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DECEMBER 2002
SURFACE WATER MONITORING REPORT
FOR WASHINGTON WORKS FACILITY AND
LOCAL, LETART AND DRY RUN LANDFILLS
WASHINGTON, WV

Date: February 2003

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CORPORATE REMEDIATION GROUP

*An Alliance between
DuPont and URS Diamond*

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1.0 INTRODUCTION

A multi-media consent order (Order No. GWR-2001-019) was entered into between the West Virginia Department of Environmental Protection (WVDEP), the West Virginia Department of Health and Human Resources – Bureau for Public Health (WVDHHR-BPH) and DuPont on November 15, 2001 (Consent Order). The Consent Order identified a series of requirements and tasks to be performed by the parties to determine whether there has been an impact on human health and the environment as a result of releases of ammonium perfluorooctanoate (C-8), CAS Number 3825-26-1, to the environment from DuPont operations at the Washington Works facility and the associated landfills (Local, Letart and Dry Run).

The Consent Order established the C-8 Groundwater Investigation Steering Team (GIST) to oversee investigations and activities that will be conducted to assess the presence and extent of C-8 in drinking water, groundwater, and surface water at and around the Washington Works facility and the Local, Letart and Dry Run Landfills.

An additional component of the Consent Order relates to the West Virginia National Pollutant Discharge Elimination System (WV NPDES) permit sampling requirements. In this portion of the Consent Order, specific outfalls and outlets (outfalls) are to be sampled monthly for C-8 by DuPont.

Pursuant to Attachment A of the Consent Order, three tasks were performed by DuPont and evaluated by the GIST, Tasks A, B, and C. Task A: Groundwater Use and Well Survey/Groundwater Monitoring was completed (DuPont, 2002a; 2002b). Task B: Assessment of Existing Groundwater and Surface Water Monitoring Data included compiling of historical C-8 data, monitoring all wells at the landfills and developing a Groundwater Monitoring Plan (GMP) for the Washington Works facility. The first part of the task, the historical C-8 data compilation report was submitted to the GIST for evaluation (DuPont, 2002c). The second part of this task, monitoring C-8 in groundwater at the landfills, began in December 2001, and was performed monthly for four months and quarterly thereafter. The third part of the task, developing a GMP for the Washington Works facility, was submitted to the GIST (DuPont, 2002d). Groundwater sampling at the Washington Works facility began in January 2002, and was conducted monthly for four months and quarterly thereafter. Task C: Plume Identification/Groundwater Assessment is ongoing.

This report presents the results of the monthly (December 2002) C-8 surface water sampling that was performed in December 2002 at the Washington Works facility, and the Local, Letart, and Dry Run Landfills.

2.0 C-8 ANALYTICAL REPORTING

The analytical method, method detection limit, and laboratory utilized for C-8 analysis have changed over time. Prior to 1991, DuPont performed C-8 analysis at the DuPont Experimental Station in Wilmington, Delaware. In 1991, when the RCRA Verification Investigation was conducted, the analysis was contracted to the CH₂MHill Laboratory in Montgomery, Alabama. Both labs used a Gas Chromatography/Electron Capture Detector (GC-ECD) based analytical method with detection limits for C-8 that ranged from 0.1 to 1.0 ug/l.

CH₂MHill conducted C-8 analysis for DuPont into the fall of 1998 when the laboratory ceased operation. The C-8 analytical work was transferred to Lancaster Laboratories, Lancaster, PA, in March 1999. Lancaster Laboratories continued to conduct C-8 analysis using GC-ECD for DuPont until October 2001, when development and testing was completed on a new analytical method developed by Exygen Research, Inc. (Exygen; located in State College, PA) that utilizes Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). DuPont adopted the regular use of LC/MS/MS for C-8 analysis in water in November 2001 and Exygen was contracted to perform the analyses for DuPont.

Exygen reports C-8 results for the laboratory replicate of each field sample. These results are evaluated for precision by comparing the field sample result to the corresponding laboratory replicate result.

- ☐ If both results are less than the practical quantitation limit (PQL), the replicate sample for that analyte is considered to have passed the precision criteria.
- ☐ If one or both results are between one and five times the PQL, the replicate is considered to have met the precision criteria if the two results differ by less than the PQL.
- ☐ If one result is less than the PQL and the other is not, and if the two results differed by a value less than the PQL, the replicate is said to have met the acceptance criteria.
- ☐ If both results are at least five times the PQL, the replicate is considered to have met the criteria if the relative percent difference (RPD) between the two results is less than or equal to 20%. The RPD is the absolute value of the difference of two measurements divided by their average.

When the precision criteria outlined above are met, Exygen reports the average of the field sample and lab replicate results reported by the laboratory. If criteria for precision are exceeded, Exygen reports the higher of the sample and lab replicate results. Finally, when one result (from the sample/lab replicate pair) is above the PQL and one below, the result that is above the PQLs is reported. C-8 results are recorded in the Corporate Environmental Database (CED) and are reported as FC-143 for consistency with historical results.

An aliquot of each field sample is also analyzed as a matrix spike (MS). Results of the MS analysis are used to assess accuracy. The MS recovery value must fall between 70 to

130%, unless the sample concentration is at least four times the amount spiked. The maximum amount used to spike field samples is 500 ug/L.

All data packages generated by Exygen are reviewed in-house for compliance with the laboratory Standard Operating Procedures (SOP) and data usability, using the checklist provided in the QAPP. Results of the in-house review indicate that data reported by Exygen have been generated in compliance with the laboratory SOP, with few exceptions as noted in the individual review summaries. All data reported by Exygen have been judged usable for the purposes of the project.

3.0 WASHINGTON WORKS FACILITY

Figure 1.0 shows the location of the Washington Works facility. On December 9, 2002, six outfalls were sampled for C-8 (001, 002, 003, 005, 007, and 105). All of these outfalls collect process water and stormwater runoff. No other changes to routine sampling protocols or other observations were recorded in the field notes during this sampling event. Monthly sampling of these outfalls is required by the Consent Order and WV NPDES permit No. WV0001279. The locations of these outfalls are shown in Figure 1.1.

Table 1.0 provides the C-8 analytical results for surface water. For each sampling point listed in the table, historical data is summarized with the most recent results listed first. Figure 1.2 presents the C-8 concentration map for the outfalls sampled in December. Laboratory analytical data reports and the Chain-of-Custody records are included in Appendix A and B, respectively.

4.0 LOCAL LANDFILL

Figure 2.0 shows the location of the Local Landfill. Monthly sampling of five outfalls is required by the Consent Order and the WV NPDES permit No. WV0076538. These five outfalls collect stormwater runoff. On December 13, 2002, 004(Old), 004(New), and 005(Old)/SS1, and 005(New) were sampled for C-8. Outfall 101 was sampled for C-8 on December 16, 2002. An additional point, Outlet LM1 (Leachate), was also sampled on December 16, 2002. This point is a bi-annual permit required monitoring point. On the chain of custody, this point was labeled Leachate Inlet 002. The locations of these six outfalls are shown in Figure 2.1.

Table 2.0 presents the C-8 analytical results for the December surface water samples. The table includes the historic data available for each location sampled. The data are presented with the most recent data first. Figure 2.2 presents the C-8 concentration map for the outfalls sampled in December. Laboratory analytical data reports and Chain-of-Custody records are provided in Appendices C and D, respectively.

5.0 LETART LANDFILL

Figure 3.0 presents the Letart Landfill location map. Monthly sampling of Outfalls 002 and 003 (both containing stormwater runoff) and Cap Runoff (which collects leachate and stormwater runoff) is required by the Consent Order. The location of Outfall 002, Outfall 003, and the Cap Runoff samples are shown in Figure 3.1. On December 30, 2002, sampling was conducted at Outfall 002, and Cap Runoff. Sampling was attempted at Outfall 003 but no-flow conditions were encountered at the time of sampling.

The C-8 results for the December surface water are presented in Table 3.0. For each sampling point listed in the table, historical data is summarized with the most recent results listed first. In the September 2002 monthly monitoring report, a sample taken on 9/27/02 for the Cap Runoff surface water location, was inadvertently named Stormwater Runoff. The incorrect name was carried through the October/Q402 and November 2002 monthly monitoring reports. This data point has been moved to the correct chronological spot under Cap Runoff in Table 3.0.

Figure 3.2 presents the C-8 concentration map for the outfalls sampled in December. Appendices E and F present the laboratory analytical data reports and the Chain-of-Custody records, respectively.

6.0 DRY RUN LANDFILL

Figure 4.0 shows the location of the Dry Run Landfill. Monthly sampling of Outfalls 001, 003, and 004 is required by the Consent Order and WV NPDES permit No. WV0076244. (Outfall 002 is a required outfall sampling location as stated in WV NPDES permit No. WV0076244. However, it was a temporary relocation of Outfall 001 and no longer exists). Outfall 001 collects stormwater and leachate. Outfalls 003 and 004 collect stormwater only. The locations of the surface water sampling points are shown in Figure 4.1. On December 30, 2002, Outfall 001 was sampled. During the month of December, Outfalls 003 and 004 were not sampled due to no-flow conditions.

Table 4.0 presents the C-8 analytical results for the December surface water samples. For each sampling point listed in the table, historical data are summarized with the most recent results presented first. Figure 4.2 presents the C-8 concentration map for the outfall sampled in December. Laboratory analytical data reports and Chain-of-Custody records are provided in Appendices G and H, respectively.

7.0 REFERENCES

- DuPont. 2002a. *One-Mile Radius Survey and C-8 Sampling Report and Ohio River Public Water Supply Sampling, DuPont Washington Works (December 2001-February 2002)* January 2002. DuPont Corporate Remediation Group and URS Diamond.
- DuPont. 2002b. *Two-Mile Radius Survey and C-8 Sampling, DuPont Washington Works Facility/Local Landfill, West Virginia (March-May 2002)* August 2002. DuPont Corporate Remediation Group and URS Diamond.
- DuPont. 2002c. *Compilation of Historical C-8 Data, DuPont Washington Works Main Plant and Landfills* January 2002. DuPont Corporate Remediation Group and URS Diamond.
- DuPont. 2002d. *Proposed Groundwater Monitoring Plan for Washington Works Facility Plant and Landfills* January 2002. DuPont Corporate Remediation Group and URS Diamond.

