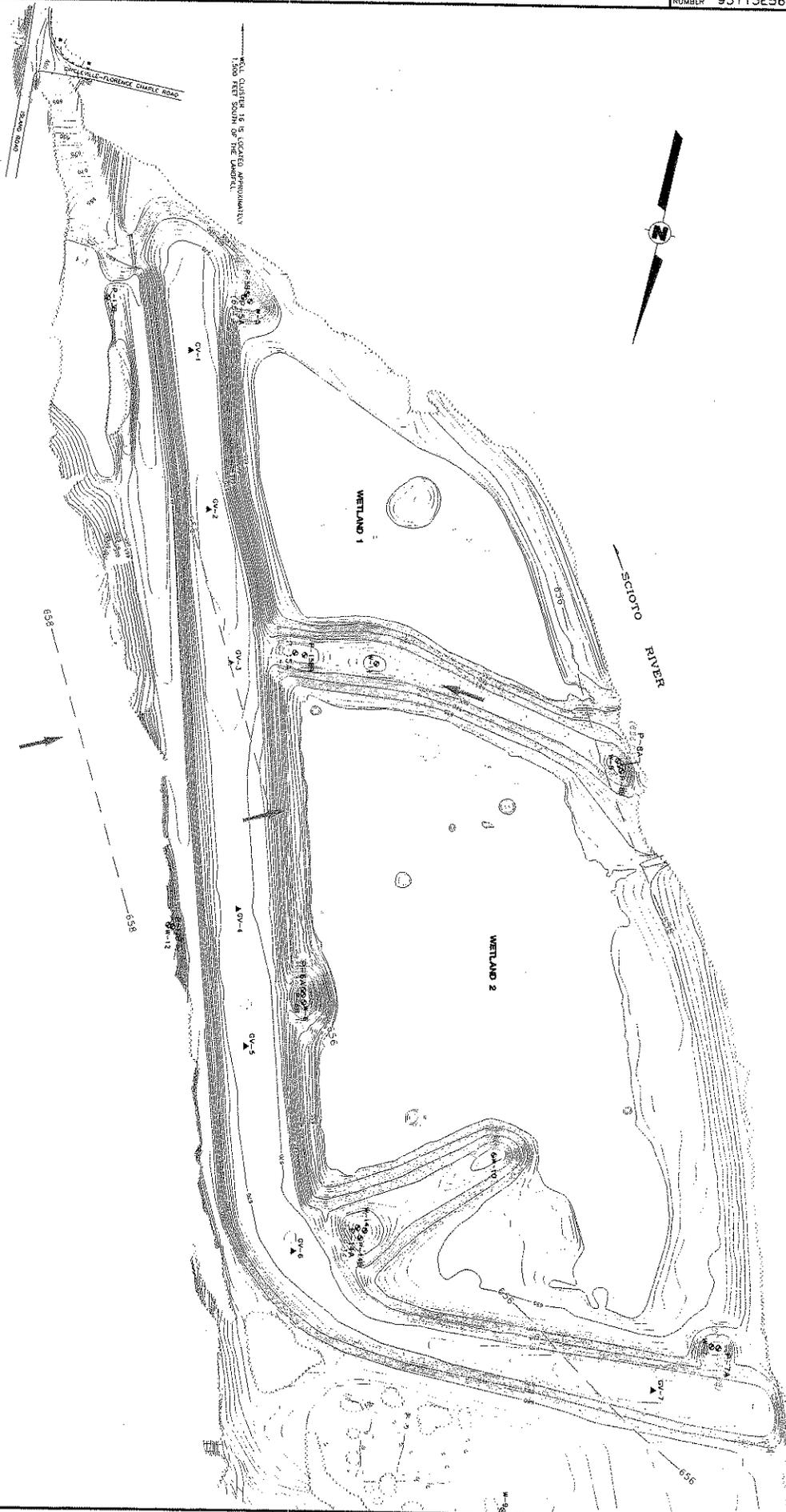
P-44 0 APPROXIMATE WELL LOCATION  
 (933177)



