Jacobs
Challenging today.
Reinventing tomorrow.

Two Commerce Square
2001 Market Street
9th Floor, Suite 900
Philadelphia, PA 19103

T +1.215.569.2900
F +1.215.569.5963
www.jacobs.com

September 10, 2026

Attn: Katie Faulkner
Hydrologist II
State of Delaware
Department of Natural Resources and Environmental Control – Remediation Section
391 Lukens Drive
New Castle, DE 19720

Subject: Response to DNREC-RS Comments

Dear Ms. Faulkner

Jacobs Engineering, Inc. has prepared these responses to comments submitted by DNREC-RS on July 31, 2026, following a review of the *Corrective Measures Implementation Work Plan (Phase 1)* submitted by Jacobs on February 2026 for the Former Chemours Edge Moor Facility (U.S. Environmental Protection Agency ID DED000800284).

Table 1. Responses to Comments Submitted by DNREC-RS

Item	Section	DNREC-RS Comment	Response
1	General	Need to have professional engineer or professional geologist signature on report, per permit condition Module I.F	Revised
2	General	Add a table of contents	Revised
3	General	The structure of the document is set up in such a way that each part of the CMI could be a standalone document but is nested within the CMI with duplicate attachments such as the permit. It would be simpler in the current document configuration to have one comprehensive appendix or attachment section at the end to make it more readable and reduce redundancy. Also, the permit has two permit attachments which are not attached. Attachment 1- Final Post-Closure Care Plan, which is for the surface impoundments, and Attachment 2- Site-Wide Data Management Plan originally from the 2010 03 Phase II RFI Work Plan.	Document has been reformatted, and the two permit attachments have been attached.

Item	Section	DNREC-RS Comment	Response
4	General	Please include a plan and reportable outcomes for CMI Progress Reporting on a quarterly and annual basis, as per Permit Condition Module II. G. 2. d.	Updated Section MP5.5 in the Management Plan to include a statement on planned CMI Progress Reporting.
Corrective Measures Implementation Work Plan			
5	Section 1 Introduction Bullet 2	Introduce the Excavated Materials Handling Management Plan (EMHCP) as the CMMP.	Revised.
Community Engagement Plan			
6	General	The Community Engagement Plan lacks a plan for engaging with the community. The Community Engagement Plan only lists historical engagement activities, not planned future engagement activities related to remedy implementation and future corrective action.	Revised – Ongoing Community Engagement section added to Section CEP.
7	Section 1. Introduction Paragraph 1, last sentence	Permit reference should be revised from "Section II.G.2.a" to "Module II.G.2.a".	Revised.
8	Section 2 Facility History Second paragraph, first sentence	Clarify the transfer history from the Krebs Company to Chemours.	Revised.
9	Section 2 Facility History Second paragraph, last sentence	*"The plant was demolished in 2016 and sold to Diamond State Port Corporation (DSPC) in February 2017; it has been in operational since 2016."* This statement needs rewritten or clarified.	Revised.
10	Section 3.1 Activities Completed	*"A 2001 Consent Order with EPA required DuPont obtain an RCRA Corrective Action Permit for the site to address SWMUs."* Was an RCRA permit issued prior to the RCRA Corrective Action Permit?	No record of a prior permit. RCRA Corrective Action Permit was issued in March 2006. Also, text was updated to clarify that the RCRA CAP was issued March 14, 2006.

Item	Section	DNREC-RS Comment	Response
11	Section 3.1 Activities Completed	*"The Delaware Department of Natural Resources and Environmental Control (DNREC) issued a Statement of Basis on its final remedy decision for the DSPC Edge Moor Facility. DNREC determined its final remedy is protective of human health and the environment in April 2021."* Add the public comment period, public notice, or public engagement information into the timeline.	Public hearing and comment information was added.
12	Section 4.4 Agencies	Is the facility within the limits of City of Wilmington? If so, it should also be listed under Local.	No, the Delaware River Basin Commission is located in NJ, and listed as a federal agency.
13	Section 7.1 Port of Wilmington Master Plan Section named "Public Comments Included:"	Is this section supposed to be for comments from the January 2016 DSPC Open House Meeting, or a general list of public comments received regarding the Port of Wilmington Master Plan?	This section presents both comments during the open house meeting and general comments regarding the Port of Wilmington Master Plan.
14	Section 7.1 Port of Wilmington Master Plan Section named "Public Comments Included:"	Various bullet points seem unrelated to the section, including "Outreach conducted Prior to Submittal of Permit Applications to DNREC, USACE (January-March 2020)," and Legislative Engagement and Oversight."	Revised. Created the following new sections and listed bullets in these sections: ▪ Section CEP8.4: "United States Army Corp of Engineers (USACE) Public Notices and Outreach." ▪ Section CEP8.5: "Legislative Engagement and Oversight."
15	Section 8.2 DNREC Public Notices and Hearings	*"USACE Edgemoor Project, Mitigation Plan and Replacement Capacity under Section 217(a)"* This is listed under DNREC Public Notices and Hearings, instead of in a more appropriate section.	Revised. Listed under Section CEP8.4: "United States Army Corp of Engineers (USACE) Public Notices and Outreach."

Item	Section	DNREC-RS Comment	Response
Corrective Measures Permitting Plan			
16	Section 1. Introduction Paragraph 1, last sentence	Permit reference should be revised from "Section II.G.2.a" to "Module II.G.2.a."	Revised.
17	Section 2.2 State Additional Permits Possibly Needed	Need to obtain any necessary permits from DNREC's Division of Air Quality regarding dust emissions from demolition of existing structures, buildings, or parts of buildings. As well as grading, land clearing excavation and use of non-paved roads, and crushing materials.	Revised. Added that a Natural Minor Air Quality permit from DNREC's Division of Air Quality will be obtained.
Management Plan			
18	General	Start the planning process for once the remedy is complete, add a section to discuss the institutional controls, an LTS plan, engineering controls and the groundwater monitoring requirements at the SWMU-6a, b, c, and d. Section 3 and Section 5 introduces these measures, but starting to define a plan and activities will aid in the future process.	▪ Section MP. 5.4 "Corrective Measures in Phase 2": Per 9/4/26 discussion with Katie Faulkner, since this CMIWP only pertains to Phase 1, this section was reduced to a short statement that these requirements will be detailed in later submissions of a Phase 2 CMIWP and Phase 2 Design Report. ▪ Section MP5.6: "Post-Remedy Requirements" have been added summarizing LTM requirements for the Phase 1 section of the asphalt cap, along with continued groundwater monitoring of SWMU 6 wells.
19	Section 1.0 Introduction Paragraph 1, last sentence.	Permit reference should be revised from "Section II.G.2.a" to "Module II.G.2.a."	Revised.

