

DRAFT PHASE II
MONITORING/SAMPLING WORK
PLAN
DUPONT WASHINGTON WORKS SITE
WASHINGTON, WEST VIRGINIA

Date: March 2004

Project No.: 507423
18983990.04006
18983992.04006



CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

EXP000387

TABLE OF CONTENTS

1.0	Introduction	1
2.0	Background Information	3
3.0	Air Modeling Verification Study	5
3.1	Phase II Air Monitoring Activity	5
3.1.1	Air Sampling Events, Duration and Locations	5
3.1.2	Number of Samples	5
3.1.3	Sampling Equipment, Methods and Schedule	6
3.1.4	Analytical Methods	6
3.1.5	Meteorological Monitoring	7
3.1.6	Meteorological Data	7
3.1.7	Model Selection and Methodology	8
3.1.8	Receptor Selection	8
3.2	Progress Reports and Results	8
4.0	Water Monitoring Activities	9
4.1	Private Water Sources	9
4.1.1	West Virginia: GIST Conclusions and Recommendations for West Virginia Private Water Supply Sources	9
4.1.2	West Virginia: Private Water Supply Sources Activities	10
4.1.3	Ohio: GIST Conclusions and Recommendations for Ohio Private Water Supply Sources	11
4.1.4	Ohio: Private Water Supply Sources Activities	12
4.2	Public Water Sources	13
4.2.1	West Virginia: GIST Conclusions and Recommendations for West Virginia Public Water Supply Sources	13
4.2.2	West Virginia Public Water Supply Sources Activities	13
4.2.3	Ohio: GIST Conclusions and Recommendations for Ohio Public Water Supply Sources	14
4.2.4	Ohio Public Water Supply Sources Activities	14
4.2.5	Ohio: OEPA Recommended Well Installation at Little Hocking Water Association Well Field	15
5.0	Surface Water and Groundwater Monitoring	17
6.0	Surface Soil/Biota (Vegetation) Sampling	18
7.0	Schedule and Reporting	20
8.0	References	21

EXP000388

TABLES

Table 1	Summary Data for Proposed Sampling Locations In and Around DuPont Washington Works Site
Table 2	Summary of GIST Private Water Source Sampling Recommendations
Table 3	Summary of GIST Public Water Source Sampling Recommendations

FIGURES

Figure 1	Offsite Monitoring Locations Near the Washington Works Facility/Local Landfill in West Virginia and Ohio
Figure 1.5	OVS Tube
Figure 2	Offsite Monitoring Locations Near the Dry Run Landfill in West Virginia
Figure 2A	Wind Rose – DuPont Washington Works
Figure 3	Offsite Monitoring Locations Near the Letart Landfill in West Virginia
Figure 4	Public Water Source Monitoring Locations in West Virginia and Ohio
Figure 5	Proposed Locations of the Four Shallow Wells at the Little Hocking Well Field
Figure 6	Washington Works MOU Schedule

APPENDICES

Appendix A	Phase II Quality Assurance Project Plan, DuPont Washington Works Site, Washington, West Virginia
------------	--

EXP000389

1.0 INTRODUCTION

This Phase II Monitoring/Sampling Work Plan (Work Plan) is referenced as Appendix 5 in a Memorandum of Understanding (MOU) between the United States Environmental Protection Agency (USEPA) and E. I. DuPont de Nemours and Company (DuPont) that documents DuPont's intent to conduct a Perfluorooctanoic Acid (PFOA) Site-Related Environmental Assessment Program. This MOU summarizes DuPont's commitment to provide additional media-specific monitoring of PFOA by conducting a PFOA Site-Related Environmental Assessment Program at and near the DuPont Washington Works Site in West Virginia. PFOA is a disassociated form of ammonium perfluorooctanoate (APFO, commonly known as C-8 and historically known as FC-143) and other salts.

PFOA is the entity detected by the analytical instrument for all media. Soil and aqueous samples will be analyzed for PFOA and reported as C-8 for consistency with historical, including Phase I, results. C-8 results for soil and aqueous samples are obtained through a mathematical conversion. PFOA results for soil and aqueous samples are multiplied by the ratio of the molecular weight of C-8 over the molecular weight of PFOA. Air and biota samples will be analyzed and reported as PFOA.

The PFOA Site-Related Environmental Assessment Program employs a phased approach. Phase I includes commitments previously made by DuPont that were memorialized in a Letter of Intent (LOI) and that includes environmental monitoring and modeling activities at and near the DuPont Washington Works Site in West Virginia. Phase I also encompasses other relevant environmental work not within the scope of the LOI. Many of the Phase I environmental monitoring/modeling commitments have already been conducted. However, some Phase I commitments, such as surface water and groundwater monitoring at the Local, Letart and Dry Run Landfills per West Virginia National Pollutant Discharge Elimination System (WV/NPDES) permits WV0001279, WV0076538, WV0076066 and WV0076244, are ongoing. Details of the LOI commitments and other relevant environmental commitments can be found in Appendices 3 and 4 of the MOU. A listing of submissions made by DuPont pertaining to environmental monitoring/modeling at or near the DuPont Washington Work facility is also provided in the Appendix 1 of the MOU.

Phase II of the PFOA Site-Related Environmental Assessment Program includes activities that augment and build upon the LOI and other relevant environmental commitments. Phase II includes sampling on-site and sampling off-site in both West Virginia and Ohio. The following media will be sampled during Phase II:

- ☐ Air
- ☐ Drinking water sources (private and public water sources)
- ☐ Groundwater
- ☐ Surface water
- ☐ Soil
- ☐ Biota

EXP000390

A description of the Phase II work for each media is provided in this Work Plan. All work described in this Work Plan will be completed by DuPont or its authorized representatives.

This document is organized into the following sections:

- ☐ Background Information
- ☐ Air Modeling Verification Study
- ☐ Water Source Monitoring Activities
- ☐ Surface Water and Groundwater Monitoring Activities
- ☐ Soil/Biota (Vegetation) Sampling Activities
- ☐ Schedule and Reporting
- ☐ References

For each media section, a brief discussion of the study objective, sampling locations, number of samples, and frequency of sampling is presented in this Work Plan. The Quality Assurance Project Plan (QAPP) describes the specific procedures and practices that were and will be followed to ensure that data generated during the Phase II investigation at and near the DuPont Washington Works facility in West Virginia and Ohio are technically sound, usable, and properly documented.

EXP000391

Can we work this language into introduction?

2.0 BACKGROUND INFORMATION

keep OK
This Work Plan has been prepared to document multi-media PFOA sampling and monitoring activities that will be completed by DuPont during Phase II. These activities were developed pursuant to discussions with one or more of the following regulatory agencies:

- ☐ West Virginia Department of Environmental Protection (WVDEP) in regard to multi-media consent order GWR-2001-019 (Consent Order)
- ☐ Ohio Environmental Protection Agency (OEPA)
- ☐ United States Environmental Protection Agency (USEPA)

The multi-media Consent Order was entered into between the WVDEP, the West Virginia Department of Health and Human Resources – Bureau for Public Health (WVDHHR-BPH) and DuPont on November 15, 2001. The Consent Order identified a series of requirements and tasks to be performed by the parties (WVDEP, WVDHHR-BPH, and DuPont) in order to determine whether there has been an impact on human health and the environment as a result of releases of C-8 from DuPont operations at the Washington Works facility (facility) and the associated landfills (Local, Letart, and Dry Run¹).

The Consent Order established the C-8 Assessment of Toxicity Team (CATT), which consisted of scientists from academia (Marshall University), government (USEPA, EPA Region 3, WVDEP, WVDHHR-BPH), non-profit organizations [National Institute for Chemical Studies (NICS), Toxicology Excellence for Risk Assessment (TERA)], and industry (DuPont, 3M), to assess the toxicity and risk to human health and the environment associated with exposure to C-8 releases from DuPont activities. The CATT established the human health protective C-8 screening criteria for water (C-8 water SL) of 150 ug/L, the C-8 screening criteria of 240 mg/kg for soils (C-8 soil SL; WVDEP, 2002), and the Aquatic Life Advisory Concentration for C-8 (C-8 ALAC) of 1,360 ug/L (Menzie-Cura & Associates, 2002).

The Consent Order also established the C-8 Groundwater Investigation Steering Team (GIST), which consisted of scientists from WVDEP, WVDHHR-BPH, USEPA Region III and DuPont, to oversee investigations and activities conducted under the Consent Order. These tasks included Task A: Groundwater Use and Well Survey/Groundwater Monitoring, Task B: Assessment of Existing Groundwater and Surface Water Monitoring Data, and Task C: Plume Identification/Groundwater Assessment at each site. Upon DuPont's completion of Tasks A, B, and C, and comparison of the results to the CATT-established screening criteria, DuPont issued the *C-8 Data Summary Report* (DuPont, 2003) to the GIST. The GIST then prepared its *Final C-8 GIST Report* (GIST, 2003) with findings and conclusions regarding groundwater quality and the extent of groundwater impacts. These documents are in the EPA Docket as OPPT-2003-0012-0039 and OPPT-2003-0012-0204, respectively.

EXP000392

¹ Note: In the Consent Order, C-8 means ammonium perfluorooctanoate (CAS Number 3825-26-1).

The *Final C-8 GIST Report* (GIST, 2003) also presented recommendations regarding the need to conduct further work. In addition to the recommendations made by the GIST, the OEPA, which was a non-voting member of the GIST, also made recommendations that additional work be conducted in the state of Ohio, across the Ohio River from the Washington Works facility in West Virginia.