TABLES

Table 1.0
Summary of Analytical Results:
C-8 in Surface Water
DuPont Washington Works Facility
Washington, WV

Sample	Date	C-8 (ug/l)
OUTLET 001	12/9/02	9.76
	11/13/02	17.0
	10/18/02	10.5
	9/24/02	2.15
	8/27/02	2.94
	7/23/02	8.63
	6/25/02	17.9
	5/20/02	22.4
	4/16/02	19.7
	3/19/02	21.4
	2/5/02	9.43
	1/17/02	10.9
	12/20/01	3.720
OUTFALL 002	12/9/02	2.37
	11/13/02	4.75
	11/13/02 (dup)	5.28
	10/18/02	3.49
	9/24/02	2.14
	8/27/02	2.56
	8/27/02 (dup)	2.51
	7/23/02	2.29
	6/25/02	3.86
	6/25/02 (dup)	3.81
	5/20/02	4.13
	4/16/02	2.45
	3/19/02	5.85
	2/5/02	4.66
	1/17/02	4.23
	12/20/01	1.980
	11/26/01*	4.84
	10/25/01	2.8
	9/19/01	0.118
	7/11/01	0.558
	6/14/01	0.594
	5/31/01	0.436
	4/11/01	1.5
	3/21/01	8.54
	2/14/01	1.74
OUTLET 003	12/9/02	0.680
	11/13/02	1.24
	10/18/02	0.870
	9/24/02	0.317
	8/27/02	0.268
	7/23/02	0.291
	6/25/02	0.175
	5/20/02	0.503
	4/16/02	2.76
	3/19/02	2.91
	3/19/02 (dup)	2.81
	2/5/02	1.33
	1/17/02	0.956
	1/17/02 (dup)	3.99
	12/20/01	0.713

000167

Table 1.0
Summary of Analytical Results:
C-8 in Surface Water
DuPont Washington Works Facility
Washington, WV

Sample	Date	C-8 (ug/l)
OUTFALL 005	12/9/02	6.39
	12/9/02 (dup)	6.62
	11/13/02	18.1
	10/18/02	12.1
	9/24/02	4.64
	9/24/02 (dup)	5.02
	8/27/02	12.4
	7/23/02	19.2
	6/25/02	17.9
	5/20/02	98.6
	5/17/02	65.7
	4/16/02	3.8
	3/19/02	9.26
	2/5/02	141.0
	1/17/02	137.0
	12/20/01	31.40
	12/20/01 (dup)	35.20
	11/26/01	915
	10/25/01	65.7
	9/19/01	2.86
	8/30/01	2.16
	7/11/01	120
	6/14/01	7.4
	5/31/01	1.43
	4/11/01	4.31
	3/21/01	199
	2/14/01	153
OUTLET 007	12/9/02	0.263
	11/13/02	8.56
	10/18/02	0.251
	10/18/02 (dup)	0.209
	9/24/02	NQ (<0.05)
	8/27/02	0.207
	7/23/02	0.597
	7/23/02 (dup)	0.544
	6/25/02	0.284
	5/20/02	0.490
	4/16/02	0.567
	3/19/02	0.483
	2/5/02	0.320
	2/5/02 (dup)	0.339
	1/17/02	0.871
	12/20/01	1.99
OUTLET 105	12/9/02	6.07
	11/13/02	10.5
	10/18/02	54.6
	9/24/02	3.69
	8/27/02	6.73
	7/23/02	34.7
	6/25/02	3.86
	5/20/02	6.27
	5/20/02 (dup)	5.16
	4/16/02	15.9
	3/19/02	13.2
	2/5/02	14.6
	1/17/02	7.53
	12/20/01	9.78

Note: Analytical method changed as of November 2001 (see Section 2.0 for details).
 NQ = Not Quantifiable. Detected at a concentration above the LOD and below the limit of quantification (LOQ).

000168

Table 2.0
Summary of Analytical Results:
C-8 in Surface Water
Local Landfill
Washington, WV

Sample	Date	C-8 (ug/l)
OUTFALL 004 (New)	12/13/02	10.7
	11/30/02	No-flow conditions
	10/31/02	No-flow conditions
	9/30/02	No-flow conditions
	8/26/02	No-flow conditions
	7/1/02	11.2
	6/13/02	9.29
	5/21/02	No-flow conditions
	4/29/02	14.5
	3/26/02	14.6
OUTFALL 004 (Old)	12/13/02	12.5
	11/30/02	No-flow conditions
	10/31/02	No-flow conditions
	9/30/02	No-flow conditions
	8/26/02	No-flow conditions
	7/1/02	11.6
	6/13/02	10.0
	5/21/02	No-flow conditions
	4/29/02	15
	3/26/02	1.54
	2/20/02	10.9
	1/24/02	11.4
	12/13/01	No-flow conditions
	9/27/2000	4.73
	12/10/1999	7.1
	6/3/1999	3.06
	6/2/1998	12
	5/29/1997	13
	4/2/1996	13
	2/16/1994	11
OUTFALL 005 (New)	12/13/02	9.51
	11/30/02	No-flow conditions
	10/31/02	No-flow conditions
	9/30/02	No-flow conditions
	8/26/02	No-flow conditions
	7/1/02	No-flow conditions
	6/13/02	No-flow conditions
	5/21/02	No-flow conditions
	4/29/02	34.3
	3/26/02	16.0
OUTFALL 005 (Old)/SS1	12/13/02	38.1
	11/30/02	No-flow conditions
	10/31/02	No-flow conditions
	9/30/02	No-flow conditions
	8/26/02	No-flow conditions
	7/1/02	32.1
	6/13/02	27.3
	5/21/02	No-flow conditions
	4/29/02	40.9
	3/26/02	39.0
	2/20/02	46.0
	1/11/02	51.4
	12/13/01	No-flow conditions
	9/27/2000	13.3
	12/10/1999	34
	6/3/1999	6.8
	6/2/1998	39
	5/29/1997	41
	4/2/1996	39
	2/16/1994	35

000169

Table 2.0
Summary of Analytical Results:
C-8 in Surface Water
Local Landfill
Washington, WV

Sample	Date	C-8 (ug/l)
OUTLET 101	12/16/02	49.5
	11/19/02	76.7
	10/31/02	78.6
	9/30/02	115.0
	8/26/02	70.3
	7/1/02	63.0
	6/13/02	38.0
	5/21/02	40.0
	4/29/02	48.2
	3/25/02	36.4
	2/20/02	63.10
	1/23/02	81.4
	12/13/01	82.40
	9/14/2000	12
	6/3/1999	15
	6/2/1998	54
OUTLET LM1 (LEACHATE) / INLET 002	12/16/02	81.7
	11/21/02	120.0

Note: Analytical method changed as of November 2001 (see Section 2.0 for details).

000170

Table 3.0
Summary of Analytical Results:
C-8 in Surface Water
Letart Landfill
Letart, WV

Sample	Date	C-8 (ug/l)
002(LEACHATE BASIN)	12/30/02	1170
	11/25/02	939
	10/31/02	645
	9/27/02	4.52
	8/30/02	2050
	7/30/02	1410
	6/28/02	Not Analyzed*
	5/30/02	1630
	4/30/02	443
	3/28/02	131
	2/19/02	355
	1/25/02	50.1
	12/14/01	36.1
	11/27/2001	53.2
	7/20/01	159
	7/25/2000	1350
	4/3/2000	1900
	1/14/2000	920
	10/21/1999	3240
003	12/30/02	No-Flow Conditions
	11/30/02	No-Flow Conditions
	10/31/02	No-Flow Conditions
	9/27/02	0.170
	8/30/02	No-Flow Conditions
	7/30/02	No-Flow Conditions
	6/28/02	Not Analyzed*
	5/30/02	0.282
	4/30/02	0.0653
	3/28/02	0.198
	2/19/02	No-Flow Conditions
	1/25/02	0.148
	12/14/01	0.390
	10/31/02	2.83
RT 33 STREAM	9/27/02	2.24
	8/30/02	No-Flow Conditions
	5/30/02	1.570
	4/30/02	0.845
	3/28/02	1.26
	2/19/02	3.92
	1/25/02	1.9
	7/20/2001	2.01
	7/31/2000	0.573
	7/20/1999	2.23
	7/23/1997	2
	4/17/1996	1.8
	10/14/02	0.0612
BRINKER RUN		
CAP RUNOFF	12/30/02	415
	11/25/02	65.1
	10/31/02	102
	9/27/02	50.9**
	8/30/02	No-Flow Conditions
	6/28/02	Not Analyzed*
	5/30/02	371
	4/30/02	279
	3/28/02	Not Sampled
	2/19/02	No-Flow Conditions
	1/25/02	119

Note: Analytical method changed as of November 2001 (see Section 2.0 for details).

* Samples were taken at the respective surface water locations. However, due to an error by the courier, the samples arrived at the lab warm and were not analyzed.

**This sample was inadvertently named Stormwater Runoff in the September/Q302 report.

000171

Table 4.0
Summary of Analytical Results:
C-8 in Surface Water
Dry Run Landfill
Lubeck, WV

Sample	Date	C-8 (ug/l)
OUTLET 001	12/30/02	56.9
	11/21/02	64.6
	10/30/02	81.7
	9/30/02	No-flow conditions
	8/30/02	No-flow conditions
	7/31/02	No-flow conditions
	7/1/02	No-flow conditions
	6/28/02	No-flow conditions
	5/28/02	30.9
	4/24/02	41
	3/25/02	71.6
	2/25/02	43.9
	1/28/02	41.6
	12/12/01	No-flow conditions
	10/3/2000	31.5
	12/29/1999	66
	5/19/1998	17
	4/9/1996	86
OUTLET 003	12/30/02	No-flow conditions
	11/30/02	No-flow conditions
	10/30/02	No-flow conditions
	9/30/02	No-flow conditions
	8/30/02	No-flow conditions
	7/1/02	25.3
	6/28/02	No-flow conditions
	5/28/02	No-flow conditions
	4/29/02	20.1
	3/26/02	6.77
	2/25/02	No-flow conditions
	1/28/02	No-flow conditions
	12/12/01	No-flow conditions
OUTLET 004	12/30/02	No-flow conditions
	11/30/02	No-flow conditions
	10/30/02	No-flow conditions
	9/30/02	No-flow conditions
	8/30/02	No-flow conditions
	7/1/02	0.70
	6/28/02	No-flow conditions
	5/28/02	No-flow conditions
	4/27/02	No-flow conditions
	3/26/02	158
	2/25/02	No-flow conditions
	1/28/02	No-flow conditions
	12/12/01	No-flow conditions
PROPERTY BOUNDARY	10/30/02	3.80
	8/30/02	No-flow conditions
	5/28/02	9.41
	4/24/02	6.69
	3/25/02	22.8
	2/25/02	3.81
	1/28/02	11.1
	12/12/01	3.99
	10/3/2000	10.3
	12/29/1999	39
	7/14/1998	0.88
	4/9/1996	9.9

000172

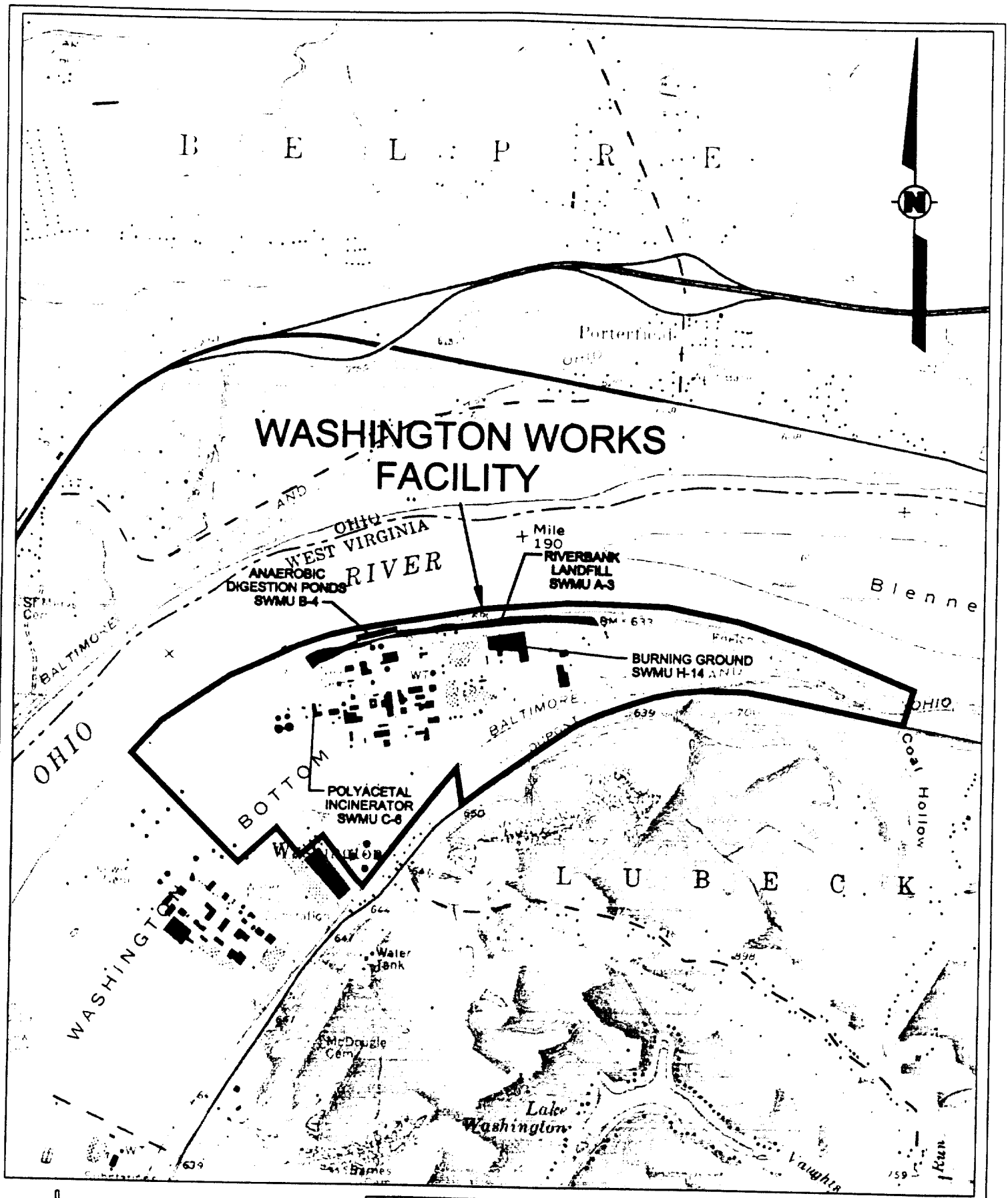
Table 4.0
Summary of Analytical Results:
C-8 in Surface Water
Dry Run Landfill
Lubeck, WV

