DuPont Engineering
4200 Camp Ground Road
Louisville, KY 40216

DUPONT

DuPont Engineering

May 10, 2002

RECEIVED
MAY 2002
DNR Ashland
Service Center

Mr. Christopher A. Saari
Hydrogeologist
Northern Region Remediation and Redevelopment
State of Wisconsin Department of Natural Resources
Ashland Service Center
2501 Golf Course Road
Ashland, Wisconsin 54806

DRAINAGE SAMPLING WORK PLAN
Former DuPont Barksdale Works
Barksdale, Wisconsin

Dear Mr. Saari:

This letter transmits the Drainage Sampling Work Plan for the former E. I. du Pont de Nemours and Company, Inc. (DuPont) Barksdale Works. DuPont has submitted the applicable fees for your review of this work plan to the Wisconsin Department of Natural Resource's Rhinelander, Wisconsin office (see attached letter and copy of payment).

As we have discussed previously, DuPont desires to implement the sampling on May 17, 2002, pending your review of the work plan and the presence surface water flow within the site's drainage features.

If you have any questions or comments regarding work plan, please contact me at (502) 569-2148.

Sincerely,

Bradley S. Nave

Bradley S. Nave
DuPont Corporate Remediation Group
Project Director

cc: Mr. Cary E. Pooler, P.G., URS Corporation
Mr. Robert J. Raymond, URS Corporation
Mr. Paul Bretting, Bretting Manufacturing, Inc.
Mrs. Amelia Lindsey, RN, Bayfield County Health Department
Mr. Henry Nehls-Lowe, MPH, State of Wisconsin Department of Health and Family Services
Mr. Doug Shultz, Wisconsin Department of Natural Resources, Ashland Service Center

DuPont Engineering
Barley Mill Plaza - Bldg. 27
Lancaster Pike & Rte. 141
Wilmington, DE 19805

DUPONT

DuPont Engineering

May 3, 2002

Janet Kazda
WDNR
107 Sutliff Avenue
Rhinelander, WI 54501

Dear Ms. Kazda:

Enclosed is check in the amount of five hundred dollars ($500.00) to cover the cost of reviewing a sediment/surface water workplan for the former DuPont Barksdale site.

Please forward a receipt to my attention at --

DuPont
Barley Mill Plaza, 27/2278
4417 Lancaster Avenue
Wilmington, DE 19805

Thanks,

Peggy Moss

Peggy Moss
Administrative Secretary

Enclosure

DRAINAGE SAMPLING PLAN FORMER DUPONT BARKSDALE FACILITY BARKSDALE, WISCONSIN

Date: May 2002

Project No.: 40-D4BA7431.02

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

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1.0 INTRODUCTION

This sampling plan describes the proposed scope of work for conducting a screening level characterization and evaluation of sediment and surface water at the former Barksdale Works Site (see Figure 1). Currently, there are eight drainage locations at or near the site boundary. Each will be evaluated as part of this sampling program.

The objective of this sampling program is to determine whether site-related constituents are present in sediment and surface water at drainage locations at or near the former manufacturing site boundaries. The results will be used to prioritize future investigations if deemed necessary.

1.1 Background

Site investigation activities were initiated when groundwater samples collected by the Wisconsin Department of Natural Resources (WDNR) in June 1997 from a drinking water well located at a residence adjacent to the site showed detectable concentrations of 2,4-dinitrotoluene (2,4-DNT) and 2,6-DNT. In response, the WDNR and E.I. duPont de Nemours and Company, Inc. (DuPont) met and agreed upon investigative and remedial objectives for the site.

From 1997 to 2000, various groundwater and residential water sampling events occurred to evaluate groundwater and drinking water quality. Also, in 1997, a surface water and sediment study along Boyd Creek was conducted to evaluate the potential for offsite transport of DNT, trinitrotoluene (TNT) and nitroglycerin (NG) at levels of ecological concern. This investigation concluded that DNT isomers were present in the creek's sediments, but that the concentrations of these constituents were not considered to be a potential concern.