Around this same time, USEPA began its exposure assessment investigation of C-8. DuPont and other members of the Fluoropolymer Manufacturers Group (FMG) shared available data on PFOA in the environment with USEPA. Discussions occurred amongst USEPA and industry concerning the need for and type of data that would be useful and relevant to assess sources and pathways of exposure to PFOA.

In this Work Plan, DuPont presents the details of the sampling, monitoring, and modeling activities it intends to conduct during Phase II, as based on discussions with one or more of USEPA, GIST and OEPA. Details of the specific procedures and practices that will be followed to ensure that the Phase II data generated are technically sound, usable and properly documented can be found in the QAPP located in the attached Appendix A.

EXP000393

3.0 AIR MODELING VERIFICATION STUDY

DuPont is conducting a two-phased verification study to compare results from air dispersion modeling to ambient air sampling data. The purpose of this study is to understand how modeling predictions relate to measured ambient air concentrations of PFOA. To evaluate this objective, actual ambient air modeling will be performed in two phases. Phase I activity has been initiated and includes perimeter monitoring at six locations at the Washington Works fenceline. The details for this activity will be set forth in EPA public docket document number OPPT-2003-0012. Phase II of the verification study activity is described in this Work Plan.

3.1 Phase II Air Monitoring Activity

3.1.1 Air Sampling Events, Duration and Locations

The Phase II air monitoring program will consist of seven sampling events conducted over a period of six weeks. During each sampling event, one sample will be collected over a 24-hour period at each location. One sampling event will occur every six days during the six-week period.

The sample network will consist of nine locations, seven in Ohio and two in West Virginia. These locations are shown in Figure 1 and listed in Table 1. Sample locations were selected based on the following rationale:

- ☐ To be representative of the complete range of wind directions (North, South, East, and West).
- ☐ To provide sufficient spatial coverage up to 2 kilometers from the site. Because a physical terrain barrier (ridge) exists approximately 2 kilometers to the north of the site, meteorological conditions outside that radius would differ from those measured by the site meteorological station. These data points would not be consistent with the rest of the data set, creating conditions that are not optimal for conducting a verification analysis.
- ☐ To evaluate potential concentration gradients along prevailing wind directions to the northeast and east to west (see Figure 2A for the wind rose).
- ☐ To coincide with co-located soil and grass samples, in order to gain a better conceptual understanding of important environmental compartments.

3.1.2 Number of Samples

A total of 77 samples will be analyzed over the duration of the program. The samples will include the following:

- ☐ One field blank per sampling event
- ☐ One sample from each of the nine sampling locations per event

EXP000394

- ☐ One duplicate (co-located) sample for each event, place at a location where concentrations are expected to be highest
- ☐ A total of 11 samples per event x 7 events = 77 samples

3.1.3 Sampling Equipment, Methods and Schedule

Sampling will be conducted using a sorbent method for collection and analysis. In general, this method involves drawing ambient air through a medium and adsorbing the analyte of concern onto that medium. The collected species are preserved and shipped to a laboratory for analysis. The laboratory desorbs the analyte from the medium and proceeds with analysis.

For collection and analysis of PFOA, the Occupational Safety and Health Administration (OSHA) Versatile Sampling (OVS) tube with a 0.3 micron filter will be used (catalogue # 226-58 from SKC, Inc., Eighty Four, Pennsylvania, or equivalent). This tube is uniquely designed to simultaneously capture aerosols and vapors (see Figure 1.5). Details describing the tube design are included in Appendix A.

Pumps will be required at each sampling location to provide airflow through sample tubes. Sample pumps, such as the Universal PCXR4, capable of 500 mL to 1,500 mL/minute flowrate will be specified. The samplers will be set to run at approximately 1 liter per minute for a total volume of 1.44 cubic meters over the 24-hour sampling period. Sampling equipment will be mounted on poles and covered as needed to provide protection from weather and other potential damage. If these locations do not have AC power, battery operated pumps will be used. Duplicate pumps will be provided at each location to minimize potential power failure issues.

Field personnel will be trained by professional industrial hygienists familiar with OVS equipment. Field logs will be provided to record pertinent information during sampling events.

Sampling is expected to begin in the second quarter of 2004 (2Q2004), provided property owners grant permission for sampling. If a property owner declines permission, an alternative air sampling location will be proposed by DuPont.

3.1.4 Analytical Methods

Ambient air samples will be analyzed by Exygen Research of State College, Pennsylvania. Exygen will use analytical methodology that has undergone third-party validation and has been submitted to the public docket under OPPT-2003-0012-0317 through 0318. The methodology uses a methanol extraction with liquid chromatograph/mass spectrometer (LC/MS) system to detect PFOA. Method detection limits are approximated at 0.1 ug/m³.

Contents of sample tubes will be analyzed separately for vapor and particles greater than 0.3 microns, then composited for a total concentration at each sampling location. Additional details of the analytical methodology can be found in the QAPP (see Appendix B).

EXP000395

3.1.5 Meteorological Monitoring

Meteorological measurements will be taken during each event using an on-site meteorological station. The use of an on-site meteorological station ensures the data are representative of conditions at the perimeter of the site.

Data collected during each 24-hour sampling event will include the following:

- ☐ Hourly average wind speed
- ☐ Hourly average wind direction
- ☐ Hourly average ambient air temperature
- ☐ Calculation of stability class
- ☐ Phase II Air Modeling Activity
- ☐ Emission Inventory

Source Characterization

The following information will be collected and used as input into air dispersion modeling:

- ☐ Stack locations
- ☐ Stack heights-
- ☐ Stack diameters
- ☐ Stack gas exit temperatures
- ☐ Stack gas flow rates or exit velocities
- ☐ Emission rates

Methods for Estimating Emissions

Site-specific operational data will be used to relate production data to emissions levels using a factor. Through a combination of actual stack monitoring (for vents with highest emissions) and mass balance estimates (for vents with very small emissions), a factor has been established for each PFOA emission point to estimate the quantity of emissions released at a given production rate. This factor will be combined with production data to calculate PFOA emissions during each 24-hour sampling event.

3.1.6 Meteorological Data

On-site meteorological data will be collected during each sampling event, as described in Section 3.1.5. Concurrent twice-daily upper air observations will be collected from the upper air station located in Wilmington, Ohio in order to compute hourly mixing depth. Both sets of data will be combined and preprocessed by Trinity consultants of Dallas, Texas, to be used as input to the air dispersion model. Missing data and measured wind speeds of less than 1.0 m/s will be treated consistent with the recommendations in USEPA's *Meteorological Monitoring Guidance for Regulatory Model Applications*. An anemometer height of approximately 9.14 meters will be used for modeling analysis.

EXP000396

3.1.7 Model Selection and Methodology

The Industrial Source Complex Short Term Model (ISCST3), version 02035 will be used to conduct air dispersion modeling. All modeling will be performed in accordance with the procedures in USEPA's *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). All model options will be set to the USEPA default version of ISCST3.

PFOA emission sources will be evaluated for downwash effects from surrounding buildings. USEPA's Building Profile and Input Program (BPIP) will be used to provide wind direction specific building parameters. All buildings on site will be evaluated to determine if these buildings could potentially impact the stack by causing building downwash effects.

The area surrounding Washington Works is primarily non-urban. The USEPA procedures classify land use within 3 kilometers of the site by the Auer method. Previous review of the U.S. Geological Survey (USGS) maps, aerial photographs, and site visits indicate the area is well over 50% non-urban. The Washington Works facility is located within the Ohio River Valley, and is surrounded by significant terrain features on both sides of the river valley. As a result, terrain elevations will be considered in the modeling analysis.

An averaging time of 24 hours will be used to simulate the duration of field sampling.

3.1.8 Receptor Selection

Receptors will be placed at exact coordinates of the perimeter sampling locations shown in Figure 1. A Global Positioning System (GPS) will be used to identify UTM coordinates of each sample location. The aboveground elevation of intake tubing for each sample location will also be measured and input into the ISCST3 model.

3.2 Progress Reports and Results

Progress of Phase II sampling will be summarized in semi-annual status reports that will be issued by DuPont. Following completion of Phase II air monitoring and modeling, DuPont will submit a report, no later than 30 days after the report is finalized to USEPA, WVDEP, and DEPA providing results of the verification study (Phases I and II).

EXP000397

4.0 WATER MONITORING ACTIVITIES

In the *Final C-8 GIST Report* (GIST, 2003), conclusions were presented and recommendation were made related to the three tasks performed by DuPont and evaluated by the GIST (Tasks A, B, and C).

Task A required DuPont to conduct a distance-phased public water supply service survey along the Ohio River on both the West Virginia and Ohio sides of the river. Subsequent to the Task A requirement, a one-mile (and possibly a two- and three-mile) radial distance of the Washington Works facility and Local, Letart and Dry Run Landfills was also surveyed. This phased approach to the water and groundwater use survey and sampling was intended to allow the GIST to focus efforts along potential C-8 impacted transport pathways and eventually cease activities in directions where impacts were not present or where there were low concentrations.

4.1 Private Water Sources

4.1.1 West Virginia: GIST Conclusions and Recommendations for West Virginia Private Water Supply Sources

Following completion of Task A, GIST concluded the following:

- ☐ Initial sampling within a one-mile radius of the Washington Works facility and each of the three landfills resulted in varying levels of C-8 being found in private water sources.
- ☐ Private water sources within a one- to two-mile radius were sampled around the Washington Works facility and the Local Landfill based on C-8 concentrations detected in groundwater greater than 1.0 ug/L in the one-mile radius. No further private water source sampling beyond the two-mile radius is necessary based on the lower concentrations detected in the one- and two-mile radius sampling area.
- ☐ No private water sources in West Virginia were found to exceed the C-8 drinking water screening level of 150 ug/L. The highest concentration detected was 10.4 ug/L.