Sample	Date	C-8 (ug/l)
STREAM SAMPLING POINT#1	10/30/02	1.63
	8/30/02	No-flow conditions
	5/28/02	1.63
	4/24/02	0.932
	3/25/02	1.06
	2/25/02	0.850
	1/28/02	0.893
	12/12/01	1.19
	10/3/2000	0.758
	12/29/1999	0.54
	5/19/1998	1
STREAM SAMPLING POINT#2	10/30/02	29.2
	8/20/02	No-flow conditions
	5/28/02	51.0
	4/24/02	28.9
	3/25/02	66.6
	2/25/02	24.3
	1/28/02	42.4
	12/12/01	20.5
	10/3/2000	27.6
	12/29/1999	87
	5/19/1998	4.6
DRLEACHATE	10/30/02	704
	5/28/02	150
	4/24/02	237
	3/25/02	334
	2/25/02	256
	1/28/02	398
	12/12/01	109
	10/3/2000	27.4
	12/29/1999	34
	5/19/1998	56
POND UNDERDRAIN	7/22/1997	62
	10/30/02	38.8
	5/28/02	67.4
	4/24/02	33.4
	3/25/02	66.7
	2/25/02	37.1
	1/28/02	29.3
	12/12/01	35.4

Note: Analytical method changed as of November 2001 (see Section 2.0 for details).

000173

FIGURES



000175

Source: MAP TAKEN FROM THE LUBECK, WV
USGS QUADRANGLE



Corporate Remediation Group

An Alliance between
DuPont and URS Diamond

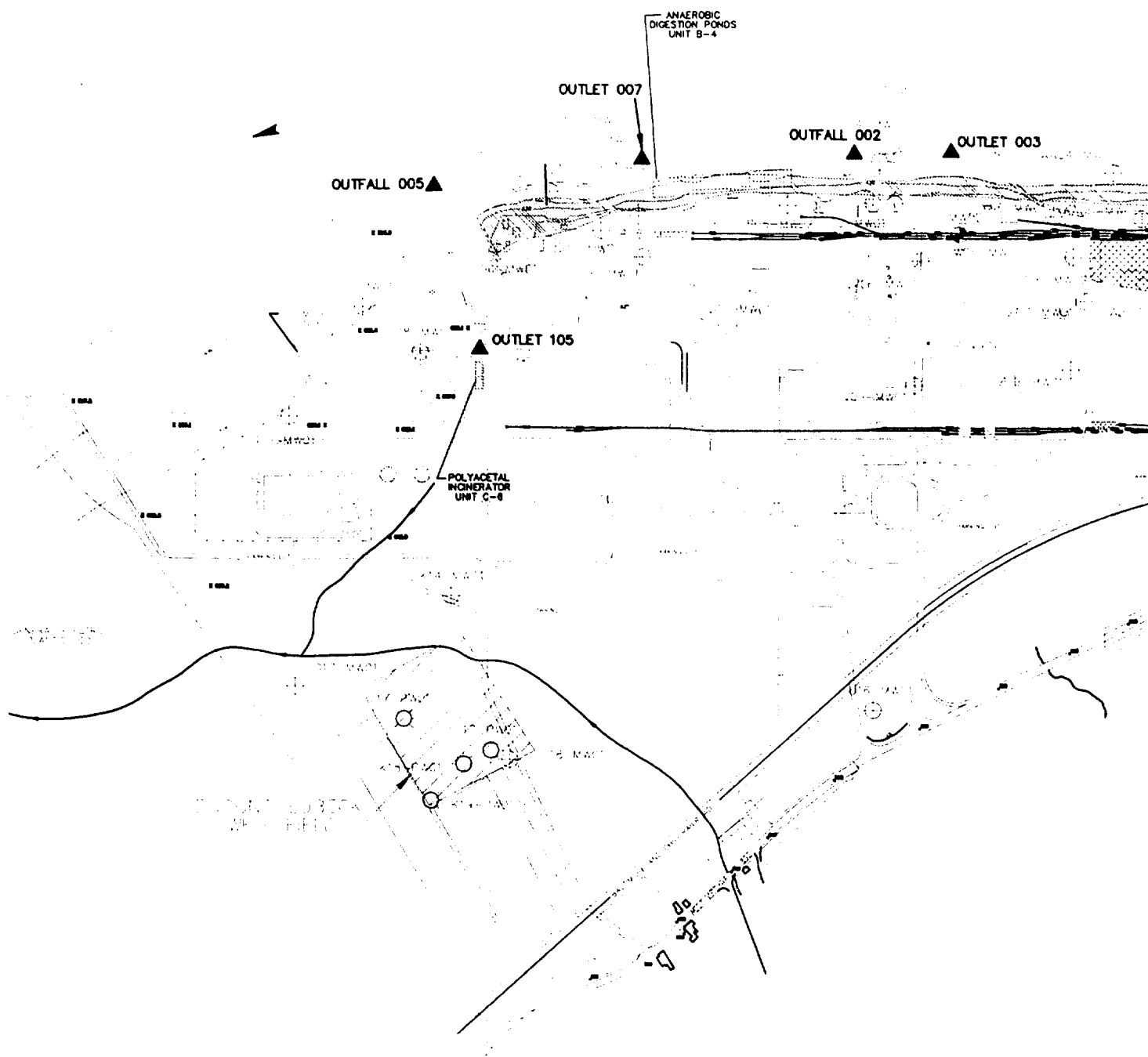
Barley Mill Plaza, Building 27
Wilmington, Delaware 19805



SITE LOCATION MAP

DuPont Washington Works Facility
Washington, West Virginia

SCALE Not to scale	DRAWN DEL	DRAWN DEL	DATE 8/27/01	FILE NO. 7432A001
	CHECKED M. HOULDAY	APPROVED		FIGURE 1.0



LEGEND

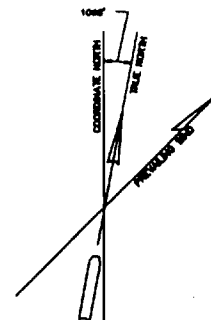
OUTLET 005  = OUTFALL SAMPLING POINT

000176

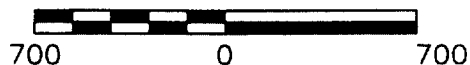
OUTLET 001

RIVERBANK
LANDFILL
UNIT A-3

BURNING GROUND
UNIT H-14



SCALE



0000176a

DESIGNED	INITIALS
K. DAVIS	
DRAWN	
D.H. ENGLISH	
CHECKED	
K. DAVIS	
APPROVED(DESIGN)	
APPROVED(CONSTRUCTION)	



Corporate Remediation Group

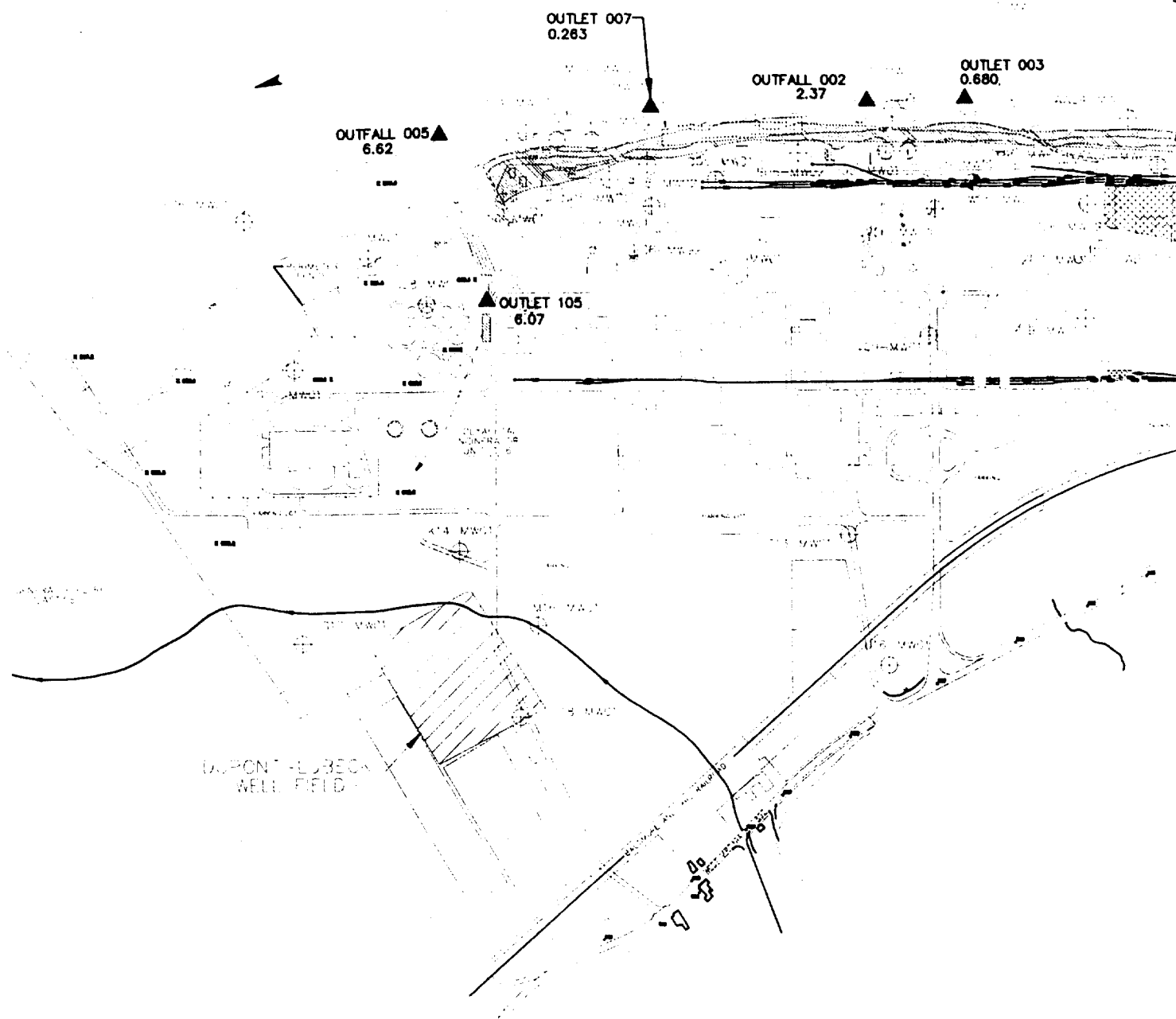
*An Alliance between
DuPont and URS Diamond*