Item	Section	DNREC-RS Comment	Response
20	Section 1.0 Introduction Second bullet in second series of bullets:	*"Avoid or minimize disturbances to the four surface impoundments (Solid Waste Management Unit [SWMU] 6) due to RCRA caps and hazardous waste."* Add that the Surface Impoundments will be returned to compliance.	Revised.
21	Section 5.3 Paragraph 1	Update narrative to reflect most recent version of SAP.	Revised.
22	Section 6.2.2 (MP 6.3.1)	Add more information on intended changes that will be presented in the "Amended PCCP for SWMU 6", will need to update the QA/QC Document for the PCCP for SWMU 6 as well.	▪ Per 9/4/26 discussion with Katie Faulkner at DNREC, the bullet was modified to say "Amended PCCP for the Phase 1 partial sitewide remedy and SWMU 6" because this CMIWP addresses corrective measures in Phase 1. Additional bullets were added, including a required Phase 2 CMIWP and Design Report, which will be included in later submissions. ▪ An updated QA/QC document will be included with the Design Report submissions.
Sampling and Analysis Plan			
23	General	Append finalized and signed June 2026 version.	The signed June 2026 Sampling and Analysis Plan has been added.

Please contact Louis Kaminski at 646-908-6835 or Louis.Kaminski@jacobs.com if you have any questions or need more information.

Sincerely,



Louis Kaminski

Jacobs
On behalf of: Diamond State Port Corporation (DSPC)

Copies to: Walsh: Brian Midlick and Andrew Saunders
Enstructure: Diego Lopez and John Reece
DSPC: Brian Devine

Corrective Measures Implementation Work Plan (Phase 1)

Document No.: 260811153614_9f406615
Revision: 1 Draft Version 2

Walsh Construction Company II, LLC –
Soletanche Bachy International, Inc. Joint Venture

Delaware Container Terminal FD (P1)
Edgemoor Port Expansion Project, Edgemoor, Delaware
Former Chemours Edge Moor Plant
September 2026

Corrective Measures Implementation Work Plan (Phase 1)

Date: September 2026 **Revision:** Version 2

Client Name: Walsh Construction Company II, LLC –
Soletanche Bachy International, Inc. Joint Venture

Project Name: Delaware Container Terminal FD (P1)
Edgemoor Port Expansion Project, Edgemoor, Delaware
Former Chemours Edge Moor Plant

Company: State of Delaware
Department of Natural Resources and Environmental Control (DNREC) –
Remediation Section

Prepared By: Jacobs
On behalf of: Diamond State Port Corporation (DSPC)

Document History and Status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1	September 2026	Consolidated Plans	Jacobs on behalf of DSPC	EC	SR	LK

Distribution of Copies

Revision	Issue Approved	Date Issued	Issued To	Comments
1		September 2026	▪ **Walsh:** Brian Midlick and Andrew Saunders ▪ **Enstructure:** Diego Lopez and John Reece ▪ **DSPC:** Brian Devine	

Jacobs

Two Commerce Square
2001 Market Street
9th Floor, Suite 900
Philadelphia, PA 19103

T +1.215.569.2900
F +1.215.569.5963
www.jacobs.com

© Copyright 2026 Jacobs. All rights reserved. The content and information contained in this document are the property of the Jacobs group of companies ("Jacobs Group"). Publication, distribution, or reproduction of this document in whole or in part without the written permission of Jacobs Group constitutes an infringement of copyright. Jacobs, the Jacobs logo, and all other Jacobs Group trademarks are the property of Jacobs Group.

NOTICE: This document has been prepared exclusively for the use and benefit of Jacobs Group client. Jacobs Group accepts no liability or responsibility for any use or reliance upon this document by any third party.

Professional Engineer Certification

This Corrective Measures Implementation Work Plan (Phase 1) has been prepared by or under the responsible supervision, direction, or control of the Delaware-licensed Professional engineer whose signature and seal appears below.

Approval

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.



Signed: _____ **Date:** 9/10/2026

Louis Kaminski
Jacobs
Professional Engineer
State of Delaware, No. 33200

Concurrence and Approval

Signatures for concurrence and approval from individuals responsible for implementing this CMIWP are presented in this section.

Project/Operations Manager



Signature
Louis Kaminski, Jacobs

September 10, 2026

Date

Project Quality Assurance Manager



Signature
Sonny Rutkowski, Jacobs

September 10, 2026

Date

Contents

Professional Engineer Certification ..... **i**
Approval i
Concurrence and Approval ..... **ii**
Project/Operations Manager ii
Project Quality Assurance Manager ii
Acronyms and Abbreviations ..... **vi**
Corrective Measures Implementation Work Plan (Phase 1) **CMI-1**
CMI1. Introduction CMI-1
CMI1.1 Site Background CMI-1
CMI2. Resource Conservation and Recovery Act Activities and Solid Waste Management Units CMI-3
CMI2.1 Previous Investigations CMI-3
CMI2.2 Summary of RCRA SWMUs and Status CMI-4
CMI3. References CMI-6
Management Plan **MP-1**
MP1. Introduction MP-1
MP2. Key Personnel MP-3
MP2.1 RCRA Key Personnel Qualifications MP-3
MP3. Conceptual Design of Corrective Measures MP-4
MP4. Proposed Field Activities for Groundwater Monitoring MP-4
MP5. Conceptual Design and the FDRTC Requirements MP-5
MP5.1 FDRTC Requirements MP-5
MP5.2 Construction Phasing MP-5
MP5.2.1 Phase 1: Partial Build MP-7
MP5.2.2 Phase 2: Full Build MP-7
MP5.3 Interim Actions During Construction Phase 1 ..... MP-8
MP5.4 Corrective Measures in Phase 2 ..... MP-8
MP5.5 Ongoing Groundwater Monitoring and Visual Inspections MP-8
MP5.6 Post-Remedy Requirements MP-10
MP6. Schedule of Work MP-10
MP6.1 Preconstruction DNREC Submittals MP-10
MP6.2 Phase 1: Partial Build (May 2026 to November 2028) MP-10
MP6.3 Phase 2: Full Build (To Be Determined) MP-11
MP6.3.1 Other DNREC Submittals (To Be Determined) MP-11
MP6.3.2 DNREC Submittals Following Phase 2 ..... MP-11