Based on these conclusions, limited private water source resampling in West Virginia was recommended by the GIST for the purpose of evaluating the current trend of C-8 concentrations with respect to those sources. For private water sources around the Washington Works facility/Local Landfill, the Dry Run Landfill, and the Letart Landfill, water-sampling categories were defined, the number of samples from each category was identified, and the sampling frequency was specified (GIST, 2003) as indicated in the following table.

EXP000398

	GIST Defined Water-Sampling Category	GIST Recommended Number of Samples Per Category	GIST Recommended Frequency of Sampling
Washington Works/Local Landfill (Total of 10 locations)	Drinking water wells with detected levels of PFOA	3	Quarterly for one year
	Drinking water springs with detected levels of PFOA	1	Quarterly for one year
	Non-drinking water wells with detected levels of PFOA	1	Quarterly for one year
	Springs and cisterns with detected levels of PFOA	3	Quarterly for one year
	One well and spring used for cattle where prior sampling has detected PFOA concentrations above 5 ug/L	2	Quarterly for one year
Dry Run Landfill (Total of 10 Locations)	Drinking water wells with detectable levels of PFOA	6	Quarterly for one year
	Drinking water springs with detectable levels of PFOA	1	Quarterly for one year
	Springs and cisterns with detectable levels of PFOA	3	Quarterly for one year
Letart (2 Locations)	GERLACHIBA BRINKERA	1	Annually for one year

4.1.2 West Virginia: Private Water Supply Sources Activities

DuPont intends to resample ten private water sources around the Washington Works facility/Local Landfill and ten private water sources around the Dry Run Landfill on a quarterly basis for one year for the purpose of evaluating the C-8 concentration trend for those sources. Sampling is anticipated to start in 2Q04. This start date will be dependent upon obtaining property owner permission to resample. If a property owner declines to have the private water source resampled, then an alternative sampling location will be proposed by DuPont.

Private water sampling locations for the Washington Works facility/Local Landfill and the Dry Run Landfill were selected based on the following:

- Specific water sampling categories defined by the GIST and the number of samples required for each category based on GIST recommendations (see Table 2)

EXP000399

- ☐ Potential access to the sampling locations
- ☐ The ability to cluster private water sampling locations with locations also selected for air monitoring and/or sampling of soil and biota to minimize the total number of access points (Air monitoring and soil/biota sampling activities and locations are discussed in Sections 3.0 and 5.0, respectively.)

Private water sources selected for sampling at the Washington Works facility/Local Landfill and the Dry Run Landfill are shown in Figures 1 and 2, respectively. Each private water sampling location shown in Figures 1 and 2 is also listed in Table 2 according to the water-sampling category. Table 1 also summarizes additional data for each private water source to be sampled.

In addition, at the Letart Landfill, DuPont intends to sample the two private water sources recommended by the GIST (i.e., the Gerlach and Brinker residences), annually for one year. Figure 3 shows the locations of the Gerlach and Brinker residences. Sampling will be conducted in 2Q04 provided permission to sample is granted.

The sampling methodology used for acquiring these samples is dependant upon water source and sampling point (e.g., spring, well, cistern, tap). The analytical method that will be used is a validated LC/MS/MS aqueous method developed by Exygen Research of State College, Pennsylvania. The method has a PQL of 0.05 ug/L. Details describing the private water sampling methods and the analytical methodology are provided in the QAPP (see Appendix A).

The progress of the Phase II private water sampling in West Virginia will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the West Virginia private water supply sampling will be included in final report submitted to USEPA, WVDEP, and GIST no later than 30 days after the report is finalized.

4.1.3 Ohio: GIST Conclusions and Recommendations for Ohio Private Water Supply Sources

Following completion of Task A, GIST concluded the following:

- ☐ Initial sampling within a one-mile radius of the Washington Works facility resulted in varying levels of C-8 being found in approximately 94% of the water sources sampled.
- ☐ Private water sources within a one- and two-mile radius from the Washington Works facility were sampled based on the levels of C-8 detected at the outer limits of the one-mile radius.
- ☐ No private water sources in Ohio were found to exceed the drinking water screening level of 150 ug/L. The highest concentration detected was 23.6 ug/L.

Based on these conclusions, limited private water source resampling in Ohio was also recommended by the GIST for the purpose of evaluating the current trend of C-8 concentrations with respect to those sources. For private water sources in Ohio, water-sampling categories were defined, the number of samples from each category was identified, and the sampling frequency was specified by the GIST (GIST, 2003) as shown the following table.

EXP000400

	Water Sampling Category	Number of Samples per Category	Frequency of Sampling
Ohio (Total of 11 Locations)	Drinking water wells with detectable levels of PFOA	5	Quarterly for one year
	Drinking water springs with detectable levels of PFOA	1	Quarterly for one year
	Non-drinking water wells with detectable levels of PFOA	1	Quarterly for one year
	Springs and cisterns with detected levels of PFOA	4	Quarterly for one year

4.1.4 Ohio: Private Water Supply Sources Activities

DuPont intends to resample eleven private water sources in Ohio on a quarterly basis for one year, starting in 2Q04, for the purpose of evaluating the C-8 concentration trend for those sources. Sampling is anticipated to start in 2Q04. This start date will be dependent upon obtaining property owner permission to sample. If a property owner declines to have the private water source resampled, then an alternative sampling location will be proposed by DuPont. The ten private water source sampling locations in Ohio were selected based on the same criteria given for private water sources in West Virginia. In February 2004, USEPA and OEPA requested that one additional private water source be included in the proposed sampling program. This location has been added to the program.

The eleven private water sources selected for sampling are shown in Figure 1. Each private water sampling location shown in Figure 1 is also listed in Table 2 according to the water-sampling category. Table 1 also summarizes additional data for each private water source to be sampled.

The sampling methodology used for acquiring these samples is dependant upon water source and sampling point (e.g., spring, well, cistern, tap). The analytical method that will be used is a validated LC/MS/MS aqueous method developed by Exygen Research of State College, Pennsylvania. The method has a PQL of 0.05 ug/L. Details describing the private water sampling and the analytical methodology are provided in the QAPP (see Appendix A).

The progress of the Phase II private water sampling in Ohio will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the Ohio private

EXP000401

water supply sampling will be included in final report submitted to USEPA, WVDEP, OEPA, and GIST no later than 30 days after the report is finalized.

4.2 Public Water Sources

4.2.1 West Virginia: GIST Conclusions and Recommendations for West Virginia Public Water Supply Sources

The GIST concluded the following for West Virginia public water supply sources:

- No public water supply production wells in West Virginia were found to exceed the drinking water screening level of 150 ug/L. The highest concentration detected was 1.87 ug/L.
- The widespread distribution and low concentrations of C-8 indicate that the primary migration pathways to public water supplies are air emissions from the Washington Works facility and pumping-induced infiltration from the Ohio River, which receives C-8 from the NPDES outfalls and the Washington Works facility and the Letart landfill.

Based on these conclusions, GIST recommended continued quarterly sampling at the Lubeck Public Service District (PSD), the DuPont Washington Works facility, and the General Electric public water system for two years. Annual sampling of the Blennerhassett Island State Park, Mason County PSD, and the Racine Lock and Dam Public Water System (PWS) for two years was also recommended. Continued sampling was recommended for the purpose of evaluating the C-8 concentration trend for those sources. Following these monitoring periods, the GIST recommended re-evaluation of the monitoring. For each of these public water sources, the GIST identified specific production wells and finished water sampling points to be monitored.

In addition, the GIST recommended DuPont conduct a limited field investigation of C-8 in soil at the Lubeck PSD to determine the extent and concentration of C-8 in soil at the Lubeck PSD in the vicinity of their production wells. DuPont would document the results in a report and submit this report to the GIST. Following data evaluation of the soil results, the GIST would then determine what additional sampling activities would be necessary, if any, to complete the investigation. The details of the investigation to be conducted at the Lubeck PSD are provided in Section 6.0.

4.2.2 West Virginia Public Water Supply Sources Activities

DuPont intends to monitor public water sources in West Virginia, following the recommendations of the GIST, for the purpose of evaluating the C-8 concentration trend for those sources. Figure 4 shows the locations of public water sources in West Virginia that will be monitored for two years. At each monitoring location, the color (pink or blue) and shape (square or circle) of the label indicates monitoring frequency (annually or quarterly) and individual sampling points (production wells and finished water sampling points) are listed. Table 1 also summarizes additional data for each public water source to be sampled. Table 3 indicates the duration of monitoring for each public water source.

The sampling methodology used for acquiring these samples is dependant upon sampling point (e.g., spring, well, cistern, tap). The analytical method to be used is a validated LC/MS/MS aqueous method developed by Exygen Research of State College, Pennsylvania. The method has a PQL of 0.05 ug/L. Details describing the public water sampling methods and the analytical methodology are provided in the QAPP (see Appendix A).

The progress of the Phase II public water sampling in West Virginia will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the West Virginia public water supply sampling will be included in final report submitted to USEPA, WVDEP, OEPA, and GIST no later than 30 days after the report is finalized.

4.2.3 Ohio: GIST Conclusions and Recommendations for Ohio Public Water Supply Sources

Following the completion of Task A, GIST concluded the following:

- ☐ No public water supply production wells in Ohio were found to exceed the drinking water screening level of 150 ug/L. The highest concentration detected was 8.58 ug/L.
- ☐ The widespread distribution and low concentrations of C-8 indicate that the primary migration pathways to public water supplies are air emissions from the Washington Works facility and pumping-induced infiltration from the Ohio River, which receives C-8 from the NPDES outfalls and the Washington Works facility and the Letart landfill.