During 2001, an extensive onsite investigation program was conducted. This investigation primarily focused on evaluation of groundwater conditions. However, a screening level evaluation of surface soils in production and operation areas also occurred. These evaluations indicated the presence of site-related constituents that could potentially be eroded by storm water run-off.

Following the 2001 investigation, DuPont developed the following overall site objectives.

- ☐ Continue to provide drinking water that meets appropriate Wisconsin regulatory standards for all site-related constituents.
- ☐ Develop a plan for a long-term drinking water supply and implement as appropriate.
- ☐ Evaluate the potential for off-site surface issues and take appropriate action.
- ☐ Identify priority source areas and take appropriate action.

The sampling program presented in this work plan is the first step in addressing the third objective.

2.0 INVESTIGATION AREAS

As mentioned in Section 1.0, there are eight current drainage locations where surface water and sediment are potentially transported beyond the site boundaries. The point at which each of these drainages approximately exits the site is described below and depicted on Figure 1.

- ☐ Location 1: Ditch along the northern site boundary that receives drainage from the site's northern area and proceeds along Nolander Road's southern drainage ditch
- ☐ Location 2: Culvert along the northern site boundary that empties into a ditch along the south side of Nolander Road
- ☐ Location 3: Culvert along the eastern site boundary that receives drainage from the site's northern area
- ☐ Location 4: Ditch at the front gate on Highway 13 that receives overland flow
- ☐ Location 5: Culvert along the eastern site boundary that receives drainage from the site's central area
- ☐ Location 6: Boyd Creek near Highway 13
- ☐ Location 7: Mission Springs Creek near Highway 13
- ☐ Location 8: Culvert along the northeastern site boundary (first culvert going south from the intersection of Nolander Road and State Highway 13)

Locations 6 and 7 are most likely to have continuous flow throughout the year.

3.0 FIELD ACTIVITIES

All sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP) dated September 2001. Field activities will be coordinated so that sufficient water flow is present in each drainage location for collection of the required number of samples. In addition, to ensure that samples within each drainage feature are comparable (representative of similar conditions), sampling will be conducted at all eight locations during a single sampling event.

3.1 Investigation Rationale and Methodology

The scope of work was designed to provide flexibility in choosing sample locations and matrices due to the uncertainty that is inherent with this type of sampling program. Samples will be collected approximately at the site boundary when safety issues are not a concern. If safety issues are a concern, every attempt will be made to safely collect samples as close to the site boundary as possible.

3.1.1 Sediment Sampling

The method of sediment sample collection will depend on the depth and velocity of flow at the time of sample collection. If the flow is low and direct access to the drainage bed can be safely achieved, a board or other barrier will be inserted to divert fast flowing water, then a decontaminated stainless steel bowl and stainless spoon will be used to collect sediment samples. If flow is fast or deep, a Teflon sampling dipper (pole mounted beaker) will be used to collect the sediment by dragging the drainage bottom. Based upon field conditions, additional equipment may be used. A complete description of actual sample collection activities will presented in the sampling event's summary report (see Section 4 for additional Report information).

Based upon each drainage location's physical characteristics, sediment may not be present or the volume of sediment present is not adequate to collect representative samples in a drainage location. However, soil may be present. Therefore, soil samples may be collected instead.

Once the sample containers are filled, they will be placed immediately into a cooler and preserved to < 4°C with ice.

If soil samples are collected for volatile organic constituents (VOCs), Encore® sampling devices will be used.

3.1.2 Surface Water Sampling

A decontaminated Teflon® dipper will be used to retrieve surface water samples from the drainage channels (based upon field conditions, additional equipment may be used to retrieve the samples). Aliquots for whole water analyses will be immediately decanted from the dipper reservoir into the sample containers. For VOC samples, every attempt will be made to minimize disturbance of the water. For dissolved constituent analyses, the water will be pumped from the dipper reservoir into the containers using a peristaltic pump outfitted with fresh tubing and an unused 45-micron filter. Once the sample containers are filled, they will be placed immediately into a cooler and preserved to < 4°C with ice.

3.2 Sampling Locations

At each location, a minimum of one sediment/soil sample and one surface water sample will be collected. Sediment samples will be collected if there is sufficient volume present. If the drainage bed does not contain sufficient sediment, soil samples will be collected from the drainage bottom instead. Figure 1 shows the proposed sampling locations. Table 2 summarizes sampling information for each sample location/drainage area.