Community Engagement Plan CEP-1
CEP1. Introduction CEP-1
CEP1.1 Purpose of Community Engagement Plan CEP-1
CEP1.2 Continuing Community Engagement CEP-1
CEP1.3 Project Purpose CEP-2
CEP1.4 Construction Plans CEP-2
CEP2. Facility History CEP-2
CEP3. RCRA Action Description CEP-4
CEP3.1 Activities Completed CEP-4
CEP3.2 Planned Activities CEP-5
CEP4. Agencies, Groups, and Key Individuals Most Likely to be Interested in the Process CEP-5
CEP4.1 Civic and Environmental Organizations CEP-5
CEP4.2 Local Businesses/Agency Operations CEP-5
CEP4.3 Elected and Appointed Officials CEP-6
CEP4.4 Agencies CEP-6
CEP5. Key Personnel CEP-7
CEP6. Anticipated RCRA Related Activities CEP-7
CEP7. Description of Early Consultation CEP-7
CEP7.1 Port of Wilmington Master Plan CEP-7
CEP8. Public Involvement Through Local, State, Regional, Federal Permitting Process CEP-8
CEP8.1 New Castle County Board of Adjustment Public Hearing CEP-8
CEP8.2 DNREC Public Notices and Hearings CEP-9
CEP8.3 Delaware River Basin Commission Hearing CEP-9
CEP8.4 USACE Public Notices and Outreach CEP-9
CEP8.5 Delaware Legislative Engagement and Oversight CEP-10
CEP8.6 Estimated Level of Public Interest in RCRA Process CEP-10
CEP9. Verdantas's Public Participation Activities in 2022 to 2023 ..... CEP-10
CEP10. References CEP-10
Corrective Measures Permitting Plan CMP-1
CMP1. Introduction CMP-1
CMP2. Required Permits and Approvals CMP-1
CMP2.1 Federal (RCRA Permits Delegated to the State of Delaware) CMP-1
CMP2.2 State CMP-2
CMP2.3 Interstate CMP-3
CMP2.4 Regional CMP-3
CMP2.5 Local CMP-3

CMP3. Required Agreements with Adjoining Landowners CMP-3
CMP3.1 Site Access Agreements CMP-4
CMP3.2 Easement Agreements CMP-4
CMP4. CMPP Requirements CMP-4

Appendices

Appendix A Key Resumés
Appendix B Sediment and Stormwater Management Plan Phase 1 Proof of Concept
Appendix C United States EJ Screen Output
Appendix D October 6, 2021 DNREC Final Decision and Response to Comment (FDRTC)
Appendix E Final Post-Closure Care Plan
Appendix F Sitewide Data Management Plan
Appendix G Signed Sampling and Analysis Plan

Tables

Table CMI1. Current Status of SWMUs CMI-4
Table MP1. Key Personnel MP-3
Table MP2. RCRA Key Personnel Qualifications MP-3

Figures

Figure CMI1. Site Location Map CMI-2
Figure MP1. Site Location MP-2
Figure MP2. SWMU Layout Sketch MP-6
Figure MP3. Monitoring Well Locations MP-9
Figure CEP1. Site Location Map CEP-3

Acronyms and Abbreviations

Acronym	Definition
<	less than
AST	aboveground storage tank
Bond Bill	Fiscal Year 2022 Bond and Capital Improvements Act
CAP	Corrective Action Plan
CMI Work Plan	Corrective Measures Implementation Work Plan
CMPP	Corrective Measures Permitting Plan
DC	direct contact
DCT	Delaware Container Terminal
DelDOT	Delaware Department of Transportation
DNREC	Delaware Department of Natural Resources and Environmental Control
DNREC-RS	Remediation Section of Delaware Department of Natural Resources and Environmental Control
DRBC	Delaware River Basin Commission
DSPC	Diamond State Port Corporation
EMHCP	Excavated Materials Handling Contingency Plan
EPA	U.S Environmental Protection Agency
FDRTC	Final Design and Response to Comments
HH&E	human health and the environment
IGW	ingestion of groundwater
NAVD1988	North American Vertical Datum of 1988
NFA	No Further Action
PCB	polychlorinated biphenyl
PCCP	Post Closure Care Plan
project	Delaware Container Terminal project

Acronym	Definition
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act Facility Investigation
site	Former Chemours (DuPont) Edge Moor Plant
TiO_2	titanium oxide
SWMU	solid waste management unit
UECA	Uniform Environmental Covenant Act
USACE	United States Army Corps of Engineers
UST	underground storage tank
Walsh/SBI JV	joint venture of Walsh Construction and Soletanche Bachy International

Corrective Measures Implementation Work Plan (Phase 1)

CMI1. Introduction

This Corrective Measures Implementation Work Plan (CMI Work Plan) was prepared in accordance with Section II.G.2. (a) of the Permit for Corrective Action, issued by the State of Delaware DNREC to the DSPC on April 29, 2021 (Permit HW31B04). This plan describes the design, construction, operations, maintenance, and monitoring actions that will occur while implementing corrective measures at the Former Chemours Edge Moor Plant (the site) during Phase 1. The corrective actions are required by Permit HW31B04. On October 6, 2021, DNREC signed a Final Decision and Response to Comments (FDRTC), representing a Corrective Measures Remedy for the DuPont Edge Moor Site (Appendix D). Per the permit requirements, a CMI Work Plan must be submitted. The FDRTC provides the following corrective measures remedy:

- Most of the site is to be paved with an asphalt cap.
- The approved Contaminated Materials Management Plan, referred to in as the Excavated Materials Handling Contingency Plan, is to be implemented during site construction or disturbance.
- Groundwater monitoring will continue around the closed surface impoundments, per the site Post-Closure Care Plan (PCCP). The PCCP will be amended to include provisions for additional operations and maintenance items related to the asphalt cover of the multilayered impervious cap or post-port construction features integral to the remedy.
- When the remedy is complete, a *Uniform Environmental Covenant Act* covenant will be executed, to protect the remedy in perpetuity.