The GIST recommended continued quarterly sampling at the Little Hocking Water Association PWS for two years and annual sampling of the Tupper's Plains PWS for two years for the purpose of evaluating the C-8 concentration trend for those sources. For these two public water sources in Ohio, the GIST listed specific production wells and finished water sampling points to be monitored. Following these monitoring periods, the GIST recommended re-evaluation of the monitoring.

4.2.4 Ohio Public Water Supply Sources Activities

DuPont intends to monitor the public water sources in Ohio, following the recommendations of the GIST, for the purpose of evaluating the C-8 concentration trend for those sources. In Ohio, two public water sources will be sampled (the Little Hocking Water Association and the Tupper's Plains-Chester Public Service District) for a period of two years. Figure 4 shows the locations of public water sources in Ohio that will be monitored. At each monitoring location, the color (pink or blue) or the shape (square or circle) of the symbol, which indicates monitoring frequency (annually or quarterly) and individual sampling points (production wells and finished water sampling points), are also listed. Table 1 also summarizes additional data for each public water source to be sampled. Table 3 indicates the duration of monitoring for each public water source.

The sampling methodology used for acquiring these samples is dependent upon sampling point (e.g., spring, well, cistern, tap). The analytical method to be used is a validated LC/MS/MS aqueous method developed by Exygen Research of State College,

EXP000403

Pennsylvania. The method has a PQL of 0.05 ug/L. Details describing the public water source sampling methods and the analytical methodology are provided in the QAPP (see Appendix A).

The progress of the Phase II public water sampling in Ohio will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the Ohio public water supply sampling will be included in final report submitted to USEPA, WVDEP, OEPA, and GIST no later than 30 days after the report is finalized.

4.2.5 Ohio: OEPA Recommended Well Installation at Little Hocking Water Association Well Field

As part of Task A of the Consent Order, public water supplies along the Ohio River in both Ohio and West Virginia were sampled. The Little Hocking Water Association is one of the public water supplies located in Ohio that was sampled. It is located immediately across the Ohio River from the DuPont Washington Works facility. Groundwater results for test well, TW-4, which was installed to evaluate groundwater quality and is not used as drinking water, showed unusually high C-8 concentration compared with other concentration measured at this public water supply. Based on the elevated results at TW-4 compared to the surrounding wells, the OEPA requested that DuPont conduct a focused field investigation to delineate C-8 concentrations in soil and groundwater near TW-4.

In August 2002, DuPont conducted the field investigation at the Little Hocking Water Association well field. During this investigation, ten temporary soil borings were drilled and geologic information was continuously monitored. Soil and groundwater were sampled and groundwater parameters were monitored at various depths within the ten temporary borings. In addition, groundwater in all production and test wells was sampled, and recorded groundwater elevations were recorded. Ohio River stage was also monitored.

There were three primary conclusions from this investigation, which are as follow:

- ❑ First, consistently high pH values measured in TW-4 and other field observations indicate that this test well's construction is likely compromised, possibly due to a failed grout seal or to a failed well casing.
- ❑ Secondly, based on the current data available, DuPont believes the following C-8 migration pathway exists: C-8 from the DuPont facility is transported via air emissions by wind and is deposited on the Little Hocking well field surface soils. Precipitation then leaches the C-8 downward through the unsaturated zone to the aquifer. Dissolved C-8 then migrates with groundwater within the aquifer. Groundwater containing low levels of C-8 is then pumped from the aquifer through the four production wells. Water from the production wells is mixed and the finished water, containing even lower levels of C-8, then enters the Little Hocking Water Association distribution system.
- ❑ Third, the C-8 results for finished water, a combination of waters from the production wells that is distributed to Little Hocking customers, ranged from 1.69 to 4.29 ug/L, significantly lower than the water C-8 SL of 150 ug/L.

EXP000404

These conclusions and other findings of this investigation were documented in a report to the GIST (DuPont, 2003).

As indicated in the *Final C-8 GIST Report* (GIST, 2003), OEPA and DuPont together would determine what additional activities are necessary to complete the Little Hocking field investigation to the satisfaction of the GIST and OEPA. After reviewing the *Little Hocking Sampling Investigation Report*, the OEPA recommended revisions to the report and requested additional investigation. The revisions have been made to the report and the *Revised Little Hocking Sampling Investigation Report* was submitted to the GIST in February 2004.

During Phase II, DuPont intends to install the four shallow wells at the Little Hocking Water Association well field as recommended by OEPA. One of the shallow wells will be installed north of production wells #5, if possible, as requested by the OEPA. The other three shallow wells will be clustered with existing test wells TW-1, TW-6, and TW-12. Proposed shallow well locations are shown in Figure 5. During well installation, surface soil/biota and subsurface soil will be sampled. Details of the shallow well installation and the surface and subsurface soil sampling are provided in the QAPP (see Appendix A).

Installation of the wells is anticipated to begin 2Q04 and if dependent upon the property owner granting permission for such installation. In the event permission is not granted, DuPont will consult with OEPA.

Following installation and development of the four new shallow wells at Little Hocking, these wells, along with the deeper clustered wells (Figure 5), will be included in the quarterly groundwater sampling program for Little Hocking. The progress of the Phase II shallow well installation at the LHWA well field and the sampling of these clustered test wells will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the shallow well installation and the test well monitoring will be included in final report that is due to USEPA no later than 30 days after the report is finalized.

EXP000405

5.0 SURFACE WATER AND GROUNDWATER MONITORING

Task B of the Consent Order (Assessment of Existing Groundwater and Surface Water Monitoring Data) required the development and implementation of a monitoring plan that would determine the extent and presence of C-8 in drinking water, groundwater, and surface water at the Washington Works facility and the three landfills. In addition, this task required DuPont to compile all the available groundwater and surface water monitoring data and hydrogeological data for each site.

For the Washington Works facility and the three landfills, the GIST recommended that surface water and groundwater monitoring continue at selected sampling points.

Surface-water and groundwater monitoring activities will be continued under the requirements of the WV/NPDES permits WV0001279, WV0076538, WV0076066 and WV0076244 for the Washington Works facility and the Local, Letart and Dry Run Landfills, respectively. Because surface-water and groundwater monitoring is being conducted in accordance with the WV/NPDES permits, this monitoring is not part of Phase II and is not discussed further in this document. Additional details of this monitoring can be found in the permits. The results of monitoring conducted pursuant to permits will be submitted to USEPA as part of the semi-annual reports set forth in the LDI.

EXP000406

6.0 SURFACE SOIL/BIOTA (VEGETATION) SAMPLING IN WEST VIRGINIA AND OHIO

OEPA recommended establishing at least eight locations to collect surface soils for analysis of C-8. Sampling locations were to be selected based on available C-8 data from air modeling, groundwater modeling and sampling activities. OEPA recommended that some of the eight samples be collected from residential areas near the Little Hocking well field and in areas where different soil types would be expected.

GIST recommended DuPont conduct a limited field investigation of C-8 in soil at the Lubeck PSD to determine the extent and concentration of C-8 in soil at the Lubeck PSD in the vicinity of their production wells.

Based on the recommendations from OEPA and GIST, and on additional data needs identified by USEPA, DuPont plans to conduct a soil and biota (vegetation) sampling program at the following locations in West Virginia and Ohio for the purpose of determining if C-8 is present:

- ☐ On the surface of vegetation
- ☐ Within the vegetation matrix (i.e., it is being uptake onto plant structure)
- ☐ Within the topmost, highly organic soil underlying the vegetative layer

For the field investigation of surface soil/biota, DuPont has selected eleven locations in Ohio and ten locations in West Virginia (see Figure 1 and Table 1). Sampling locations were selected to be consistent with locations selected for air and private water sampling locations. In Ohio, four surface soil/biota sample locations were selected, adjacent to where the four new shallow wells will be installed at the Little Hocking Water Association well field. Seven private residences in Ohio were also selected for surface soil/biota sampling. In West Virginia, seven private residences were selected for surface soil/biota sampling. In addition, three surface soil/biota sample locations will be selected at the Lubeck Public Service District well field. The exact position of these three sampling locations will be determined following a site visit by DuPont (or its authorized representative). If a property owner declines soil/biota sampling, DuPont will propose an alternative surface soil/biota sampling location. After permission has been granted to collect the soil/biota samples for the private residences and the public water suppliers, exact sampling locations will be identified and surveyed using a global positioning system and the location marked with flagging or equivalent.

For the surface soil/biota sampling in Ohio and West Virginia, DuPont proposes conducting two synoptic sampling events in the late spring 2004 (providing access is granted), one following a "wet" period and one following a "dry" period. ("Wet" and "dry" periods are defined in Appendix A.) The objective of sampling following a "wet" and "dry" period is to evaluate if precipitation has an effect on the concentration of PFOA measured. Meteorological data will be monitored prior to and during the "wet" and "dry" sampling events.

At each sampling location, two samples will be collected immediately adjacent to each other during each sampling event. Each sample will consist of a 6-inch depth core of

EXP0004

vegetation and soil. The two samples will be collected adjacent to each other. The first sample will be submitted for analysis and the second sample, which will be a larger diameter sample, will be used to determine the soil classification (ASTM D2487) at the location. Sample collection methodology is presented in Section 2.2.10 of the QAPP (see Appendix A).