The physical characteristics of each sampling area (total of eight) will be documented after analytical samples are collected. These characteristics, at a minimum, will include the following.

- ☐ Water flow (depth, width, velocity), turbidity, temperature and conductivity
- ☐ Sediment, sheen or other non-aqueous features within the flow channel
- ☐ Description and photos of surrounding features and the drainage channel within 100-ft upstream of the sampling point: grass area, along side of a road, etc.

In drainages where the flow channel is well defined and average water depth is greater than 3 inches, velocity will be measured using a Marsh-Mcburney ultrasonic doppler velocity meter or equivalent at spacings of no more than 18-inches across the wetted stream cross-section. Where flow is dispersed or depth is less than the required submergence of the meter, velocity may be estimated using a floating object and a stopwatch. Where the flow is slow and confined to a narrow accessible cross-section (culverts), direct measurement using a bucket and stopwatch will be used rather than velocity measurements.

Turbidity, temperature, dissolved oxygen, conductivity and pH will be measured at the mid-depth in the flow channel using a Horiba U-10 Water Quality meter or equivalent.

Sediment and non-aqueous flow components (foam, sheen, detritus etc.) will be identified by plunging a clean bucket into the center of the stream to the bottom and visually describing the contents after the bucket has been allowed to stand and separate.

3.3 Analytical Methods

3.3.1 Field Parameters

For each surface water sample, the following parameters will be evaluated in the field:

- ☐ pH
- ☐ Turbidity
- ☐ Dissolved Oxygen (DO)

- Specific Conductivity
- Temperature

3.3.2 Laboratory Parameters

All samples will be submitted to Severn Trent Laboratories (STL) for analyses. The following analyses will be performed on all samples.

- Metals (surface water will be quantified for total and dissolved metals)
- Nitroaromatics/nitramines
- Semivolatile organic constituents (SVOCs)
- VOCs

Table 1 presents the specific constituent lists. Since the purpose of this sampling program is characterization, comprehensive analytical lists were selected to allow a thorough evaluation of sediment and surface water quality. In addition, all nitroaromatic/nitramine analyses will be submitted for independent data validation in accordance with guidance from the *National Functional Guidelines for Organic Data Review*, U.S. EPA, 2/94 and 10/99 updates.

Chain of Custody

The laboratory will also initiate the chain-of-custody (COC) at the time the sample containers are prepared for shipment to the site and will accompany the empty containers to the site. The following information will be recorded on the COC prior to shipping samples from the site to the laboratory.

- Collector's name
- Sample collection dates and times
- Sample identification numbers
- Number of containers for each sample aliquot (if not already indicated)
- Container size/type (if not already indicated)
- Type of preservation (including ice)
- Parameters (analytes from each sample aliquot)
- Turn-around requirements
- Special handling instructions
- Destination of samples
- Name, date, time and signature of each individual possessing the samples

The COC will be signed by each individual responsible for custody of the sample containers. The original signed COC will accompany the samples to the laboratory and be returned as part of the final data package to DuPont.

3.3.3 QA/QC Samples

The following QA/QC samples will be collected at the specified frequency to evaluate QA/QC issues.

- Trip Blanks: a minimum of one trip blank per shipment of VOC analyses (water samples only)
- Equipment Blanks: a minimum of one equipment blank per day
- Field Duplicates: a minimum of one field duplicate per 20 field samples of the same matrix
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples: a minimum of one MS/MSD per 20 field samples of the same matrix

Trip blanks will be used to detect outside contamination sources that might influence contaminant concentrations reported in field samples both quantitatively and qualitatively. Possible contamination sources include:

- Laboratory reagent water
- Sample containers
- Cross contamination during sampling or shipment
- Ambient air or contact with analytical instrumentation during field sampling or analysis at the laboratory
- Laboratory reagents used in analytical procedures
- Instrument carry-over

Equipment blanks will be used to evaluate the completeness of decontamination procedures in preventing cross contamination of samples by sampling equipment. Field duplicate samples will be used to evaluate the cumulative precision due to limitations of the analytical method, sample matrix, and sample collection techniques. MSs/MSDs will be used to evaluate analytical accuracy and precision.