CMI1.1 Site Background

The site is approximately 115 acres and is in Edgemoor, Delaware, along the Delaware River, in New Castle County. The site is bound as follows (Figure CMI1):

- By Fox Point State Park to the north
- By industrial/commercial properties to the south
- By the Delaware River to the east
- By Hay Road and industrial/commercial properties to the west

Figure CMI1. Site Location Map



Sources: Duffield Associates – Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, ©

DuPont purchased the former titanium dioxide plant from Krebs Company in 1935, and operated the facility continuously until 2016. Site manufacturing operations included the production of titanium dioxide, titanium tetrachloride, and ferric chloride. The facility transferred to Chemours when Chemours was separated from DuPont. Chemours began decommissioning and demolition the plant in 2016, and sold the property to DSPC in February 2017 (Verdantas 2023). The only remaining structures are two

warehouses and a pump house for stormwater discharges to the Delaware River near Fox Point State Park. Several foundations and underground utility systems (electric, water, and stormwater systems) associated with the former plant are still present onsite. A 6-foot fence topped with barbed wire surrounds the site. Most of the foundations will be demolished. Some underground utilities will be removed if they hinder grading, or will be capped and abandoned in place; others (mainly stormwater will be used in the new stormwater design

CMI2. Resource Conservation and Recovery Act Activities and Solid Waste Management Units

Twenty-nine solid waste management units (SWMUs) have been identified onsite. However, SWMUs 7A, 7B, 9, 10, 11, 12, 14, 19, 22, and 26 received a No Further Investigation status before the Phase I *Resource Conservation and Recovery Act* (RCRA) Facility Investigation (RFI) and were not listed in the Corrective Action Order. The No Further Action status was identified for SWMUs 8, 15, 17A, 17B (6, 7, 8, I, J, K, & L), 21, 24, 28, and 29. SWMUs 1,3, 4, 5, 13A, 13B, 16, 17A, 17B 18, 20, 23, 25, and 27 were evaluated as part of the risk analysis performed by Parsons (2013) and were referenced in the FDRTC.

SWMU 1 and SWMU 2 were re-evaluated to characterize current conditions, per a 2022 DNREC-approved Sampling and Analysis Plan. Specific media in SWMU 1 was re-evaluated for the Sampling and Analysis Plan, based on visual observations that surficial conditions may have changed since it was last assessed. The results were included in a SWMUs 1 and 2 data report that was approved by DNREC-Remediation Section (2024).

CMI2.1 Previous Investigations

Before Jacobs was retained, DSPC contracted Verdantas (formerly Duffield Associates) separately to provide planning, permitting, regulatory approvals, design, and project support. Verdantas is currently contracted with DSPC to support the Delaware Container Terminal's development, and continues to provide support and background information on the port's development. Additional consultants have completed investigations at the site, including Parsons and DuPont Corporate Remediation.

The following is a timeline and summary of prior RCRA activities onsite:

- August 8, 1986 –U.S. Environmental Protection Agency (EPA) identified 17 SWMUs
- November 2001 – Consent Order with EPA required DuPont obtain a RCRA Corrective Action Permit for the site to address SWMUs
- November 23, 2004 – Permittee identified 27 potential SWMUs in its Facility-wide Corrective Action Plan (CAP), approved on December 2, 2004
- October 2005 and October 2008 - SWMUs 28 and 29 identified
- April 2009 - DuPont Corporate Remediation Group performed Phase I RFI
  - No Further Investigation needed at SWMUs 16, 18, 27, or 28
  - No Further Action needed at SWMUs 9, 15, 21, or 24
  - Further Investigation needed at SWMUs 1/3, 4, 5, 13A, 13B, 17B, 20, 23, 25, and 29
- March 2010 - PCCP
  - Monitoring of surface impoundments: SWMUs 6A, 6B, 6C, and 6D
  - Semiannual groundwater monitoring
  - Quarterly surface impoundment inspections

- March 2011 - Phase II RFI performed by Parsons
  - No Further Investigation needed at SWMUs 13A, 16, 18, 27, 1/3, 4, 5, 13B, 17B, 20, 23, and 25
  - No Further Action needed at SWMUs 8, 15, 17A, 17B, 21, 24, 28, and 29
  - Further Investigation needed at SWMU 2 (in CAP)
  - SWMUs 6A, 6B, 6C, and 6D to be monitored in accordance with PCCP
- June 2012 - Environmental Indicator Determination Report Human Health Exposure by Parsons
- June 2012 – Environmental Indicator Determination Report Migration of Contaminated Groundwater under Control
- June 2013 - Risk Analysis by Parsons
- August 2013 - Corrective Measures Study
- 2019 - Contaminated Materials Management Plan by Duffield
- April 29, 2021 - Permit for Corrective Action and Post-Closure Care
- April 2021 - DNREC issued Statement of Basis on its final remedy decision for the DSPC Edgemoor site (Formerly Chemours); DNREC determined its final remedy is protective of human health and the environment
- November 2022 - SWMUs 1 and 2 Sampling and Analyses Plan by Verdantas
- March 2024 (revised) - SWMUs 1 and 2 Data report by Verdantas

CMI2.2 Summary of RCRA SWMUs and Status

Table CMI1 shows the current status of the SWMUs, updated from the table provided as part of the Statement of Basis issued by DNREC to DSPC with the closure permit on April 29, 2001.

Table CMI1. Current Status of SWMUs

SWMU/Areas of Concern	Description	Current Status
SWMU 1	Wastewater Treatment System – (Surface Water Only)	Awaiting NFA
SWMU 1	Wastewater Treatment System – (Sediment only)	Awaiting NFA
SWMU 2	Pond E Process Water	Awaiting NFA
SWMU 3	Waste Mixing Area and Split Box	NFA, No Unacceptable Risks to HH&E
SWMU 4	Former Solid Waste Landfill	NFA, No Unacceptable Risks to HH&E, but was identified as potentially containing waste
SWMU 5	Waste Settling Area	NFA, No Unacceptable Risks to HH&E, but was identified as potentially containing waste
SWMU 6	Ponds A, B, C, and D	Stabilized in Place, PCCP Approved 2010
SWMU 7 A	Building 23 PCB Storage Area	NFA, No Unacceptable Risks to HH&E
SWMU 7B	Kiln 2 PCB Storage Area	NFA, No Unacceptable Risks to HH&E