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

SURFACE WATER SAMPLE LOCATION MAP

DuPont Washington Works Facility
Washington, West Virginia

SCALE	DATE	CHG FILE NO.	FIGURE
As shown	08/02/2002	FIG-1.1	1.1

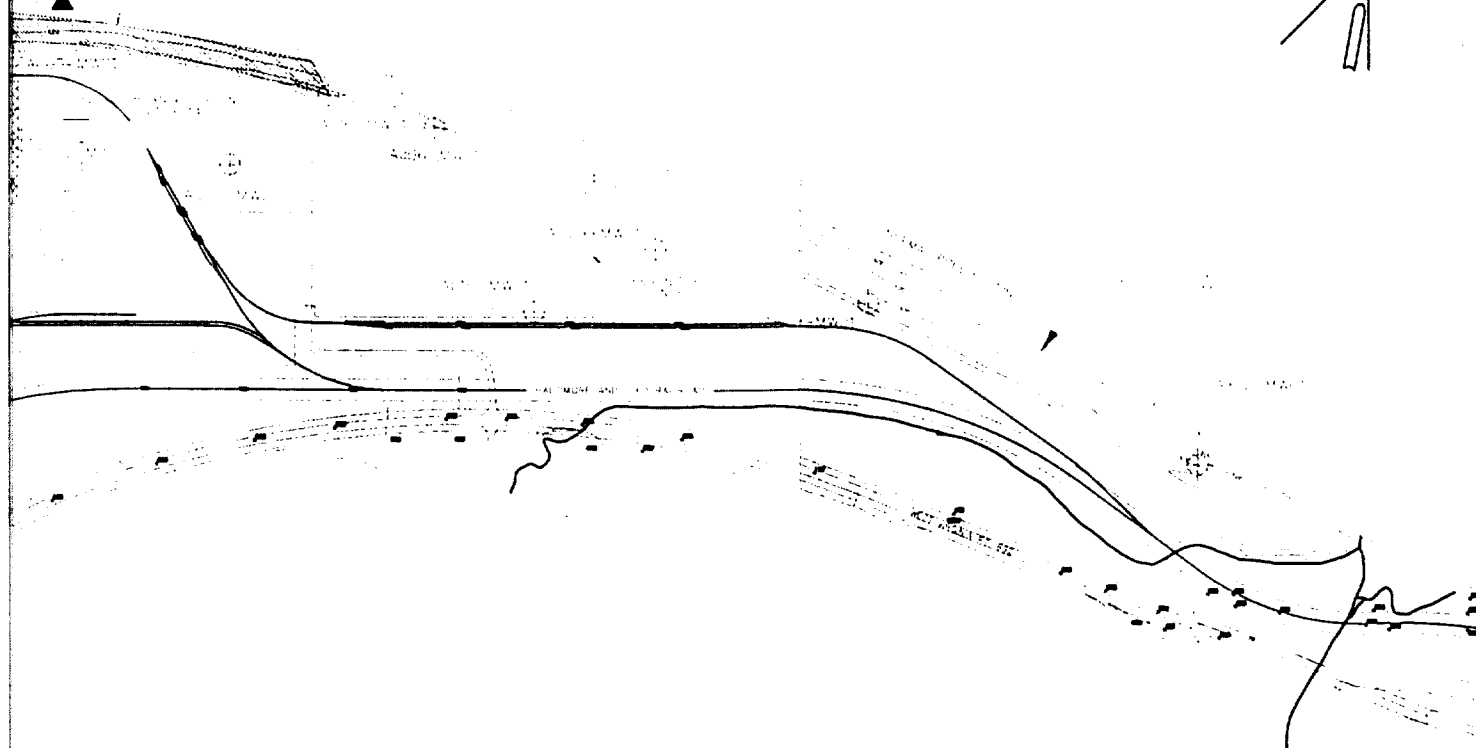
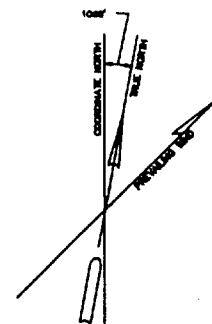


LEGEND

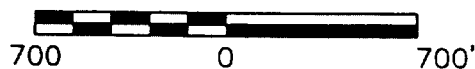
OUTLET 005  = OUTFALL SAMPLING POINT

000177

OUTLET 001
9.76 ▲



SCALE



DESIGNED	INITIALS
SJO	
DRAWN	
DEL	
CHECKED	
TDL	
APPROVED(DESIGN)	
ASH	
APPROVED(CONSTRUCTION)	