3.4 H&S/Waste Management

All field activities will be conducted as per the site specific Health and Safety Plan (HASP) and Waste Management Plan (WMP).

3.5 Schedule

Every attempt will be made to collect the samples in a timely manner. Below is a tentative schedule showing activities following sample collection.

- Sample Collection
- 30 days after Sample Collection Date: Analytical Report submitted to DuPont
- 7 days after Analytical Report submitted to DuPont: Validation Report submitted to DuPont

- ☐ 90 days after Validation Report submitted to DuPont: Report summarizing field activities and data evaluation submitted to WDNR

4.0 REPORTS

A summary report detailing all sampling activities will be prepared and submitted to the Wisconsin Department of Natural Resources (WDNR) for review. The report will present, at a minimum, the following information.

- ☐ Description of all field activities, data evaluation results, and conclusions/recommendations.
- ☐ Tables summarizing all data.
- ☐ Photo documentation of the sampling locations and drainage features
- ☐ Laboratory report.
- ☐ Maps presenting pertinent data.

TABLES

Table 1
Analytical List

Metals

Antimony (SW-846 6010B)
Arsenic (SW-846 6020)
Barium (SW-846 6010B)
Cadmium (SW-846 6010B)
Chromium (SW-846 6010B)
Cobalt (SW-846 6010B)
Copper (SW-846 6010B)
Lead (SW-846 6020)
Mercury (SW-846 7470/71B)
Nickel (SW-846 6010B)
Selenium (SW-846 6020)
Silver (SW-846 6010B)
Thallium (SW-846 6020)
Tin (SW-846 6010B)
Vanadium (SW-846 6010B)
Zinc (SW-846 6010B)

Nitroaromatics/Nitramines (SW 846 Method 8321A)

1,3-Dinitrobenzene
1,3,5-Trinitrobenzene
2-Amino-4,6-dinitrotoluene
2-Nitrotoluene
2,4-Dinitrotoluene
2,4,6-Trinitrotoluene
2,6-Dinitrotoluene
3-Nitrotoluene
4-Amino-2,6-dinitrotoluene
4-Nitrotoluene
HMX (1)
Nitrobenzene
Nitroglycerin
PETN (2)
RDX (3)
Tetryl (4)

SVOCs (SW846 Method 8270C)

1-Naphthylamine
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
1,2,4,5-Tetrachlorobenzene
1,3-Dichlorobenzene
1,3-Dinitrobenzene
1,3,5-Trinitrobenzene
1,4-Dichlorobenzene
1,4-Naphthoquinone
2-Acetylaminofluorene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Naphthylamine
2-Nitroaniline
2-Nitrophenol
2-Picoline
2,3,4,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3-Methylcholanthrene
3-Methylphenol & 4-Methylphenol
3-Nitroaniline
3,3.-Dichlorobenzidine
3,3'-Dimethylbenzidine
4-Aminobiphenyl
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Dimethylaminoazobenzene
4-Nitroaniline
4-Nitrophenol
4-Phenylenediamine
4,6-Dinitro-2-methylphenol
5-Nitro-o-toluidine
7,12-Dimethylbenz(a)anthracene
a,a-Dimethylphenethylamine
Acenaphthene
Acenaphthylene
Acetophenone
Aniline
Anthracene
Aramite
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Benzo{a)pyrene
Benzyl alcohol
bis(2-Chloroethoxy)methane
bis(2-Chloroethyl) ether
bis(2-Chloroisopropyl) ether
bis(2-Ethylhexyl) phthalate
Butyl benzyl phthalate
Chlorobenzilate
Chrysene
Diallate
Dibenz(a,h)anthracene
Dibenzofuran
Diethylphthalate
Dimethoate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate

Table 1
Analytical List

SVOCs (SW846 Method 8270C) Continued

- Diphenylamine
- Ethyl methanesulfonate
- Fluoranthene
- Fluorene
- Hexachlorobenzene
- Hexachlorobutadiene
- Hexachlorocyclopentadiene
- Hexachloroethane
- Hexachloropropene
- Indeno(1,2,3-cd)pyrene
- Isodrin
- Isosafrole
- Isophorone
- Methapyrilene
- Methyl methanesulfonate
- Naphthalene
- Nitrobenzene
- Nitroquinoline-l-oxide
- N-Nitrosodiethylamine
- N-Nitrosodimethylamine
- N-Nitrosodi-n-butylamine
- N-Nitrosodi-n-propylamine
- N-Nitrosodiphenylamine
- N-Nitrosomethylethylamine
- N-Nitrosomorpholine
- N-Nitrosopiperidine
- N-Nitrosopyrrolidine
- O,O,O-Triethyl phosphorothioate
- o-Toluidine
- Parathion
- Pentachlorobenzene
- Pentachloroethane
- Pentachloronitrobenzene
- Pentachlorophenol
- Phenacetin
- Phenanthrene
- Phenol
- Phorate
- Pronamide
- Pyrene
- Pyridine
- Safrole
- Sulfotepp
- Thionazin

VOCs (SW846 Method 8260B)

- 1,1-Dichloroethane
- 1,1-Dichloroethene
- 1,1,1-Trichloroethane
- 1,1,1,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- 1,1,2,2-Tetrachloroethane
- 1,2-Dibromo-3-chloropropane (DBCP)
- 1,2-Dibromoethane (EDB)
- 1,2-Dichloroethane
- 1,2-Dichloropropane
- 1,2,3-Trichloropropane
- 1,4-Dioxane
- 2-Butanone (MEK)
- 2-Hexanone
- 4-Methyl-2-pentanone
- Acetone
- Acetonitrile
- Acrolein
- Acrylonitrile
- Allyl chloride
- Benzene
- Bromodichloromethane
- Bromoform
- Bromomethane
- Carbon disulfide
- Carbon tetrachloride
- Chlorobenzene
- Chloroethane
- Chloroform
- Chloromethane
- Chloroprene
- Cis-1,2-Dichloroethene
- Cis-1,3-Dichloropropene
- Dibromochloromethane
- Dibromomethane
- Dichlorodifluoromethane
- Ethyl methacrylate
- Ethylbenzene
- Iodomethane
- Isobutyl alcohol
- Methacrylonitrile
- Methyl methacrylate
- Methylene chloride
- Propionitrile
- Styrene
- Tetrachloroethene
- Toluene
- Trans-1,3-Dichloropropene
- Trans-1,2-Dichloroethene
- Trans-1,4-Dichloro-2-butene
- Trichloroethene
- Trichlorofluoromethane
- Vinyl acetate
- Vinyl chloride
- Xylenes (total)