SWMU/Areas of Concern	Description	Current Status
SWMU 8	Former <90 Day HW Accumulation Area	NFA No longer in use
SWMU 9	Hazardous Waste Accumulation Pad	NFA, No Unacceptable Risks to HH&E
SWMU 10	Eastern Shore Area	NFA, No Unacceptable Risks to HH&E
SWMU 11	Drainage Culvert	NFA, No Unacceptable Risks to HH&E
SWMU 13A	Process Sewers	NFA, No Unacceptable Risks to HH&E
SWMU 13B	Process Sewers	NFA, No Unacceptable Risks to HH&E
SWMU 14	Underground Pipelines	NFA, No Unacceptable Risks to HH&E
SWMU 15	Former Unpaved Ditch	NFA, No Exceedances of DC or IGW Screening Criteria
SWMU 16	Scrap Metal Area	NFA, No Unacceptable Risks to HH&E
SWMU 17A	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 17A	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 17B	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 18	Iron Rich Staging Area	NFA, No Unacceptable Risks to HH&E
SWMU 19	Iron Rich Filter Press Building	NFA, No Unacceptable Risks to HH&E
SWMU 20	Former Fuel Oil ASTs	NFA, No Unacceptable Risks to HH&E, but Identified as Potentially Containing Waste
SWMU 21	Copper Vanadium Sludge Pad	NFA, No Exceedance in DC or IGW Screening Criteria
SWMU 22	Ferric Chloride Tank Truck Loading Spot	NFA, No Unacceptable Risks to HH&E
SWMU 23	Recovered Ore Storage Area	NFA, No Unacceptable Risks to HH&E
SWMU 24	Oil Water Separator	NFA, No Exceedance in DC or IGW Screening Criteria
SWMU 25	Ferric Chloride Railcar Area	NFA, No Unacceptable Risks to HH&E
SWMU 26	TiO_2 Railcar Loading Area	NFA, No Unacceptable Risks to HH&E
SWMU 27	Fuel Oil-Stained Soil Area	NFA, No Unacceptable Risks to HH&E
SWMU 28	Caustic Storage Area	NFA, No Exceedance in DC or IGW Screening Criteria
SWMU 29	Southland Tank	NFA, All pH Results Greater Than 2
Holland Mulch Site	Former Yard Waste Site Across Hay Road	NFA, No Unacceptable Risks to HH&E

< = less than
AST = aboveground storage tank
DC = direct contact
HH&E = human health and the environment
HW = hazardous waste
IGW = ingestion of groundwater
NFA = no further action
PCB = polychlorinated biphenyl
TiO_2 = titanium dioxide
UST = underground storage tank

CMI3. References

Verdantas. 2023. *Corrective Measures Implementation Workplan. Prepared for Department of Natural Resources and Environmental Control (DNREC).* January.

Management Plan

MP1. Introduction

This Management Plan describes the overall strategy for the design, construction, operations, maintenance, and monitoring of corrective measures for the Former Chemours Edge Moor Plant (refer to Figure MP for the site location). This plan has been prepared in accordance with *Resource Conservation and Recovery Act* (RCRA) guidance for the Corrective Measures Implementation Work Plan (CMI Work Plan). This plan has been prepared pursuant to Module II.G.2.a of Permit HW31B04.

The proposed corrective measures consist of the following components:

- An asphalt cap over more than 80% of the site
- An Excavated Materials Handling Contingency Plan (EMHCP)
- Groundwater monitoring
- A *Uniform Environmental Covenant Act* (UECA) covenant

Although this CMIWP only focuses on Phase 1 (partial build) of redevelopment, the site's final redevelopment is a proposed shipping container terminal and shipping dock. The following are objectives for the overall site management strategy:

- Redevelop the site in a way that is protective of human health and the environment.
- Avoid or minimize disturbances to the four surface impoundments (Solid Waste Management Unit [SWMU] 6) because of RCRA caps and hazardous waste, and return SWMUs to compliance.
- Minimize the offsite disposal of soils and reuse soils onsite, where geotechnically and environmentally feasible.

Figure MP1. Site Location



Sources: Duffield Associates – Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, ©

MP2. Key Personnel

Table MP lists the key project personnel.

Table MP1. Key Personnel

Role	Organization	Key Persons
Permittee and Property Owner	DSPC	Brian Devine, P.E.
Property Manager	Enstructure DCT LLC	Diego Lopez
Owner Representative	Nigel Nixon Partners Inc	Keith Abraham
CY Design Consultant	Jacobs	Chris Lawrence, P.E.
Marine Port Design Consultant	Jacobs	Chris Lawrence, P.E.
Construction General Contractor	Walsh-Soletanche Bachy JV	Brian Midlick (Walsh)
Onsite Supervisor	Walsh-Soletanche Bachy JV	Andrew Saunders
Emergency Response Coordinator & Site Safety and Health Officer	Walsh-Soletanche Bachy JV	Mike Sprangers
Laboratory	Eurofins Testing America	Omayra Penas
Driller	CGC Geoservices	Stacy Ziegler, P.E.
Surveyor	Vandemark & Lynch	Thor Lundin, P.L.S.
Regulators	DNREC-Remediation Section	Katie Faulkner, Project Manager Dylan Cook, Project Hydrologist

DNREC = Delaware Department of Natural Resources and Environmental Control

MP2.1 RCRA Key Personnel Qualifications

Table MP2 provides the key personnel's qualifications.

Table MP2. RCRA Key Personnel Qualifications

Name	Role	Qualifications
Jacobs Team		
Louis Kaminski	Project Leader and Client Representative	Refer to RCRA Key Personnel Resumés in Appendix A.
Chris Lawrence	Project Design Leader	
Sonny Rutkowski	Environmental Project Manager	
Michael Sheeley	Civil Project Manager	
Walsh Construction and Soletanche Bachy		
Brian Midlick (Walsh)	Construction Project Manager	Refer to RCRA Key Personnel Resumés in Appendix A.
Andrew Saunders	Onsite Supervisor	
Mike Sprangers	Emergency Response Coordinator & Site Safety and Health Officer	

MP3. Conceptual Design of Corrective Measures

The following corrective measures will be installed as set forth in DNREC's Final Design and Response to Comments (FDRTC) letter, dated October 6, 2021:

- Most of the site is to be paved with an asphalt cap.
- The approved revised EMHCP is to be implemented during site construction or disturbance.
- Groundwater monitoring will continue around the closed surface impoundments, per the site Post-Closure Care Plan (PCCP). The PCCP will be amended to provide for additional operations and maintenance items regarding the asphalt cap or post-port construction features integral to the remedy.
- When the remedy is complete, a UECA covenant will be executed to protect the remedy in perpetuity.