Corporate Remediation Group

*An Alliance between
DuPont and URS Diamond*

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

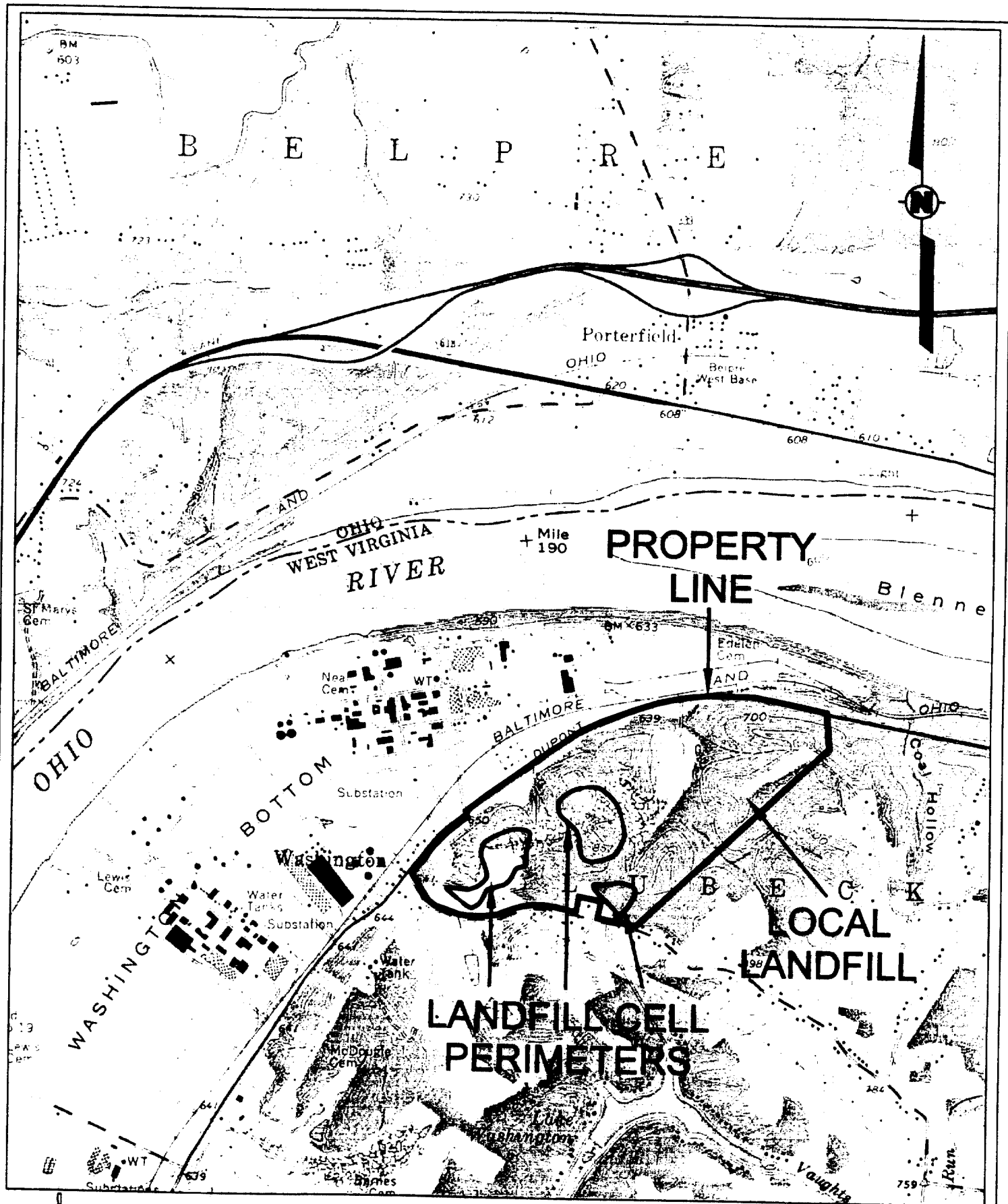


**C-8 IN SURFACE WATER
DECEMBER 2002**

**DuPont Washington Works Facility
Washington, West Virginia**

SCALE	DATE	CHG FILE NO.	FIGURE
As shown	01/31/2003	74238004	1.2

0000177a



000178



Corporate Remediation Group

An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

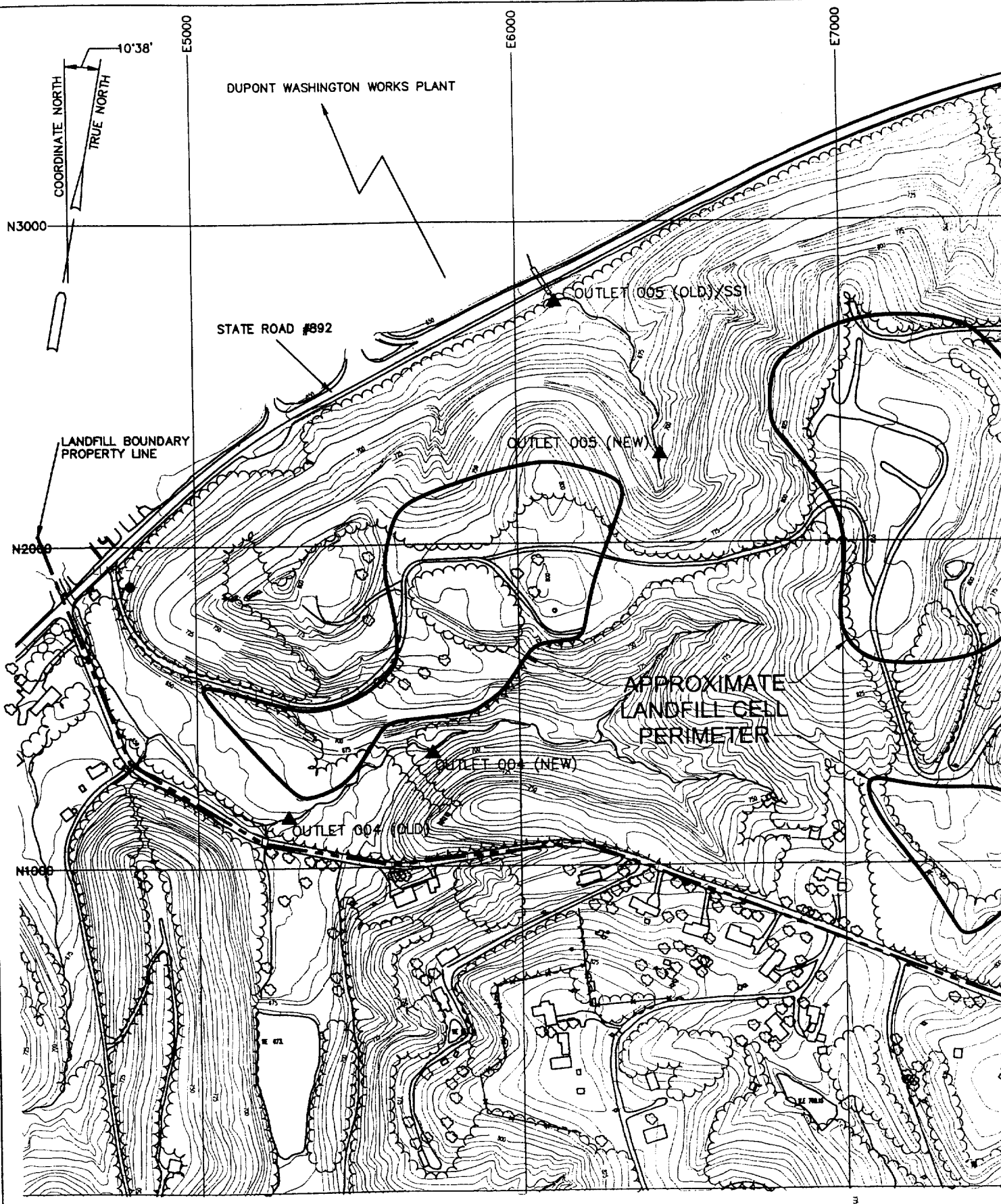


SITE LOCATION MAP

Local Landfill
Washington, West Virginia

SCALE Not to scale	DESIGNED DEL.	DRAWN DEL.	GRID FILE NO. 7421A001
DATE 8/27/01	CHECKED M. HOULDAY	APPROVED	VERSION 2.0

Source: USGS Little Hocking, Ohio - West Virginia
Quadrangle

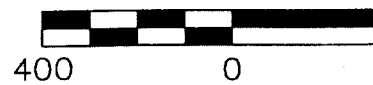


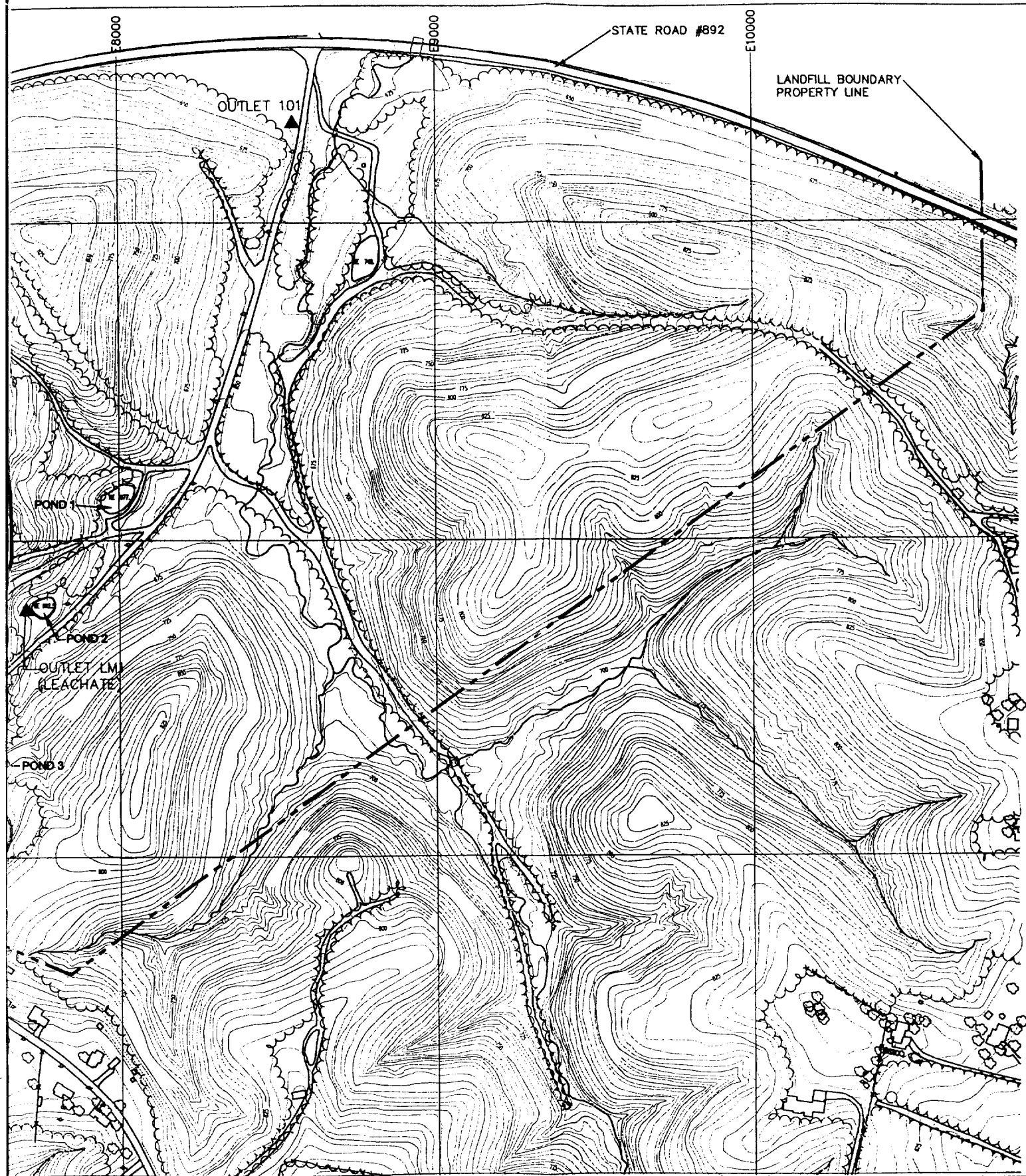
LEGEND

▲ --- SURFACE WATER SAMPLE

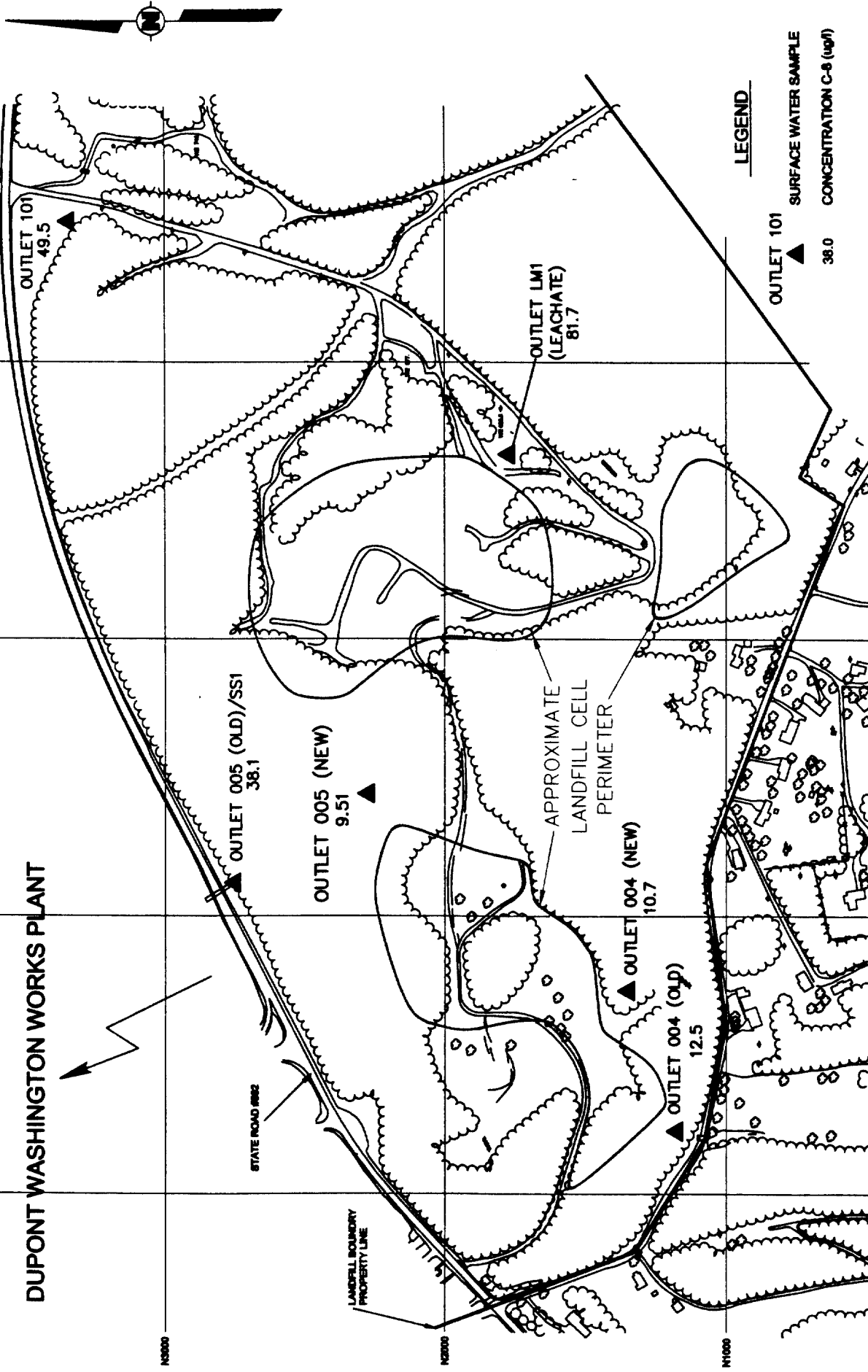
000179

S C A L E