The first sample will be divided in the field into two portions, the organic-rich portion (vegetation and litter layer) and the mineral matter-rich portion (root, root zone and the material below the root zone). The objective of dividing the sample into a biota (organic-rich) portion and soil (mineral matter-rich) portion is to evaluate if the PFOA is detectable in both portions and to compare the PFOA concentrations between the organic-rich portion and the mineral matter-rich portion. In addition, for the samples collected during the "dry" event, the organic-rich portion will be washed with deionized water, prior to processing the soil samples for analysis, to differentiate between adsorbed (sticking) or "external" PFOA removed by the deionized wash water and PFOA incorporated within the organic material itself. The washed organic-rich portion and the wash water will be analyzed for PFOA. The mineral-rich portion of four samples (OH-S/B-3, OH-S/B-4, OH-S/B-7 and WW-S/B-10) collected during the "dry" event will also be washed for comparison. For these four sample, the washed mineral-matter-rich portion and the wash water will be analyzed for PFOA.

Note that DuPont is not currently aware of a validated analytical method for determining PFOA concentrations in organic matter. Method development for surface soil/biota (organic matter-rich portions and mineral-matter rich portions) analysis has been initiated at Morse Laboratories (Morse), Sacramento, California. If Morse is unable to provide analysis for surface soil/biota sample extracts, then STL will provide analysis of these extracts. Biota sampling will be conducted during the synoptic "wet" and "dry" events although analysis of the organic rich samples will not take place until successful completion of method validation. Sample handling and storage prior to analysis will follow the protocol outlined in the QAPP. Details of the sampling and analytical methodology are provided in the QAPP (see Appendix A).

The second, larger diameter sample will be used for soil classification according to ASTM D2487. Soil classification will be based on the results of grain size determination and Atterburg Limits, and may include results of specific gravity, organic content and moisture content.

The progress of the Phase II synoptic surface soil/biota sampling at private residences and at public water suppliers Ohio and West Virginia will be summarized in the semi-annual status reports that will be issued by DuPont. The results of the two synoptic surface soil/biota sampling events will be included in final report submitted to USEPA, OEPA, and WVDEP no later than 30 days after the report is finalized.

EXP000408

7.0 SCHEDULE AND REPORTING

The schedule for completing the Phase II work required by the MOU is shown in Figure 6. The schedule begins with USEPA and DuPont signing the MOU and concludes with submitting the Phase II report for all sampled media (except air). Subsequent tasks required by the MOU (i.e., conducting assessments, performing the peer consultation, and implementing post-peer consultation commitments, etc.) will be addressed in updated schedules that will be included in the status reports generated for this assessment.

Phase II sampling will begin after permission has been granted from the off-site property owners. Throughout this assessment, reports will be generated to update status and provide data generated during this investigation. Status updates will be submitted to USEPA semi-annually. A final air report will be submitted after the air verification study is conducted and data reduction and modeling is complete. A Phase II report will be submitted (for all media except air) after Phase II is complete and after data are reduced and analyzed. Based on the current schedule, the Phase II report is expected to be submitted in November 2006. All final reports will be submitted to USEPA within 30 days of becoming final (in accordance with the terms of the MOU).

EXP000409

8.0 REFERENCES

To be completed in the final report

EXP000410

TABLES

EXP000411

TABLES

EXP000412

Table 1.
Summary Data for Proposed Sampling Locations In and Around DuPont Washington Works Site
DuPont Washington Works Site
Washington, West Virginia

DuPont Proposed Sampling Locations (OH)				DuPont Water/Non-Drinking Water		Water Source		Water Use		Water Source		Water Use	
Soil/Biota	Air	Water	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type
OH-S/B-2		OH-P-6	Well		Non-drinking Water	Used	WWK-D-McKown	Outdoor purposes (i.e. watering flowers, garden, etc.)					
		OH-P-5	Well		Drinking Water	Used	WWK-D-Eddy EE	Well used for all household purposes. They also have city water but use well water as primary source.					
OH-S/B-8		OH-P-2	Well		Drinking Water	Used	WWK-D-RumerJH	All purposes					
OH-S/B-10	OH-A-5		Well		Drinking Water	Used	WWO-D-FosterTV	All purposes except drinking and cooking, for which bottled water is used.					
		OH-P-10	Spring		Drinking Water	Used	WWK-G-SpicerRF	Occasionally used for drinking.					
		OH-P-9	Spring		Drinking Water	Unused	WWK-G-StahlPR2	Unused at present, but planned future use.					
OH-S/B-1	OH-A-2		Cistern		Non-drinking Water	Used	WWK-G-StephanML1	Cistern used for watering livestock.					
		OH-P-3	Spring		Non-drinking Water	Used	WWK-G-WatsonMP3	Used to water livestock.					
OH-S/B-7	OH-A-4		Cistern		Non-drinking Water	Used	WWK-G-WatsonMP4	Occasionally used to water livestock.					
OH-S/B-9	OH-A-6		Well		Drinking Water	Used	WWO-D-TaitWJ	City water and well. Uses well mostly to water garden. Drinks the well water if city water fails.					
OH-S/B-11	OH-A-7	OH-P-11	Well		Drinking Water	Used	WWO-D-WhiteAL	All purposes. Only water source.					
	OH-A-1		Well (hand-dug)		Non-drinking Water	Used	WWO-G-KidderEM	Outdoor purposes (i.e. watering flowers, garden, etc.)					
		OH-P-7	Well		Drinking Water	Used	WWK-D-ParsonsCF	Well serves house and business. Used for all household purposes and for kennel.					
DuPont Proposed Sampling Locations (OH)				DuPont Water/Non-Drinking Water		Water Source		Water Use		Water Source		Water Use	
Soil/Biota	Air	Water	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type	Sample ID	Sample Type
		TPPSDOW1, 2, 3, 4, 5, 6, AT	Production Wells and Finished Water										
OH-S/B-3, 4, 5, 6	OH-A-3	LHPD1, 2, 3, 5, EP001	Production Wells and Finished Water										

EXP000413

Table 1.
Summary Data for Proposed Sampling Locations In and Around DuPont Washington Works Site
DuPont Washington Works Site
Washington, West Virginia

DuPont Proposed Sampling Locations (West Virginia)					
Soil/Biota	Water Source	Sample Type	Project Name	Project Location	Project Purpose
	AM07-PW01, AO08-PW01, AX13-PW01, K16-PW01, L04 PW01, V05-PW01	Production Wells and Finished Water	DuPont Washington Works		
	MASONCPSD1, 2, 3	Production Wells	Mason County PSD		
	RACINELD	Finished Water	Racine Lock and Dam PSD		
	GE Well 3	Finished Water	GE		
	BLNISEPS1	Finished Water	Blennerhassett Island		
WW-S/B-1, 2, 3	LPSD Well A, B, C, D, E, F, AT	Production Wells and Finished Water	Lubeck PDS		
DuPont Proposed Sampling Locations (Washington Works)					
Soil/Biota	Water Source	Sample Type	Project Name	Project Location	Project Purpose
WW-S/B-9	WW-P-4	Well	WWK-D-AheartR		All purposes
WW-S/B-4	WW-P-5	Well	WWK-D-GarnesAL		Water dog and fish
	WW-P-1	Well (1)	WWK-D-ChristmanS		All purposes
WW-S/B-7	WW-P-7	Spring (1)	WWK-G-Tailhamer		Watering livestock
WW-S/B-8	WW-P-6	Cistern (1)	WWK-G-ThompsonB		Watering animals
	WW-P-10	Well	WWK-D-PhillipsAE		Well used for all purposes.
WW-S/B-6	WW-P-9	Cistern	WWK-G-WallersMM		Children play in water, water garden and yard.
	WW-P-2	Spring (1)	WWK-G-LawsonDH2		Livestock
WW-S/B-10	WW-P-3	Wells (1st of 2)	WWK-G-FurbecC		Spring used occasionally for coffee.
WW-S/B-5	WW-P-8	Spring	WWK-D-StuttlerLR		

EXP000414

Table 1.
Summary Data for Proposed Sampling Locations In and Around DuPont Washington Works Site
DuPont Washington Works Site
Washington, West Virginia

DuPont Proposed Sampling Locations (West Virginia - DuPont)									
Soil/Biota	Air	Water/Soil	Well/Cistern/Spring	Drinking Water	Use	Well Name	Water Type	Water Use	Water Type
		DR-P-2	Well (1)	Drinking Water	Used	WWK-D-AbbottRL	All purposes (excluding drinking - but used to make ice for drinks)		
		DR-P-3	Well (1)	Drinking Water	Used	WWK-D-AbbottS	All purposes		
		DR-P-1	Wells (2nd of 2)	Drinking Water	Used	WWK-D-AtkinsonJ2	Drinking only		
		DR-P-6	Well (1)	Drinking Water	Used	WWK-D-BakerH	All purposes		
		DR-P-8	Well (1)	Drinking Water	Used	WWK-D-NicholsonDH	All purposes		
		DR-P-9	Cistern (1)	Drinking Water	Used	WWK-D-NickelsonDH2	Used if well is running low		
		DR-P-10	Well (1)	Drinking Water	Used	WWK-D-ParkerJL	All purposes		
		DR-P-4	Spring (1)	Drinking Water	Used	WWK-D-SeebaughR	All uses - household, drinking, etc.		
		DR-P-5	Spring	Drinking Water	Unused	WWK-G-TennantJD			
		DR-P-7	Cistern (1)	Non-drinking Water	Used	WWK-G-DowlerE1	Used for washing vehicles, watering garden/flowers, etc...		
DuPont Proposed Sampling Locations (West Virginia - Latimer)									
Soil/Biota	Air	Water/Soil	Well/Cistern/Spring	Drinking Water	Use	Well Name	Water Type	Water Use	Water Type
		L-P-1	Well (1)	Drinking Water	Used	WWK-D-Brinkera	All purposes		
		L-P-2	Well (1)	Drinking Water	Unused	WWK-G-GratchBA			