The conceptual plans are to grade and pave the site, to allow for the facility's redevelopment into a state-of-the-art container terminal and shipping port to modernize the State of Delaware's international waterborne trade capabilities. The design calls for a top-of-wharf elevation of 16 feet North American Vertical Datum of 1988 (NAVD88) and for the upland container terminal area to slope upward from the inshore end of the wharf (bulkhead location) at a typical 1.25% grade to a ridge line, with a maximum elevation of 33 feet NAVD88. It will then slope back down to meet the existing Hay Road/Lighthouse Road grade. The average elevation of the upland site is planned to be approximately Elevation 24 to 25 feet NAVD88.

MP4. Proposed Field Activities for Groundwater Monitoring

The site's proposed redevelopment includes grading, which will increase the overall site elevations for the container terminal and shipping port. Therefore, groundwater management is not anticipated during construction. Based on the previous investigations and risk analyses at the site, impacts to sitewide groundwater are not anticipated to have unacceptable risks to human health or the environment under an industrial use. Site groundwater is not proposed for potable purposes. The corrective measures after final redevelopment are anticipated to include an Environmental Covenant limiting the site use of groundwater, as well as a requirement for most of the site to be paved with asphalt. Subsurface conditions are largely composed of discontinuous sand lenses in clay, and prior investigations found no evidence of contaminants migrating offsite to impact other receptors. Therefore, No Further Action was required for sitewide groundwater.

The potential exists to encounter water during grading near the shoreline or wharf; the project team does not expect to encounter contaminated water that is infiltrating from offsite. If groundwater or contaminated water from shoreline work is encountered during redevelopment activities, it will be handled per the EMHCP.

Groundwater monitoring activities around SWMU 6 will continue per the PCCP. Monitoring wells will be protected during construction activities. If wells require repairs or replacement, DNREC will be notified, and the work will be performed by a Delaware-licensed well driller. No other groundwater monitoring activities are proposed.

MP5. Conceptual Design and the FDRTC Requirements

The conceptual design for the property encompasses the 112-acre Former Chemours Edge Moor Plant and will take place during two phases. No planned development activities are planned for the 3-acre parcel (the Holland Mulch Site) across Hay Road, other than possible uses for parking or temporary trailer office space, with no earth disturbance.

MP5.1 FDRTC Requirements

The conceptual plan meets the site redevelopment objectives, per the FDRTC requirements, which include the following points:

- Most of the site is to be paved with an asphalt cap.
- The approved Excavated Materials Handling Contingency Plan (EMHCP) is to be implemented during site construction or disturbance.
- Groundwater monitoring will continue around the closed surface impoundments, per PCCP requirements. The PCCP will be amended to include provisions for additional operations and maintenance items regarding the asphalt cap or post-port construction features integral to the remedy.
- A UECA covenant will be executed upon remedy completion to protect the remedy in perpetuity.

In addition to these requirements, the following objectives for the overall site management strategy were developed to be protective of human health and the environment:

- Minimize the offsite disposal of soils, and maximize the reuse of soils onsite where geotechnically and environmentally suitable.
- Avoid or minimize disturbances to the four surface impoundments (SWMU 6).
- Maintain RCRA caps on SWMU 6 after redevelopment. Submit plans for DNREC's review and approval for the re-grading and redesign of SWMU 6, and capping as needed, per the final site grades.
- Use new infrastructure to improve overall site stormwater management.

MP5.2 Construction Phasing

On behalf of Enstructure and DSPC, Enstructure contracted a joint venture of Walsh Construction and Soletanche Bachy International (Walsh/SBI JV) to deliver Phase 1 in a progressive design-build process. The Walsh/SBI JV has teamed with Jacobs to provide planning and design services. The site will be developed during two phases; Sections 5.2.1 and 5.2.2 list the major construction phase components. Section 6 provides tentative timing for the construction phases. Phase 1 (Partial Build) will include 63.2 acres of disturbance, and Phase 2 (Full Build) will include 55.8 acres of disturbance. Figure MP shows the site SWMUs relative to construction during Phases 1 and 2. Appendix B provides exhibits describing Phase 1 erosion sediment controls. The CMI Design Report is anticipated to include more specific plans for construction activities.

Figure MP2. SWMU Layout Sketch



MP5.2.1 Phase 1: Partial Build

The general goal of Phase 1 is to provide an operational berth that can accommodate the design vessels, alongside sufficient upland development to allow a container throughput of at least 250,000 lifts per year. Phase 1 is anticipated to include the following components:

- A 1,355-foot-long wharf continuous berthing face, with 1 dolphin at approximately 98 feet south, to provide a further mooring point; arrangement is intended to accommodate a maximum 1,211-foot-length-overall vessel
- A wharf supporting at least four Super Post Panamax ship-to-shore container cranes and the design vessels specified here
- A 45-foot-deep berth area (mean lower low water), plus allowable overdredge adjacent to the Phase 1 Wharf and a new access channel connecting the new berths to the main channel in the Delaware River
- The demolition of infrastructure and building foundations within the Phase 1 work area
- A container yard sized to accommodate the target Phase 1 capacity; the container operations will be grounded, and containers will be handled with electric rubber-tired gantry cranes, top-picks, reach stackers, or some combination thereof
- A truck access gate, including in- and out-lanes and associated processing stations and equipment
- On-terminal maintenance repair facilities for containers and container handling equipment
- Requisite facilities for U.S Customs and Border Protection inspections
- Requisite facilities for U.S. Department of Agriculture inspections
- Upgrades to Hay Road

Interim stormwater management will require the construction of temporary drainage swales and basins that will drain to a designated outfall. The dredge material is anticipated to be placed in the Wilmington Harbor South Dredged Material Placement Facility. There is overlap between the SWMUs during Phase 1 construction, which Section MP5.3 discusses in more detail.

MP5.2.2 Phase 2: Full Build

At full build, the site is expected to have the capacity to handle more than 1.2 million 20-foot-equivalent units per year and will include the following components:

- Up to a 2,600-foot-long marginal wharf supporting at least 7 Super Post Panamax ship-to-shore container cranes, per the approved DNREC and U.S. Army Corps of Engineers permits
- A 45-foot-deep berth area (mean lower low water), plus 1 foot of allowable over dredge adjacent to the Phase 2 Wharf and a new access channel dredged to the same depth connecting the new berths to the main channel in the Delaware River
- The demolition of remaining infrastructure and building foundations within the Phase 2 work area
- Up to an 80-acre container yard; the container operations will be grounded, and containers will be handled with electric rubber-tired gantry cranes, top-picks, reach stackers, or some combination thereof

MP5.3 Interim Actions During Construction Phase 1

Three special-care SWMUs (4, 5, and 20) will be disturbed during Phase 1 construction activities. SWMUs 4 and 5 will only be partially disturbed (Figure MP). These SWMUs received a No Further Action status with acceptable risk. However, they may contain wastes that may not be appropriate for reuse onsite, and will be handled per the EMHCP, as well as the Sampling and Analysis Plan that was approved by DNREC and EPA Region 3 in June 2026. The Sampling and Analysis Plan is provided in this CMI Work Plan.