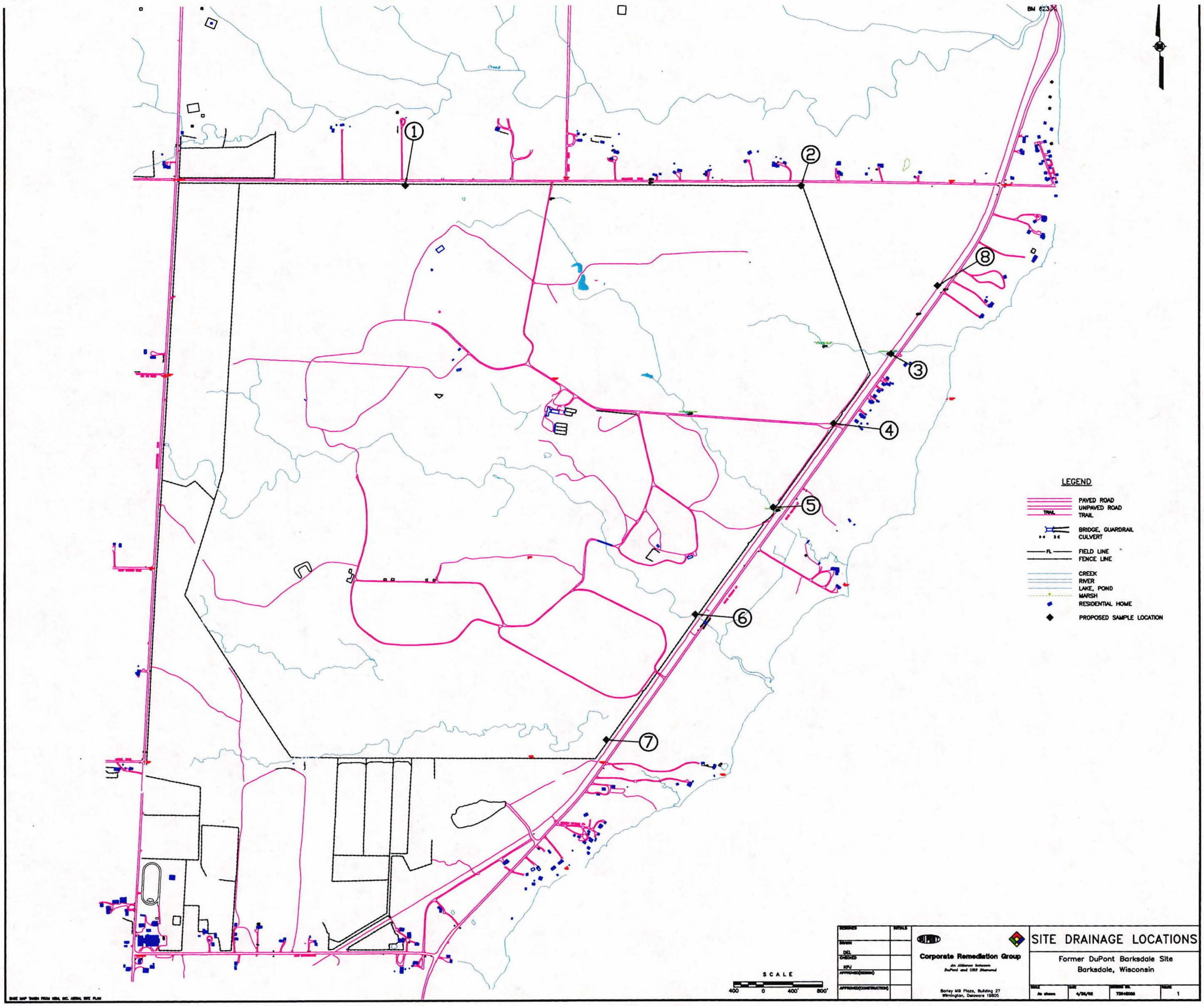
(1) HMX= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
(2) PETN= Pentaerythritol Tetranitrate
(3) RDX= Hexahydro-1,3,5-trinitro-1,3,5-triazine
(4) Tetryl= Methyl-2,4,6-trinitrophenylnitramine

Table 2
Sampling Locations

Area	Matrix	Sample IDs	Analyses			
			VOCs	SVOCs	Nitroaromatics	Metals
1	Sediment	1SD1	X	X	X	X
	Surface Water	1SW1	X	X	X	X(1)
2	Sediment	2SD1	X	X	X	X
	Surface Water	2SW1	X	X	X	X(1)
3	Sediment	3SD1	X	X	X	X
	Surface Water	3SW1	X	X	X	X(1)
4	Sediment	4SD1	X	X	X	X
	Surface Water	4SW1	X	X	X	X(1)
5	Sediment	5SD1	X	X	X	X
	Surface Water	5SW1	X	X	X	X(1)
6	Sediment	6SD1	X	X	X	X
	Surface Water	6SW1	X	X	X	X(1)
7	Sediment	7SD1	X	X	X	X
	Surface Water	7SW1	X	X	X	X(1)
8	Sediment	8SD1	X	X	X	X
	Surface Water	8SW1	X	X	X	X(1)

(1): Total and Dissolved

FIGURES



DESIGNED
INITIALS
DRAWN
DEL
CHECKED
KFJ
APPROVED(DESIGN)
APPROVED(CONSTRUCTION)

Corporate Remediation Group
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

SITE DRAINAGE LOCATIONS

Former DuPont Barksdale Site
Barksdale, Wisconsin

SCALE	DATE	DRAWING NO.	FIGURE
As shown	4/26/02	73646086	1