DUPONT WASHINGTON WORKS PLANT



C-8 IN SURFACE WATER
DECEMBER 2002

Local Landfill
Washington, WV



Corporate Remediation Group

An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

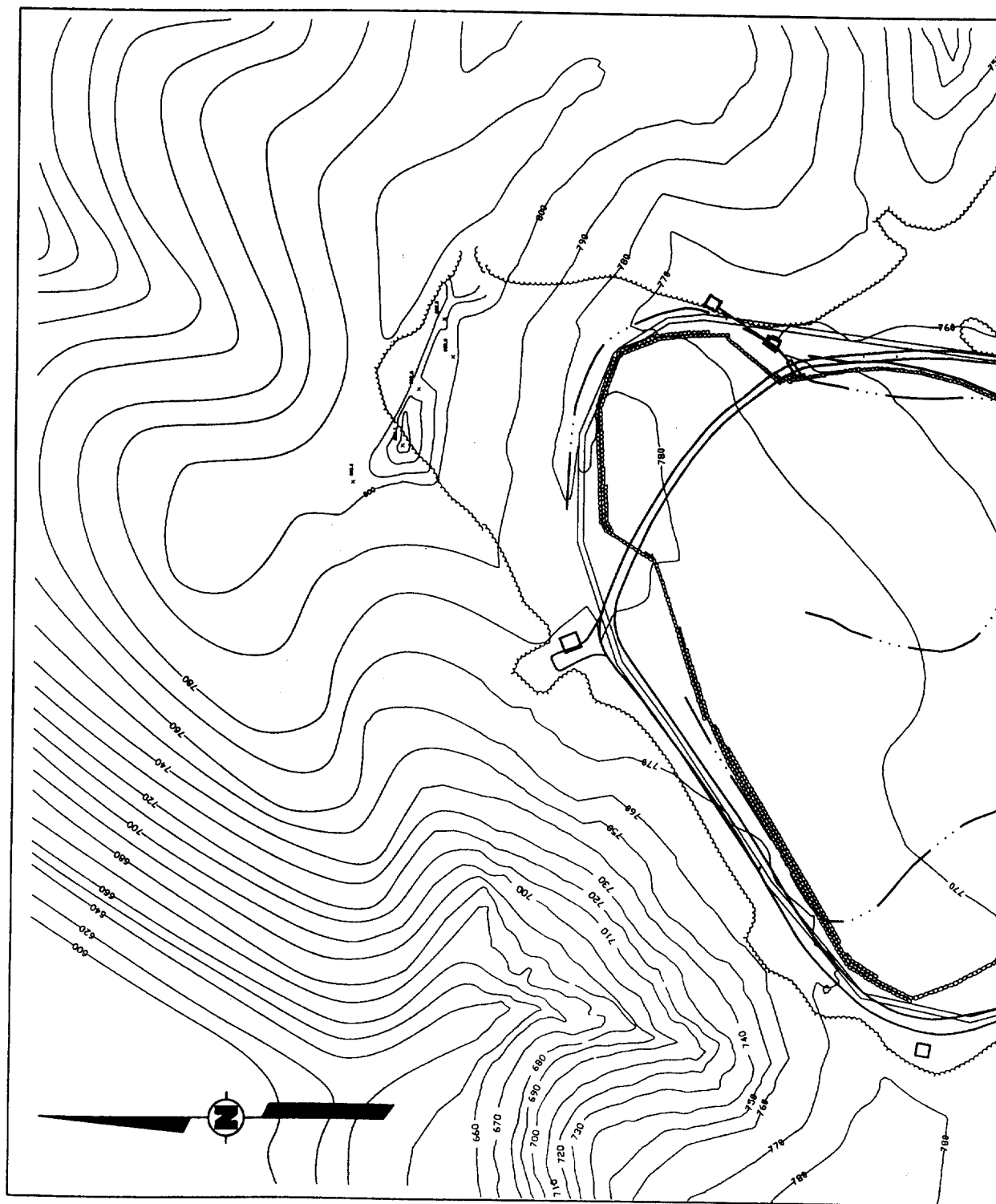


SCALE



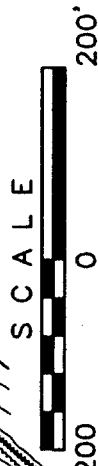
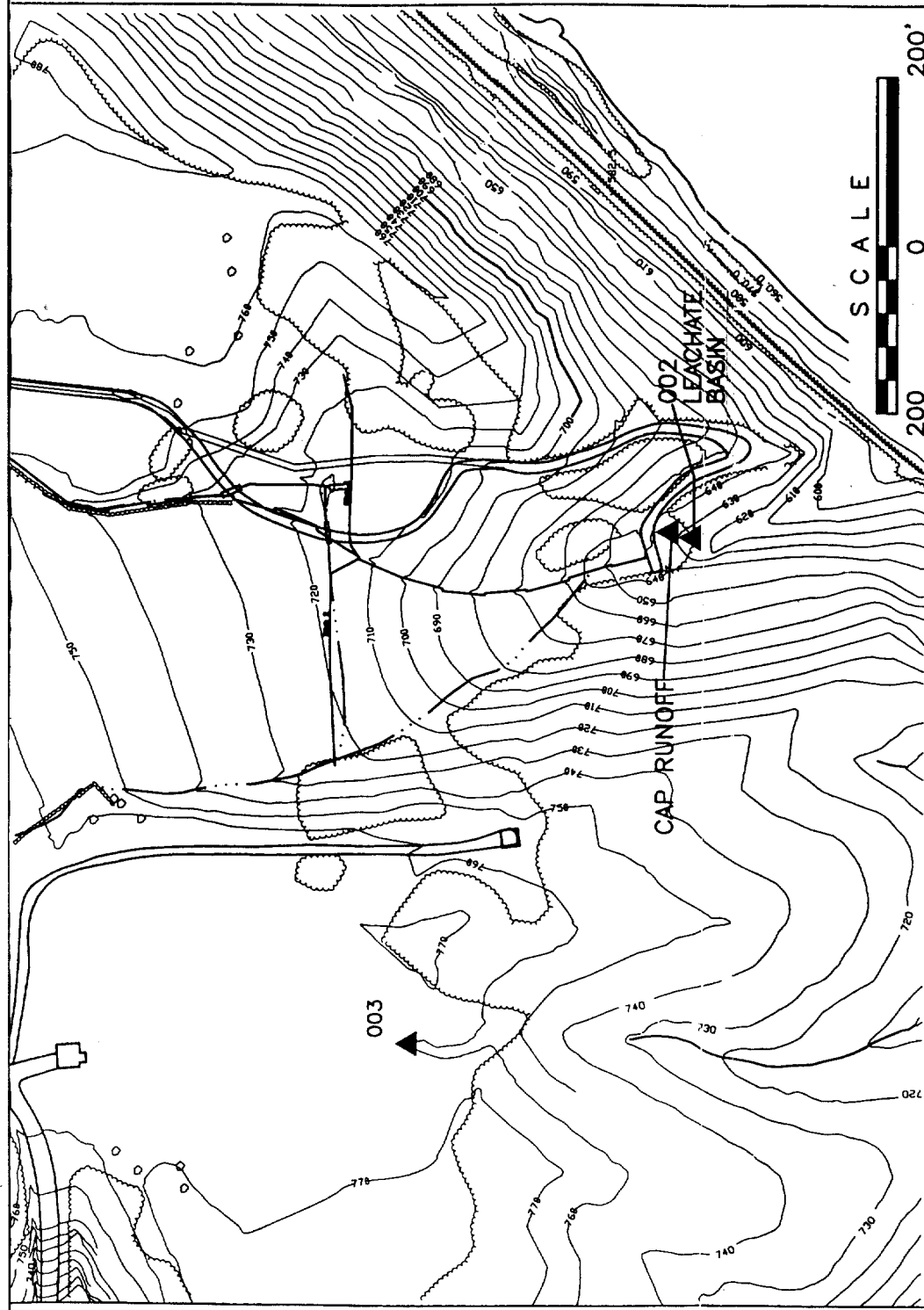
000180

DATE	APPROVED	DATE	APPROVED	DATE	APPROVED
01/31/2003	K. DAVIS	01/31/2003	K. DAVIS	01/31/2003	K. DAVIS
As shown	K. DAVIS	As shown	K. DAVIS	As shown	K. DAVIS
7451A007	D.H. ENGLISH	7451A007	D.H. ENGLISH	7451A007	D.H. ENGLISH
2.2	2.2	2.2	2.2	2.2	2.2



000182

00001829



LEGEND:

▲ SURFACE WATER SAMPLE LOCATION

DU PONT

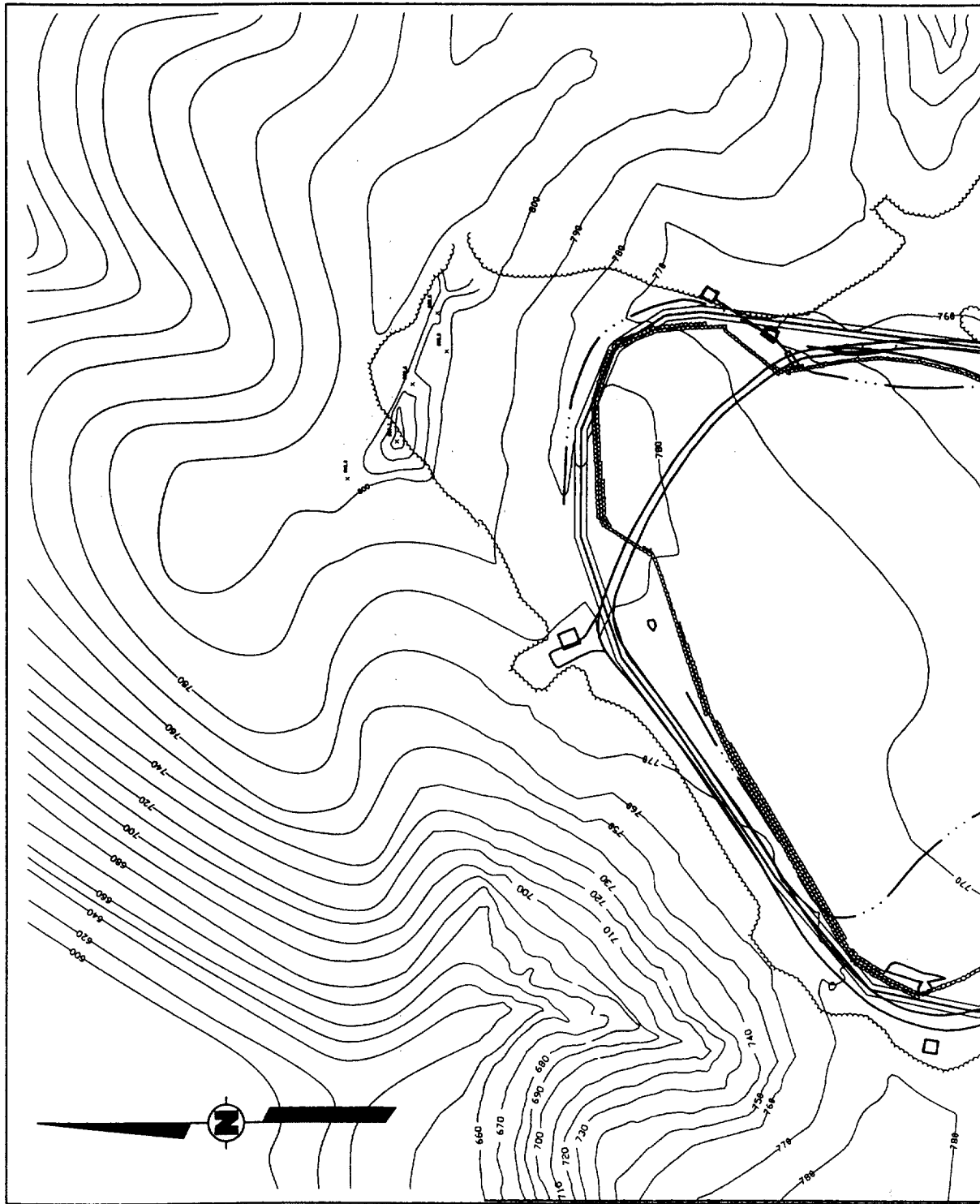
Corporate Remediation Group
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
 Wilmington, Delaware 19805

SURFACE WATER LOCATION SAMPLE MAP

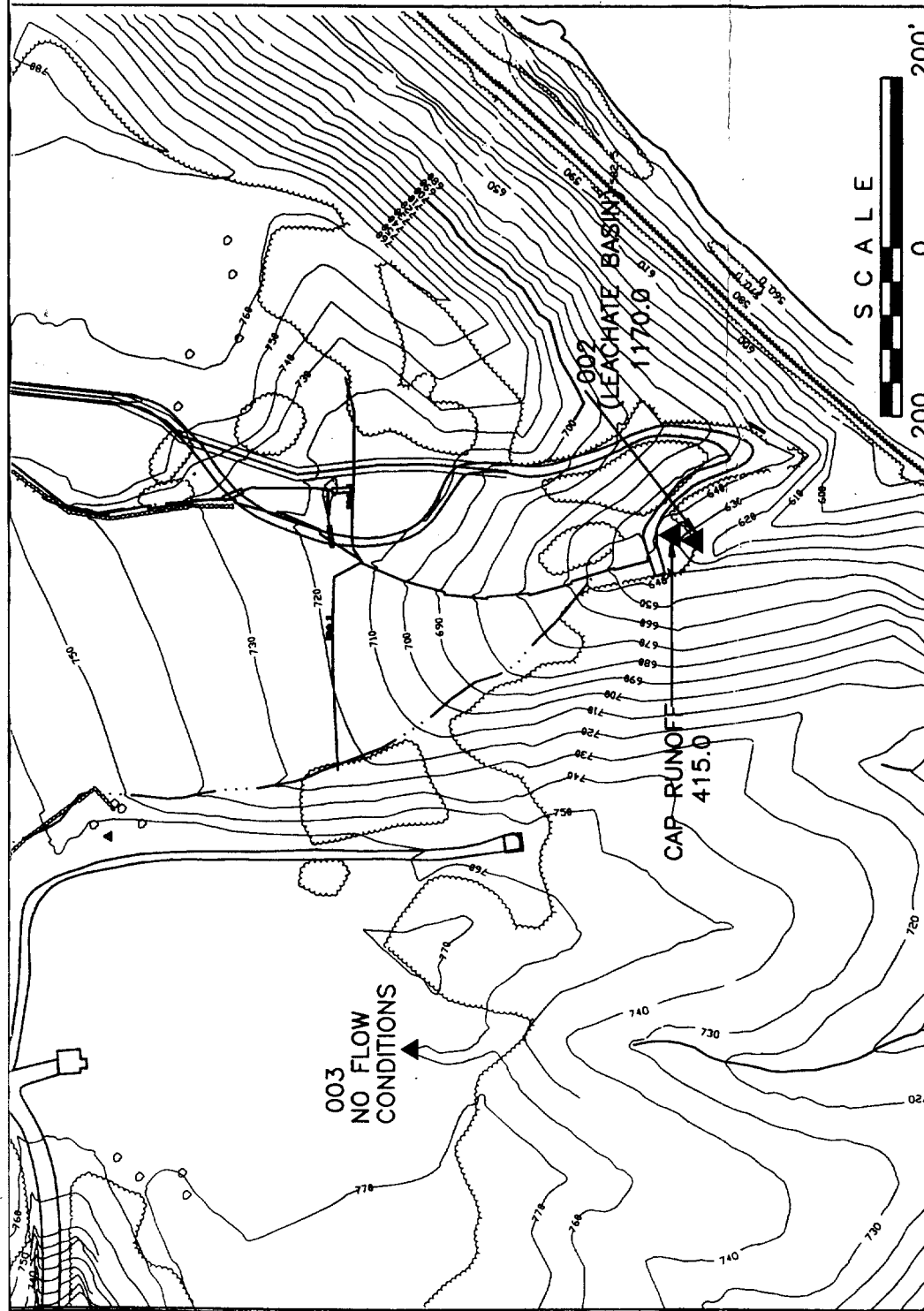
Letart Landfill Site
 Letart, West Virginia