SWMU 1 will be partially disturbed during Phase 1, and will be handled per the EMHCP and a separate 2022 DNREC-approved Sampling and Analysis Plan, because environmental conditions were assessed separately for this SWMU, along with SWMU 2. SWMU 2 will not be disturbed during Phase 1.

MP5.4 Corrective Measures in Phase 2

The FDRTC's final sitewide remedy requirement, which includes an asphalt cap covering most of the site, will be completed during Phase 2 redevelopment. Further details will be included in the later submissions of a Phase 2 CMIWP and a Phase 2 Design Report.

MP5.5 Ongoing Groundwater Monitoring and Visual Inspections

During redevelopment, CMI progress reporting will be completed on a quarterly and annual basis, pursuant to Module II.G.2.d of Permit HW31B04. Updates will be provided to DNREC throughout the corrective measures implementation, which will meet the permit requirements. These include items such as ongoing progress at the site, areas with environmental concerns, and inspection and groundwater monitoring findings. Efforts will be made to maintain the groundwater monitoring and visual inspections schedule, as required by the PCCP for SWMU 6. Figure MP shows monitoring well locations. If the wells are damaged, DNREC will be notified, and a plan and schedule will be provided to repair or replace impacted well(s). Wells may require longer casings to meet the final site grades.

Figure MP3. Monitoring Well Locations



MP5.6 Post-Remedy Requirements

Long-term stewardship monitoring at the site will be required to confirm the remedy requirements are being implemented, and will include the following activities:

- Maintenance of an asphalt cap that will cover areas included in the Phase 1 section of Figure MP1, per the PCCP
- Groundwater monitoring for the well network near SWMU 6

Semiannual visual cap inspections will take place at the SWMU 6 surface impoundments, as well as other parts of the site. The groundwater monitoring wells will be inspected during each routine sampling event, and during the semiannual cap inspections of SMWU 6. The findings will be provided electronically to DNREC in a semiannual data report.

MP6. Schedule of Work

As mentioned, a phased approach to construction is planned, which integrates corrective measures required for the site, per DNREC's FDRTC. This section provides a timeline for work, with a brief description of construction activities by phase and anticipated submittals to DNREC for the corrective measure implementation. Jacobs is aware of, and sensitive to, the RCRA-prescribed timelines for submittals to DNREC under State Permit HW31B04 for the site. Jacobs will update DNREC on changes to the submittal schedule as the project progresses.

This project is developed as a design-build project, where the engineer and contractor act as one entity and work together to develop and construct the project. Jacobs will be submitting a 90% corrective measures design report to DNREC after the CMI Work Plan and EMHCP are approved, because the construction bid price for this project is being submitted to the Owner at the 90% design level, which often happens for design-build projects.

For the more common design-bid-build projects, the engineer develops the design to a 90% to 100% level with no contractor involvement, then issues a solicitation for bid pricing from multiple contractors.

MP6.1 Preconstruction DNREC Submittals

The following draft documents were submitted in February 2026 and March 2026:

- This CMI Work Plan (February 2026)
- The EMHCP (February 2026, and Revised March 2026)
  - DNREC-RS approved the EMHCP was approved in May 2026.

MP6.2 Phase 1: Partial Build (May 2026 to November 2028)

The following components will be constructed during Phase 1:

- A 1,355-foot-long wharf
- A new access channel connecting the new berths to the main channel in the Delaware River
- A container yard sized to accommodate the target Phase 1 capacity
- A truck access gate, including in- and out-lanes and associated processing stations and equipment

MP6.3 Phase 2: Full Build (To Be Determined)

The final remedy will be completed during Phase 2, per the FDRTC.

- A 2,600-foot-long marginal wharf
- A new access channel
- An 80-acre container yard
- A truck access gate

MP6.3.1 Other DNREC Submittals (To Be Determined)

The following other documents will be submitted to DNREC:

- 90% Corrective Measures Design Report
- Amended PCCP for the Phase 1 (partial sitewide remedy) and SWMU 6
- Request for permit modification for PCCP
- CMI Report for Phase 1
- Return to compliance letter for SWMU 6
- Phase 2 CMIWP
- Phase 2 Design Report and Permit Modification
- Revised RCRA Cap Design and Contingency Plan for SWMU 6 (before Phase 2)

MP6.3.2 DNREC Submittals Following Phase 2

The following activities will take place after Phase 2:

- CMI Report for Phase 2
- Draft and record UECA covenant restricting site use
- Submit Cap Inspection, Maintenance, and Repair Plan to DNREC
- Submit Remedy Completion Report to DNREC for Former Edge Moor Plant

Community Engagement Plan

CEP1. Introduction

This Community Engagement Plan is prepared pursuant to Module II.G.2.a of Permit HW31B04. This section describes the purpose of this plan, relative to the Delaware Container Terminal (DCT) project (project).

CEP1.1 Purpose of Community Engagement Plan

The purposes of this Community Engagement Plan are as follows:

- Establish effective interactions with citizens, groups, elected officials, local/state/federal agencies, and Tribes.
- Satisfy regulatory community engagement requirements under Resource Conservation and Recovery Act (RCRA) program.
- Successfully initiate public outreach and education for effective community meetings.
- Help the public to understand the project and how it benefits the local community.
- Inform the community of the project's status and provide updates, as needed.

CEP1.2 Continuing Community Engagement

Enstructure has and will continue to engage the community through the DCT's development. This section describes specific elements of the community engagement program.