EXP000415

Table 2
Summary of GIST Recommended Private Water Source Sampling Category In and Around DuPont Washington Works Site and DuPont Proposed Sampling Locations
DuPont Washington Works Site
Washington, West Virginia

Category	Location	Number of Samples	Sampling Method	Sampling Frequency
Washington Works/Local Landfill (Total of 10 locations)	Drinking water wells with detected levels of C-8	3	WW-P-1, WW-P-4, WW-P-5	Quarterly for one year
	Drinking water springs with detected levels of C-8	1	WW-P-8	Quarterly for one year
	Non-drinking water wells with detected levels of C-8	1	WW-P-5	Quarterly for one year
	Springs and cisterns with detected levels of C-8	3	WW-P-6, WW-P-7, WW-P-9	Quarterly for one year
	One well and spring used for cattle where prior sampling has detected C-8 concentrations above 5 ug/L	2	WW-P-2, WW-P-3	Quarterly for one year
Dry Run Landfill (Total of 10 Locations)	Drinking water wells with detectable levels of C-8	6	DR-P-1, DR-P-2, DR-P-3, DR-P-6, DR-P-8, DR-P-10	Quarterly for one year
	Drinking water springs with detectable levels of C-8	1	DR-P-4	Quarterly for one year
	Springs and cisterns with detectable levels of C-8	3	DR-P-5, DR-P-7, DR-P-9	Quarterly for one year
	GERLACHIBA	1	L-P-1	Annually for one year
Letart (2 Locations)	BRINKERA	1	L-P-2	Annually for one year
	Drinking water wells with detectable levels of C-8	5	OH-P-1, OH-P-2, OH-P-5, OH-P-7, OH-P-11	Quarterly for one year
Ohio (Total of 11 Locations)	Drinking water wells with detectable levels of C-8	1	OH-P-10	Quarterly for one year
	Drinking water springs with detectable levels of C-8	1	OH-P-6	Quarterly for one year
	Non-drinking water wells with detectable levels of C-8	4	OH-P-3, OH-P-4, OH-P-8, OH-P-9	Quarterly for one year
	Springs and cisterns with detected levels of C-8			

Table 3.
Summary of GIST Public Water Source Sampling Recommendations
DuPont Washington Works Site
Washington, West Virginia

State	Public Water Source Recommended for Monitoring	Individual Water Sources To Be Sampled	Frequency of Sampling	Regulatory Order
Ohio	Tuppers Plains - Chester	TPPSDDW1, TPPSDDW2, TPPSDDW3, TPPSDD 4, TPPSDDW5, TPPSDDW6, TPPSDAT	Annual/2 yrs	WV Consent Order/OEPA
		LHPSD1, LHPSD2, LHPSD3, LHPSD5, LHPSDEP001	Quarterly/2 yrs	WV Consent Order/OEPA
		LPD Well A, LPD Well B, LPD Well C, LPD Well D, LPD Well E, LPD Well F, LPSDAT	Quarterly/2 yrs	WV Consent Order
		AM07-PW01, AO08-PW01, AX13-PW01, K16-PW01, L04 PW01, V05-PW01	Quarterly/2 yrs	WV Consent Order
West Virginia	Mason County PSD	MASONCPSD1, MASONCPSD2, MASONCPSD3	Annual/2 yrs	WV Consent Order
		RACINELD	Annual/2 yrs	WV Consent Order
		GE Well 3	Quarterly/2 yrs	WV Consent Order
		BLNISEPS1	Annual/2 yrs	WV Consent Order