DATE	01/07/2003	BY	MLB	JOB FILE NO.	74000014
SCALE	AS SHOWN	REVISION	000000	NO.	000000
				DATE	01/07/2003
				SCALE	3.1



000183

00001839



LEGEND:

▲ 003 SURFACE WATER SAMPLE LOCATION

C-8 CONCENTRATION (ug/l)

Corporate Remediation Group
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
 Wilmington, Delaware 19805

C-8 IN SURFACE WATER
DECEMBER 2002

Letart Landfill Site
 Letart, West Virginia

DATE	REVISION	DRAWN BY	CHECKED BY
01/21/2003	K. DAVIS	K. DAVIS	K. DAVIS
JOB FILE NO.			SCALE
74220005			3.2

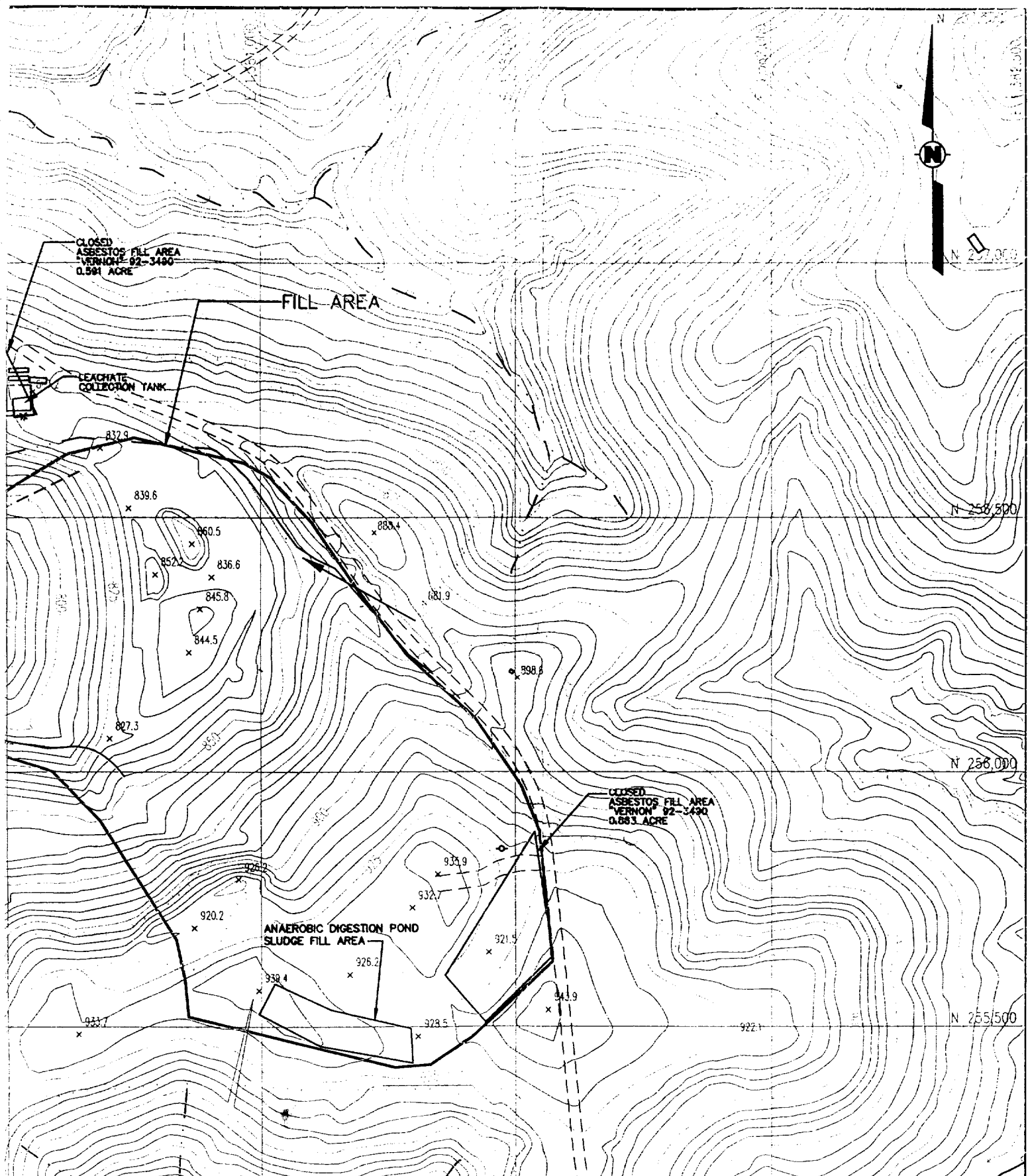


000184

Source: MAP TAKEN FROM THE LUBECK, WV
USGS QUADRANGLE

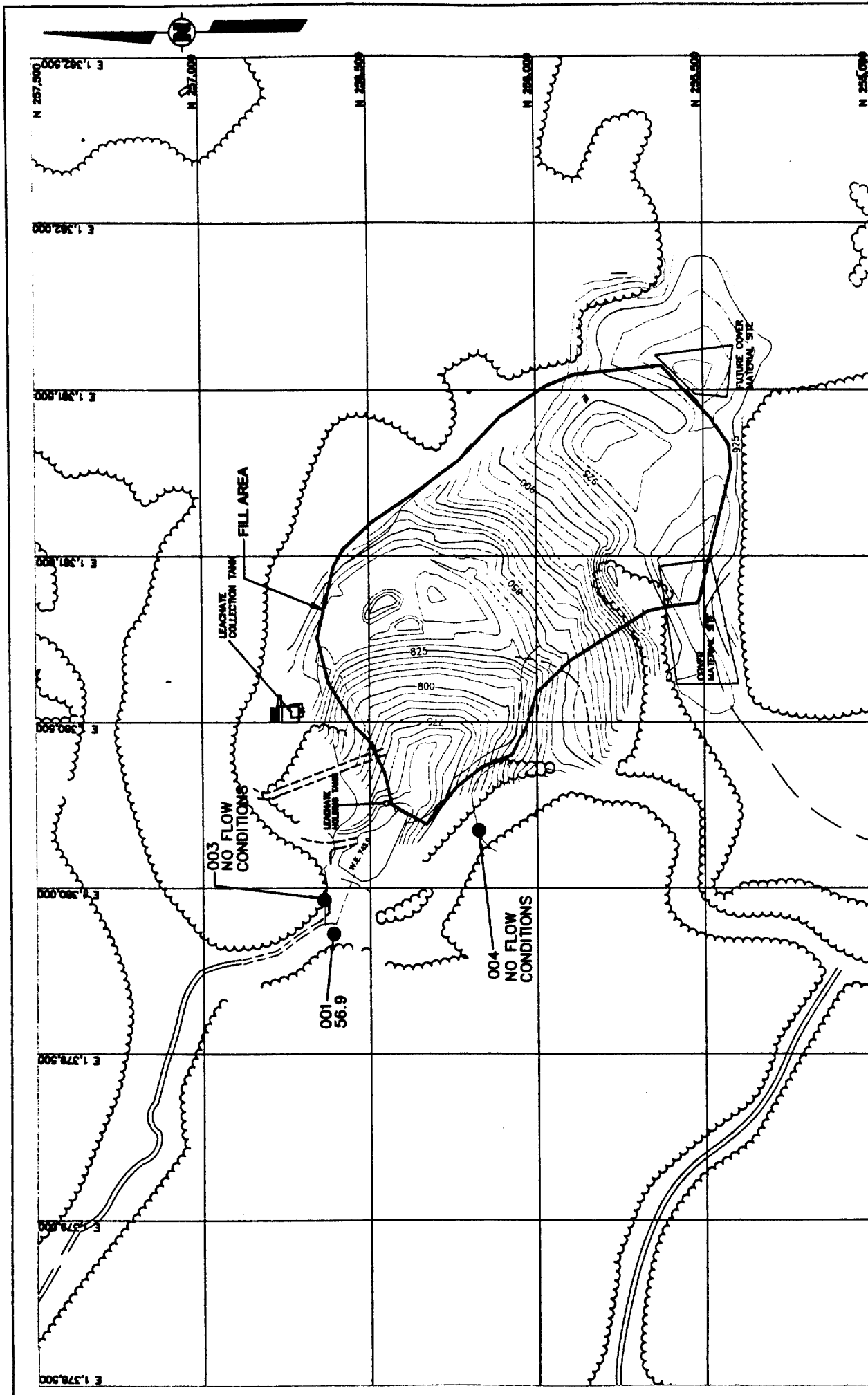


S C



DESIGNED T.D. LOUNSBURY DRAWN D.E. LITTEL CHECKED K. DAVIS APPROVED(DESIGN) APPROVED(CONSTRUCTION)		INITIALS 	 Corporate Remediation Group <i>An Alliance between DuPont and URS Diamond</i> Barley Mill Plaza, Building 27 Wilmington, Delaware 19805		SURFACE WATER SAMPLE LOCATION MAP Dry Run Landfill Wood County, West Virginia	SCALE 1" = 250'	DATE 06/30/2002	CAD FILE NO. 7422D005	FIGURE 4.1
---	--	----------------------------------	--	---	--	--------------------	--------------------	--------------------------	---------------

0000185a



LEGEND

- SURFACE WATER SAMPLE LOCATION
- 66.6 CONCENTRATION C-8 (ug/l)

SCALE



C-8 IN SURFACE WATER
DECEMBER 2002

Dry Run Landfill
DuPont Washington Works
Lubeck, West Virginia



Corporate Remediation Group
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

DATE	01/31/2003	BY	K. DAVIS	FOR FILE IN	74224017
REVISION	000000	DESCRIPTION	000000	PROJECT	4.2

000186

APPENDICES

APPENDIX A
LABORATORY ANALYTICAL DATA REPORTS
WASHINGTON WORKS FACILITY

000188

Analytical Results Washington Works C8 Sampling 12/02

DuPont Sample Identification

APFO (ng/L)

WWK-Z-Outfall 001	9760
WWK-Z-Outfall 002	2370
WWK-Z-Outfall 003	680
WWK-Z-Outfall 005	6390
WWK-Z-Outfall 007	263
WWK-Z-Outfall 105	6070
WWK-Z-Outfall 005-2	6620
WWK-K-EQBLK-1	NQ

Limit of Detection (LOD) for the procedure is approximately 10 ng/L

Limit of Quantitation (LOQ) for the procedure is 50 ng/L

ND - Compound not detected

NQ - Compound detected at a level between the LOD and LOQ. Result is not quantifiable.