**GUMMINS**  
 CONSULTING ENGINEERS  
 1000 W. 10th Street  
 Columbus, OH 43260  
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NO.	REVISION	DATE	APPROVED
1	ISSUED FOR PERMIT	5-15-07	C.C. COV
2	REVISED	8-29-07	C.C. COV
3	REVISED	8-29-07	C.C. COV

FIGURE 3  
 PHASE I SURFACE MAP  
 SHELTON UNIT - 4/16/07  
 E.I. du PONT de NEMOURS AND CO., INC.  
 WASHINGTON, DELAWARE  
 RITESH AND ASSOCIATES, INC.  
 INDIANAPOLIS, INDIANA  
 SCALE AS SHOWN  
 SHEET 1 OF 1



**LEGEND**

- P-144 ○ PROPOSED MONITORING WELL LOCATED WITH SEA LEVEL
- CV-1 ○ PRELIMINARY SURFACE ELEVATION OF ABOVE WITH SEA LEVEL
- W-8 ○ APPROXIMATE WELL LOCATION
- — — — — PROPOSED SURFACE CONTOUR
- — — — — UNDRAINAGE FLOW DIRECTION

**NOTE**

1. ELEVATIONS ON THIS MAP ARE BASED ON THE NATIONAL DATUM. THE VERTICAL DATUM IS THE MEAN SEA LEVEL DATUM. THE HORIZONTAL DATUM IS THE NAD 83 DATUM.

THIS DRAWING IS A LOCATED APPROXIMATION. THIS MEANS THAT THE LOCATION OF THE MONITORING WELL IS APPROXIMATE.