EXP000417

FIGURES

EXP000418

FIGURES

EXP000419

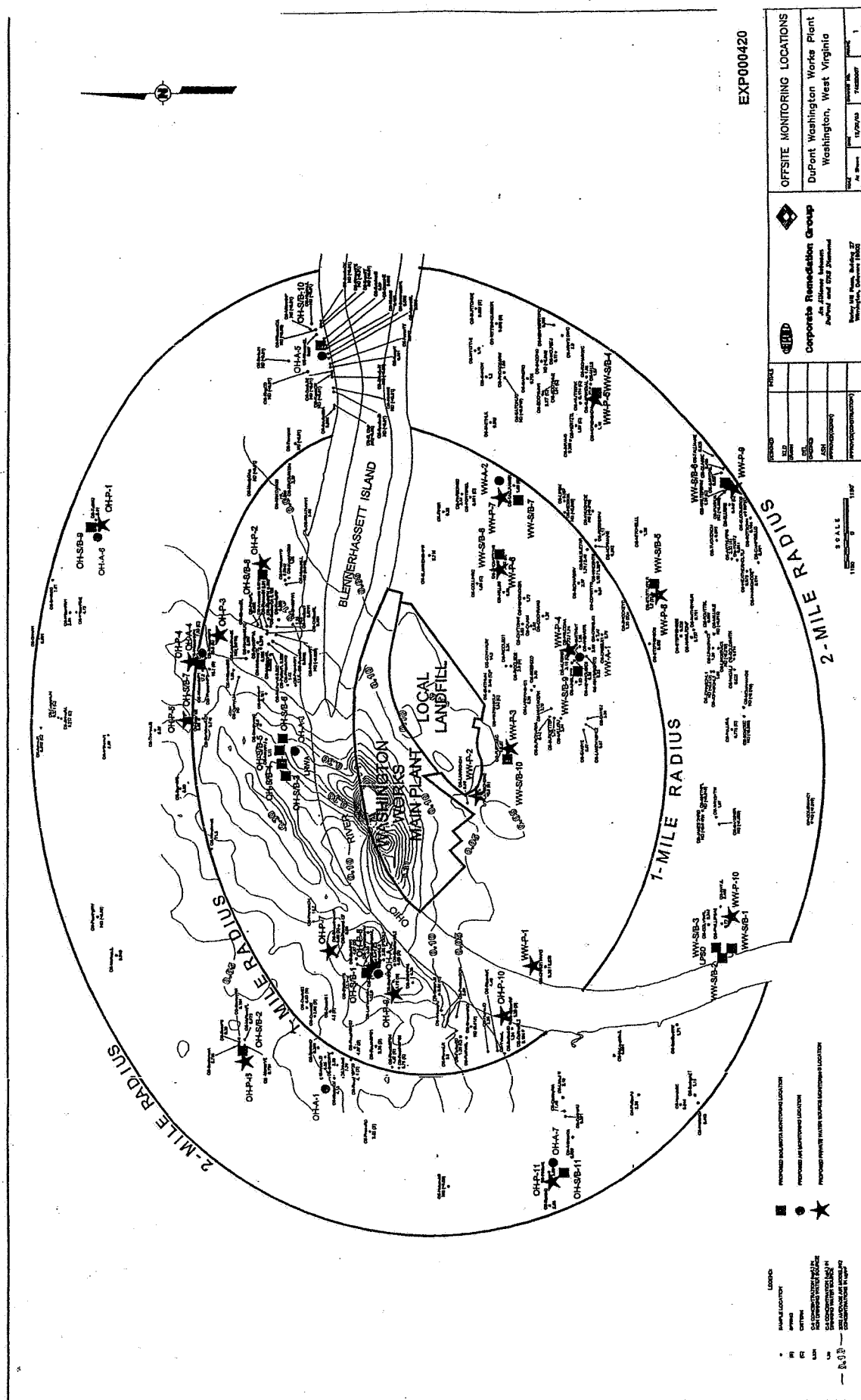
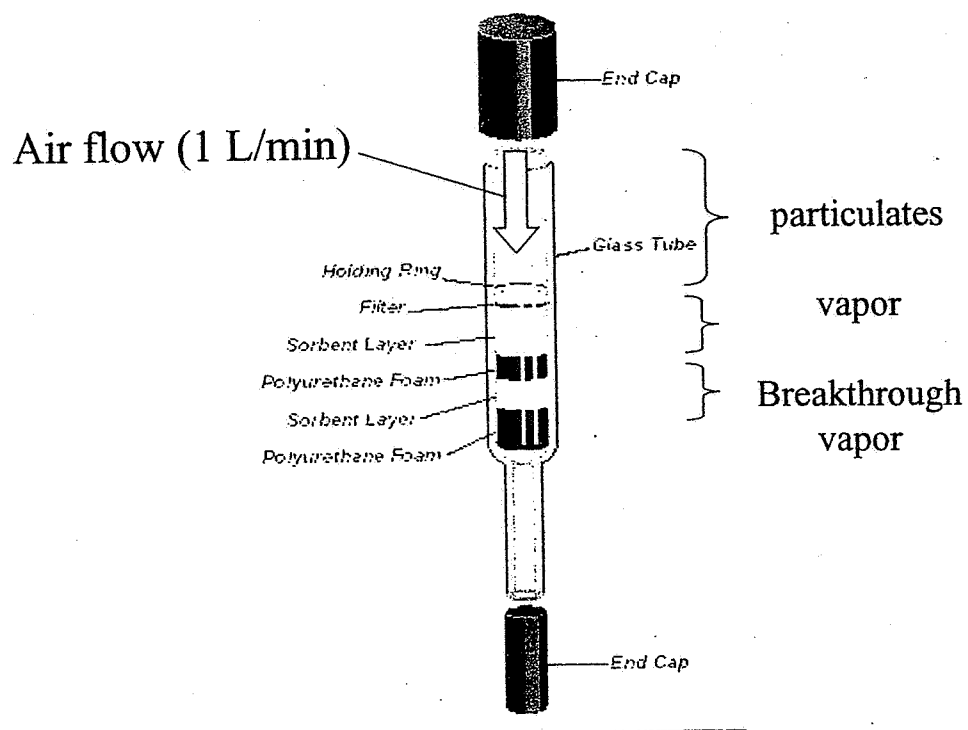
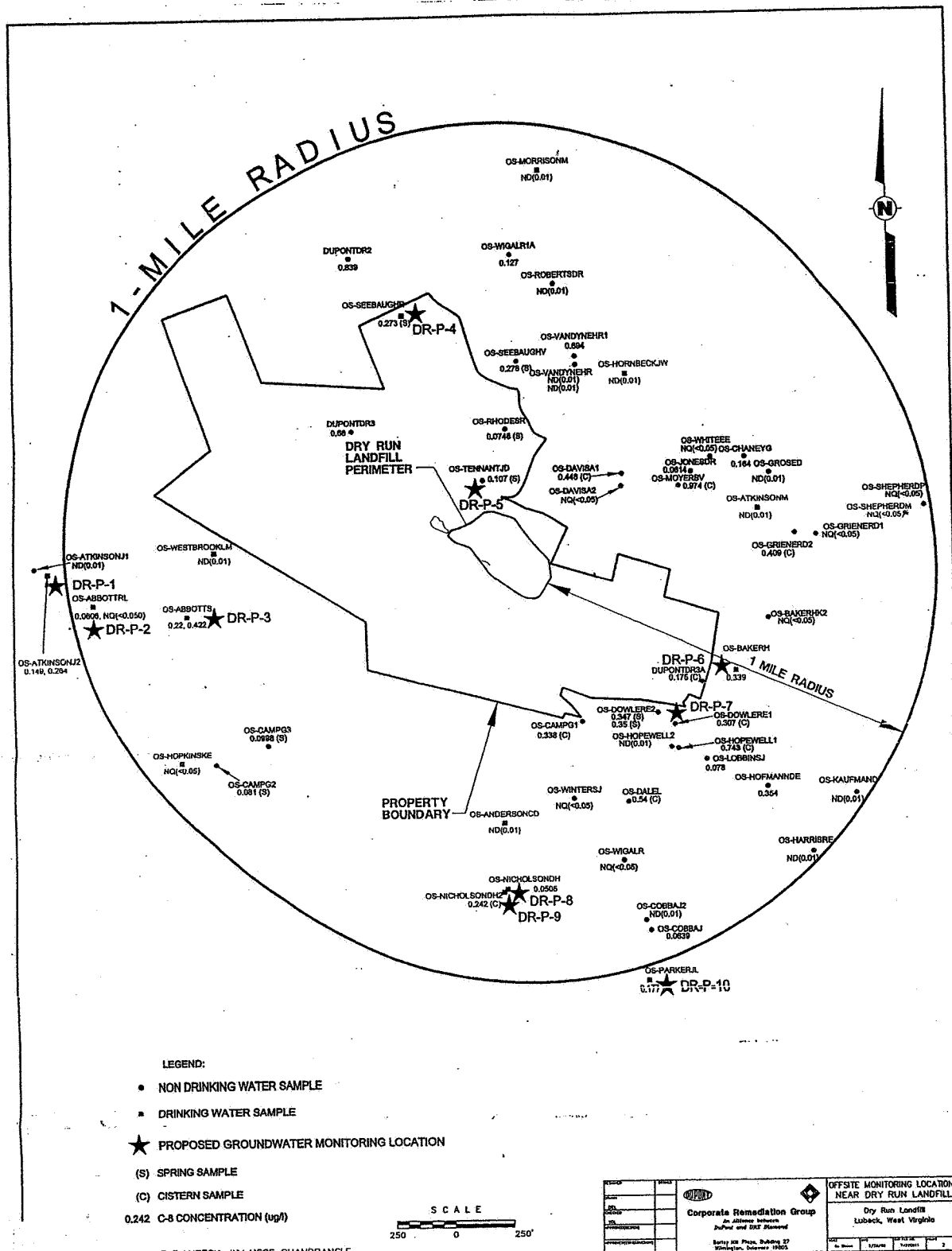
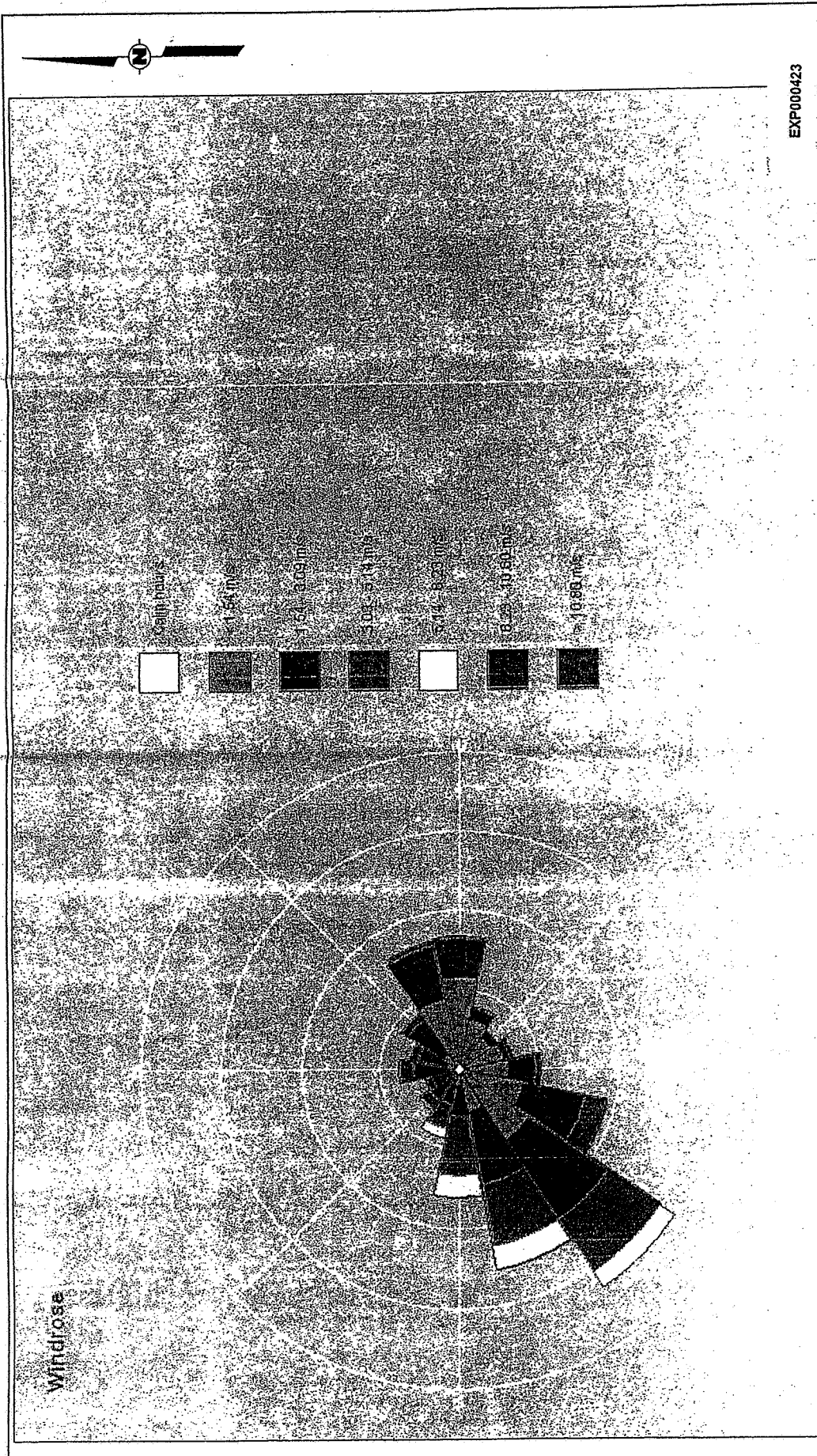


Figure 1.5
OVS Tube
DuPont Washington Works Site
Washington, West Virginia





EXP000422

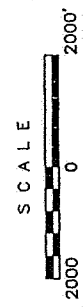


EXP000423

WIND ROSE			
Client	Project	Location	Page
DuPont Washington Works Plant	Washington, West Virginia		2A

Corporate Remediation Group
 DuPont and EES Diamond
 Barley Mill Plaza, Building 27
 Wilmington, Delaware 19805