ND < LOD < NQ < LOQ

Results are calculated according to the following criteria

If the sample and laboratory duplicate are greater than 250 ng/L, and the relative percent difference (RPD) is less than 20, the average value is reported. If the RPD is greater than 20, the higher value is reported.

If the sample and laboratory duplicate are less than 250 ng/L, and the absolute difference is less than 50, the average value is reported. If the absolute difference is greater than 50, the higher value is reported.

000189

J007

APPENDIX B
CHAIN-OF-CUSTODY RECORDS
WASHINGTON WORKS FACILITY

000190



APPENDIX C
LABORATORY ANALYTICAL DATA REPORTS
LOCAL LANDFILL

000192

Analytical Results Local Landfill C8 Sampling 12/02

DuPont Sample Identification

APFO (ng/L)

LCL-Z-Outfall 004 New West Stream	10700
LCL-Z-Outfall 004 Old West Stream	12500
LCL-Z-Outfall 005 New Central Stream	9510
LCL-Z-Outfall 005 Old Central Stream	38100
LCL-K-EQBLK-1	ND
LCL-Z-Leachate Inlet 002	81700
LCL-Z-Outlet 101	49500

Limit of Detection (LOD) for the procedure is approximately 10 ng/L

Limit of Quantitation (LOQ) for the procedure is 50 ng/L

ND - Compound not detected

NQ - Compound detected at a level between the LOD and LOQ. Result is not quantifiable.

ND < LOD < NQ < LOQ

Results are calculated according to the following criteria

If the sample and laboratory duplicate are greater than 250 ng/L, and the relative percent difference (RPD) is less than 20, the average value is reported. If the RPD is greater than 20, the higher value is reported.

If the sample and laboratory duplicate are less than 250 ng/L, and the absolute difference is less than 50, the average value is reported. If the absolute difference is greater than 50, the higher value is reported.

000193

0007

APPENDIX D
CHAIN-OF-CUSTODY RECORDS
LOCAL LANDFILL

000194



Exygen Research Sample Receiving • 3117 Research Drive • State College, PA 16801, USA
T: 814.231.8032 • F: 814.231.1580 • exygenresearch.com

Page of

Client (name & address):

FDQM App Service - Deposit
Bk# 91-14 17 L.A.C. Pk Rt 141
San Bernardino, DE 93005
Phone: 302-883-1628
Fax:
Sampler: B.G. Brown

Project Manager (Name & E-mail Address):

Mike Aaron
Michael D. Aaron, BUSA, Deputy Chief
Project Name:
CSP Scoping after 12-02
P.O. #: LRTA-BUSA Release Nj, ext888
Quotation #:

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples.

ExyLIMS#	Client Sample Identification	Collection Date	Collection Time
34020-1	LCI-2-outfall 1st New	12-13-02	1349
34020-2	LCI-2-outfall 1st New	12-13-02	1410
34020-3	LCI-2-outfall 1st New	12-13-02	1430
34020-4	LCI-2-outfall 1st New	12-13-02	1500
34020-5	LCI-2-outfall 1st New	12-13-02	1500
34020-6	LCI-2-outfall 1st New	12-13-02	1500
34020-7	LCI-2-outfall 1st New	12-13-02	1500

AB USE ONLY

Relinquished by	Date	Time
<i>[Signature]</i>	11/6/10	1300
Bailey J. Moore	12-16-02	1410

OTHER INFORMATION

Cooler ID # C. K. 1000106 Cooler Temp. (°C) 0.5

Received by	Date	Time
B. J. G. J. J. J. J.	12-13-02	0730
	12/17/02	1100

LAB USE ONLY

Cooler Temp. (°C) 0.5

Received by	Date	Time
B. J. G. J. J. J. J.	12-13-02	0730
	12/17/02	1100

PROJECT REQUIREMENTS

Results Deadline:

Laboratory Report Options:

- ☐ Sample results only
- ☐ Add case narrative
- ☐ Add quality control summary
- ☐ Add calibration summary
- ☐ Add raw data
- ☐ Other _____

ANALYSES REQUESTED

[illegible]

6000

000195

APPENDIX E
LABORATORY ANALYTICAL DATA REPORTS
LETART LANDFILL

000196

Analytical Results LeTart Landfill C8 Sampling 12/02

DuPont Sample Identification

APFO (ng/L)

LTL-Z-Outlet 002	1170000
LTL-Z-Cap Runoff	415000
LTL-K-EQBLK-1	ND

Limit of Detection (LOD) for the procedure is approximately 10 ng/L

Limit of Quantitation (LOQ) for the procedure is 50 ng/L

ND - Compound not detected

NQ - Compound detected at a level between the LOD and LOQ. Result is not quantifiable.

ND < LOD < NQ < LOQ

Results are calculated according to the following criteria

If the sample and laboratory duplicate are greater than 250 ng/L, and the relative percent difference (RPD) is less than 20, the average value is reported. If the RPD is greater than 20, the higher value is reported.

If the sample and laboratory duplicate are less than 250 ng/L, and the absolute difference is less than 50, the average value is reported. If the absolute difference is greater than 50, the higher value is reported.

000197

0007

APPENDIX F
CHAIN-OF-CUSTODY RECORDS
LETART LANDFILL

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Exxygen Research Sample Receiving • 3117 Research Drive • State College, PA 16801, USA
T: 814.231.8032 • F: 814.231.1580 • exxygenresearch.com

PROJECT INFORMATION

Client (name & address):

ADD: AP Securer - Duganet
BWP Aids 27 Lane. PA Rt 141
Wilkesboro DE 19807

Phone:

Phone: 212-691-1801

Fax:

Fax: 361-842-1818

Sampler:

Sampler: Edmund J. Noon

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples.

Project Manager (Name & E-mail Address):

Project Name: Michael D. Duncan Postgraduate
Medical Program

Project Name:

CG Sample 12/00

P.O. #: LAIR-64501 Release No Ex094
Quotation #:

SAMPLE ANALYSIS

ExyLIMS#	Client Sample Identification	Collection Date	Collection Time
L-34005-1	L7L-2-v.o.f.f.t. o.v.2	12-30-02	11:55
NR sample	L7L-2-v.o.f.f.t. o.v.3	12-30-02	11:55
L-34005-2	L7L-2-Corp Runoff	12-30-02	11:55
L-34005-3	L7L-K-EXGRK-1	12-30-02	11:55

LAB USE ONLY

[illegible]

Specify Matrix	Comments
best	64533
f	64533
f	64533
✓	64533

53	645355
57	645352
56	645359
51	645360

CHAIN OF CUSTODY

Relinquished by	Date	Time	By
GG NNN	12-20-02	1400	
		1500	

Cooler ID #C-200151

Cooler Temp. (°C) 23

Received by	Date	Time
Bullington, J. Neenan	12-30-02	0500
<i>[Signature]</i>	12/31/2002	1040

LAB USE ONLY

OTHER INFORMATION

000199

PROJECT REQUIREMENTS

Results Deadline:

Laboratory Report Options:

- ☐ Sample results only
- ☐ Add case narrative
- ☐ Add quality control summary
- ☐ Add calibration summary
- ☐ Add raw data
- ☐ Other

APPENDIX G
LABORATORY ANALYTICAL DATA REPORTS
DRY RUN LANDFILL

000200

Analytical Results Dry Run Landfill C8 Sampling 12/02

DuPont Sample Identification

APFO (ng/L)

DRL-Z-Outlet 001

56900

Limit of Detection (LOD) for the procedure is approximately 10 ng/L

Limit of Quantitation (LOQ) for the procedure is 50 ng/L

ND - Compound not detected

NQ - Compound detected at a level between the LOD and LOQ. Result is not quantifiable.

ND < LOD < NQ < LOQ

Results are calculated according to the following criteria

If the sample and laboratory duplicate are greater than 250 ng/L, and the relative percent difference (RPD) is less than 20, the average value is reported. If the RPD is greater than 20, the higher value is reported.

If the sample and laboratory duplicate are less than 250 ng/L, and the absolute difference is less than 50, the average value is reported. If the absolute difference is greater than 50, the higher value is reported.

000201

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APPENDIX H
CHAIN-OF-CUSTODY RECORDS
DRY RUN LANDFILL

000202

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Exygen Research Sample Receiving • 3117 Research Drive • State College, PA 16801, USA
T: 814.231.8032 • F: 814.231.1580 • exygenresearch.com

PROJECT INFORMATION

Client (name & address):

ADAM P.P. Sweeney - Director

beimonten DE 1985

Phone:
Fax:

Sampler: Barbara J. Moore

Project Manager (Name & E-mail Address):

m. de Arce
 Michel de Arce, Dist. de Arce

Project Name:

PO #. 102, 01, 02
C8 Sampling 12/02

Quotation #:

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples.

SAMPLE ANALYSIS

[illegible]

LAB USE ONLY

[illegible]

CHAIN OF CUSTODY

Relinquished by	Date	Time
B. G. [Signature]	12-30-02	1:50

Cooler ID # CX2000151 Cooler Temp. (°C) 21.3

Received by	Date	Time
B. J. Adams	12-30-02	05100
<i>[Signature]</i>	12/31/2002	10000

LAB USE ONLY

OTHER INFORMATION

000203

ANALYSES REQUESTED

[illegible]

PROJECT REQUIREMENTS

Results Deadline:

Laboratory Report Options:

- ☐ Sample results only
- ☐ Add case narrative
- ☐ Add quality control summary
- ☐ Add calibration summary
- ☐ Add raw data
- ☐ Other

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Exygen Research Sample Receiving • 3117 Research Drive • State College, PA 16801, USA
T: 814.231.8032 • F: 814.231.1580 • exygenresearch.com

PROJECT INFORMATION

Client (name & address):

Address: Admiral's Services - Dungeness
Bigg's Rd & Lane, N41 2P 141
Warrington, Cheshire
 Phone: 01925-892-1648
 Fax: _____
 Sampler: _____

Project Manager (Name & E-mail Address):

Project Name: Mobile Phone
Michael P. Brown District 20
Project Name: _____

Project Name:

DO #:

C-8 Sampling Notes

Quotation #:

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples.

SAMPLE ANALYSIS

[illegible]

LAB USE ONLY

[illegible][illegible]

CHAIN OF CUSTODY

Relinquished by	Date	Time

Cooler ID # CR00151 Cooler Temp. (°C) 0.3

Cooler Temp. (°C) 0.3

Received by

Time

Date	Time
------	------

OTHER INFORMATION

000204

ANALYSES REQUESTED

[illegible]

PROJECT REQUIREMENTS

Results Deadline:

Laboratory Report Options:

- ☐ Sample results only
☐ Add case narrative
☐ Add quality control summary
☐ Add calibration summary
☐ Add raw data
☐ Other

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Oxygen Research Sample Receiving • 3117 Research Drive • State College, PA 16801, USA
T: 814.231.8032 • F: 814.231.1580 • oxygenresearch.com

PROJECT INFORMATION

Client (name & address):

Adm. Assoc. - Dept. of
Bldg. & Const. Bldg. 141

beibehalten, DE 19805

Phone: 700-8922-1698

Sampler: _____

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples

SAMPLE ANALYSIS

[illegible]

LAB USE ONLY

[illegible]

Specify Matrix	Comments
----------------	----------

Specify Matrix	Comments
Green Team	P25247 / SAT5246

[illegible]

CHAIN OF CUSTODY

[illegible]Cooler ID # CR0000151

Cooler Temp. (°C) 0.3

[illegible]

LAB USE ONLY

OTHER INFORMATION

000205

PROJECT REQUIREMENTS

Results Deadline:

Laboratory Report Options:

☐ Sample results only

☐ Add case narrative☐ Add quality control summary☐ Add calibration summary☐ Add raw data☐ Other