P-144 558  
CV-1 558  
CV-2 558  
CV-3 558  
CV-4 558  
CV-5 558  
CV-6 558

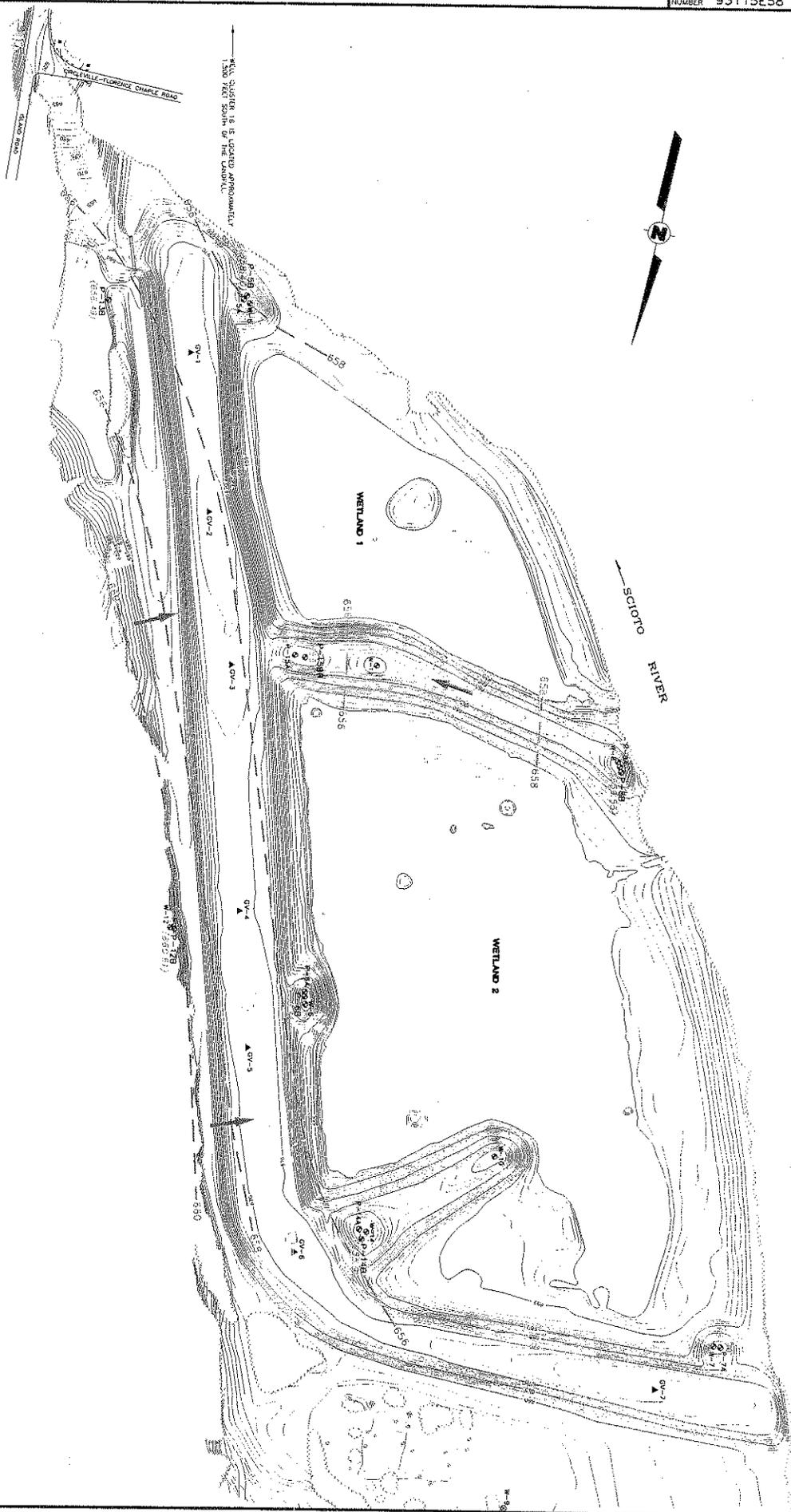


**GUMMINS**  
PITTSBURGH, PENNSYLVANIA  
CONSULTING ENGINEERS  
INC.  
1000 W. 10TH ST., SUITE 100  
PITTSBURGH, PA 15204  
TEL: (412) 241-7800

REV.	DESCRIPTION	DATE	APPROVED
1	ISSUED FOR PERMIT	6-16-07	
2	REVISED PER COMMENTS	6-22-07	
3	REVISED PER COMMENTS	6-25-07	

DESIGNED BY: J.M. GILSON  
CHECKED BY: C.C. COE  
APPROVED BY: C.L. MOY

FIGURE 4  
PHYSICAL SURFACE MAP  
INTERIM/ALTERNATIVE  
DESIGN/CONCEPT  
E.I. DU PONT DE NEMOURS AND CO., INC.  
PITTSBURGH, PENNSYLVANIA  
93115E56  
SHEET 1 OF 1



LEGEND

- P-1-100 ○ APPROXIMATE MONITORING WELL LOCATION WITH (P-1-100) SURFACE ELEVATION (FT. ABOVE MEAN SEA LEVEL)
- APPROXIMATE DGS WELL LOCATION
- APPROXIMATED MONITORING WELL
- FIBROBLAST SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION

NOTE

1. BASED ON WATER ELEVATIONS IN WELL P-1-100 DURING THE MONITORING PERIOD, THE SCIO TO RIVER UNDOUBTEDLY FLOWS FROM WEST TO EAST UNDER NORMAL FLOW CONDITIONS.

P-44



**CHUMINGS**  
**PITTSBURGH**  
 CONSULTANTS, INC.  
 1000 EAST 10TH AVENUE  
 SUITE 1000  
 PITTSBURGH, PA 15203  
 PH: (412) 261-7500

NO.	REVISIONS	DATE	APPROVED
1	ISSUED FOR PERMIT	5-15-07	
2	REVISED FOR COMMENTS	6-25-07	
3	REVISED FOR COMMENTS	6-25-07	
4	REVISED FOR COMMENTS	6-25-07	
5	REVISED FOR COMMENTS	6-25-07	
6	REVISED FOR COMMENTS	6-25-07	
7	REVISED FOR COMMENTS	6-25-07	
8	REVISED FOR COMMENTS	6-25-07	
9	REVISED FOR COMMENTS	6-25-07	
10	REVISED FOR COMMENTS	6-25-07	

**FIGURE 5**  
**PNEUMATIC SURFACE MAP**  
**DIER UNIT - 4/16/07**  
 EL 46 POND AT PETERS AND CO., INC.  
 WASHINGTON, OHIO  
 PITSBURGH, OHIO, INDIANA  
 SCALE AS SHOWN  
 SHEET 1 OF 1