REVISION	DATE	BY	APP'D



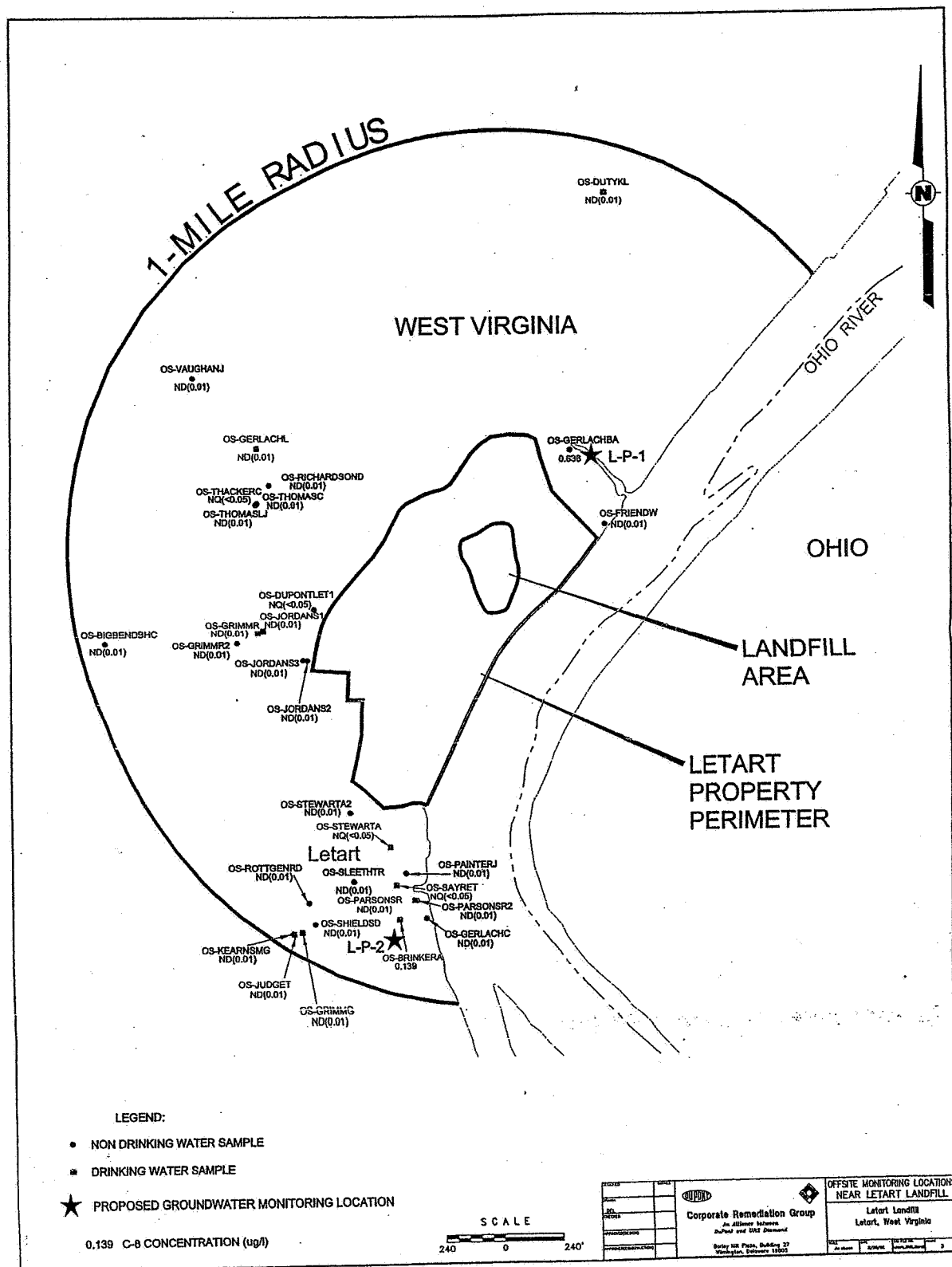
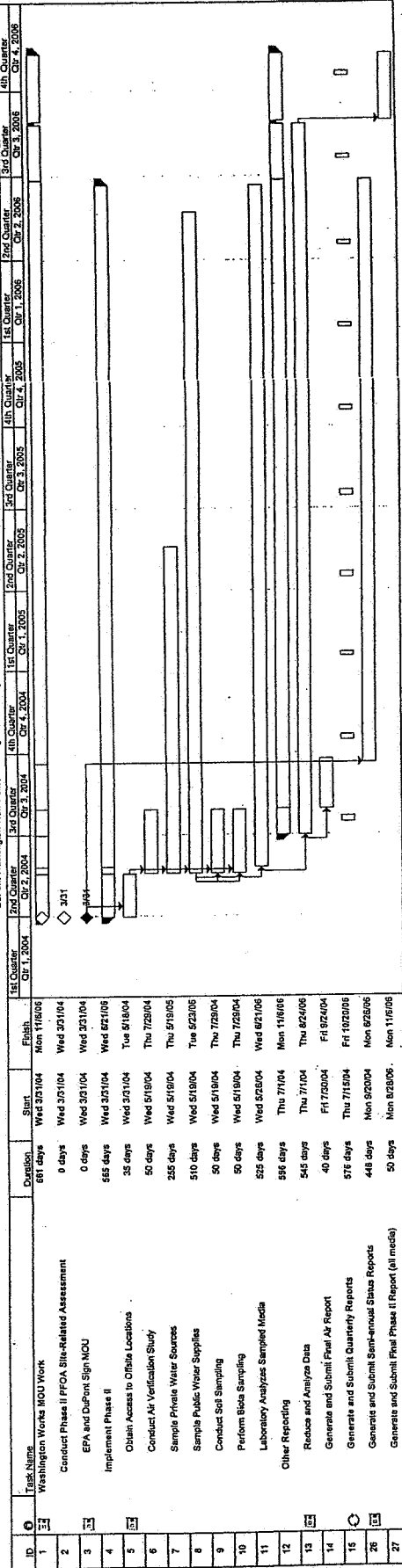


Figure 6
WW MOU Schedule
DuPont Washington Works Site, Washington, West Virginia



EXP0000426

APPENDICES

EXP000427

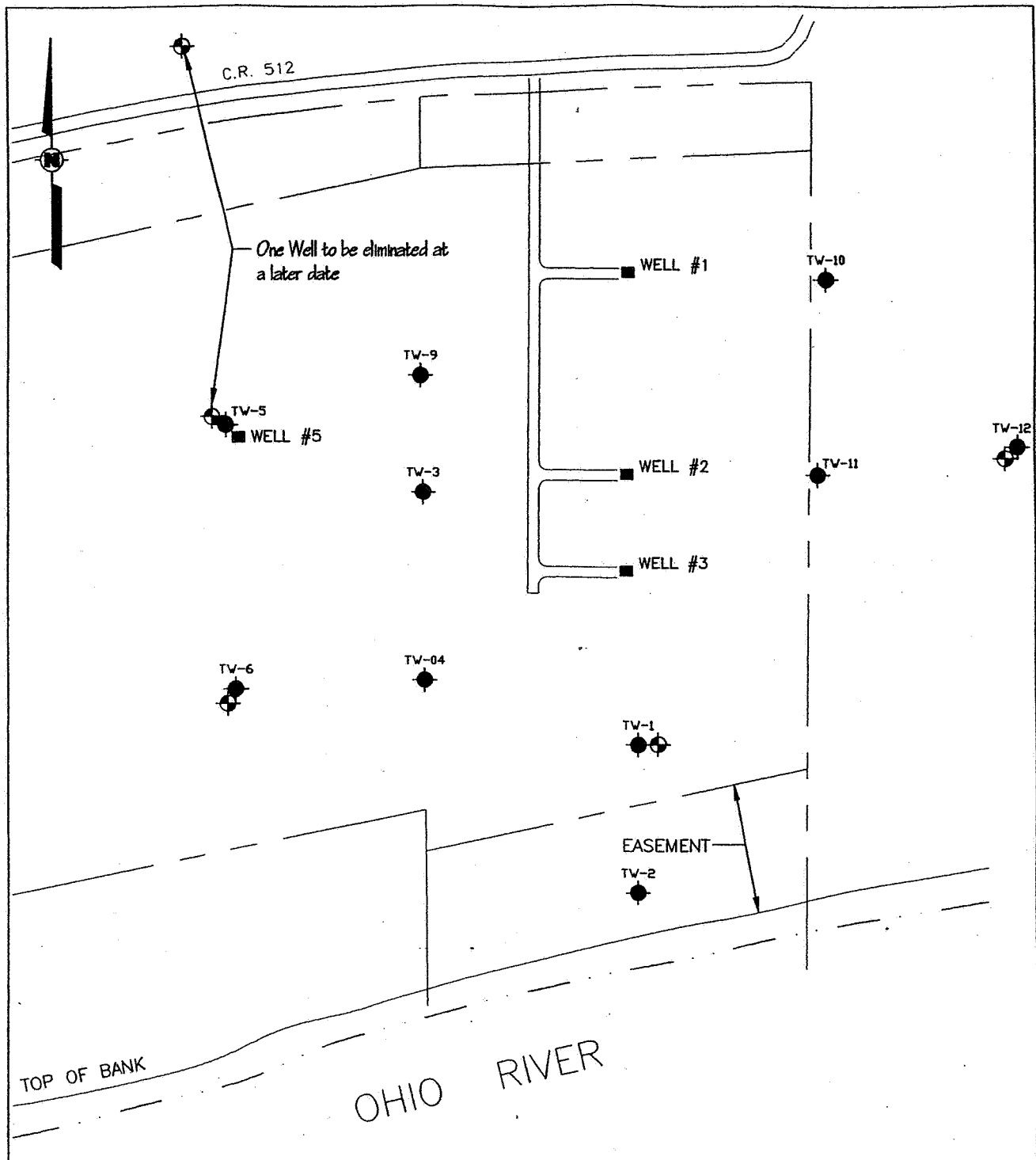
APPENDIX A

EXP000428

APPENDIX A

**PHASE II QUALITY ASSURANCE PROJECT PLAN
WASHINGTON WORKS SITE,
WASHINGTON, WEST VIRGINIA**

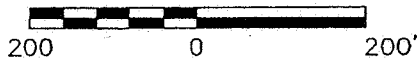
EXP000429



LEGEND:

- WATER SUPPLY WELL
- TEST WELL
- ⊕ PROPOSED SHALLOW TEST WELL

SCALE



Corporate Remediation Group

An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805



PRODUCTION AND TEST WELL LOCATIONS

Little Hocking Water Association
Little Hocking, Ohio

SCALE As Shown	DESIGNED	DRAWN DEL	CAD FILE NO. 7423A007
DATE 2/25/03	CHECKED TDL	APPROVED	FIGURE 5

EXP000430