- **Website:** Enstructure maintains a website (delawarecontainerterminal.com) to keep the community informed about ongoing development. This website will be routinely updated with project schedules, progress updates, and mechanisms to contact project contacts.
- **Fact Sheets:** Enstructure will develop and distribute frequently asked question and fact sheets to provide community members and interested parties with clear, concise information about the project, including specific details about the implementation of the required corrective measures. These frequently asked question and fact sheets will also be available on the project website. Materials will be updated, as appropriate, throughout the development process and made available through community events, interested party meetings, and other outreach activities.
- **Community Tours:** Enstructure will host periodic community tours of the project site at appropriate stages of development, giving community members and interested parties an opportunity to learn more about the project firsthand. Tours will provide updates about construction activities and project progress; highlight the main elements of the development; and create opportunities for participants to engage directly with project representatives, ask questions, and better understand the project.
- **Dedicated Point of Contact:** Enstructure has established and will continue to maintain designated email and telephone channels, so community members have a clear, accessible way to submit project-related questions, comments, or concerns. This contact information is clearly identified on the project website. The project team will monitor these channels and direct inquiries to the appropriate project representatives for review and response.

CEP1.3 Project Purpose

This project is taking place to address environmental issues associated with repurposing a legacy industrial site along the Delaware River. In doing so, the project team seeks to modernize the State of Delaware's international waterborne trade capabilities:

- Delaware's position along the Delaware River places it within a competitive international trade market with the Port of Philadelphia, just 25 miles upriver of the Port of Wilmington.
- The State of Delaware port can remain competitive within the Delaware River international trade market.
- This project will help meet the increasing demand for modern containerized ports, and will emphasize the importance of waterborne trade for the State of Delaware and the regional economy.

CEP1.4 Construction Plans

The project will take place in two phases, as described in the Management Plan section of this document; refer to the Management Plan for more details:

1. Phase 1 – Partial Build
2. Phase 2 - Full Build

This CMIWP only addresses Phase 1.

CEP2. Facility History

The facility is on an approximately 115-acre property in Edgemoor, Delaware, along the Delaware River in New Castle County. The property is bound as follows (Figure CEP1):

- Fox Point State Park to the north
- Industrial properties to the south
- The Delaware River to the east
- Hay Road to the west

Figure CEP1. Site Location Map



Sources: Duffield Associates – Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, ©

DuPont purchased the former titanium dioxide plant from Krebs Company in 1935, and then transferred the facility to Chemours in July 2015. Chemours continued to operate the plant briefly before closing it in late 2015. The plant was demolished in 2016, and was sold to DSPC in February 2017 to redevelop into a shipping container facility (Verdantas 2023).

CEP3. RCRA Action Description

This section describes the completed and planned RCRA actions.

CEP3.1 Activities Completed

The following RCRA activities have taken place:

- On August 8, 1986, the U.S. EPA (EPA) identified 17 solid waste management units (SWMUs).
- A 2001 Consent Order with EPA required DuPont obtain an RCRA Corrective Action Permit for the site to address SWMUs.
- The permittee identified 27 potential SWMUs in its Facility-Wide Corrective Action Plan (CAP) (November 23, 2004), which was approved on December 2, 2004.
- Department of Natural Resources and Environmental Control (DNREC) issued Corrective Action Permit (HW03A16) for the DuPont Edge Moor Facility on March 14, 2006.
- SWMUs 28 and 29 were identified in October 2005 and October 2008, respectively.
- The DuPont Corporate Remediation Group performed a Phase I RCRA Facility Investigation in April 2009.
  - No Further Investigation needed at SWMUs 16, 18, 27, or 28
  - No Further Action needed at SWMUs 9, 15, 21, or 24
  - Further Investigation needed at SWMUs 1/3, 4, 5, 13, 13B, 17B, 20, 23, 25, and 29
- A Post-Closure Care Plan (PCCP) was established in March 2010.
  - Monitoring of Surface Impoundments: SWMUs 6A, 6B, 6C, and 6D
  - Semiannual Groundwater Monitoring
  - Quarterly Surface Impoundment Inspections
- Parsons conducted a Phase II RCRA Facility Investigation in March 2011.
  - No Further Investigation needed at SWMUs 13A, 16, 18, 27, 1/3, 4, 5, 13B, 17B, 20, 23, or 25
  - No Further Action needed at SWMUs 8, 15, 17A, 17B, 21, 24, 28, or 29
  - Further Investigation needed at SWMU 2 (in CAP)
  - SWMUs 6A, 6B, 6C, and 6D to be monitored in accordance with PCCP
- Parsons developed an Environmental Indicator Determination Report for Human Health Exposure in June 2012.
- Parsons developed an Environmental Indicator Determination Report Migration of Contaminated Groundwater under Control in June 2012.
- Parsons conducted a risk analysis in June 2013.
- Parsons conducted a Corrective Measures Study in August 2013.
- Duffield Associates PCC developed a Contaminated Materials Management Plan in 2019.
- The DSPC applied for a new corrective action permit from DNREC because the March 14, 2006, permit had expired.
- A public hearing on the permit application was held on September 29, 2020, followed by an extended public comment period that concluded on December 1, 2020.

- The Delaware DNREC issued a permit (HW31B04) for Corrective Action and Post-Closure Care on April 29, 2021, which included its Statement of Basis on its final remedy decision for the DSPC Edge Moor Facility.
- DNREC issued the Final Decision and Response to Comments in October 2021.
- Verdantas submitted the SWMUs 1 and 2 Sampling and Analyses Plan on November 21, 2022.
- Verdantas submitted the SWMUs 1 and 2 data report in May 2023 (revised March 2024).

CEP3.2 Planned Activities

The following RCRA activities are planned for the site:

- RCRA Corrective Measures Implementation Work Plan (2026)
- RCRA Corrective Measures Implementation 90% Design Report (2026)

CEP4. Agencies, Groups, and Key Individuals Most Likely to be Interested in the Process

This section lists the agencies, groups, and individuals that are most likely to be interested in the remediation process.

CEP4.1 Civic and Environmental Organizations

The following civic and environmental organizations may be interested parties:

- Council of Civic Organizations of Brandywine Hundred – Bob Valihura, Acting President
- Eastern Brandywine 100 – Terry Wright, Chairman
- Edgemoor Gardens Civic Association
- Edgemoor Terrace Civic Association
- Brandywine Hundred Fire Company
- Partnership for Delaware Estuary – Kathy Kline, Executive Director
- Delaware Nature Society – Jennifer Adkins, Executive Director
- Delaware Audubon – Steve Cottrell, President
- Delaware Chapter Sierra Club – Dustyn Thompson, Chapter Director
- Delaware Riverkeeper – Maya von Rossom, CEO
- Delaware Community Benefits Agreement Coalition
- Claymont Renaissance Development Corporation – Brett Saddler, Executive Director
- Other communities related to the Port of Wilmington
  - Eden Park
  - Rose Gate

CEP4.2 Local Businesses/Agency Operations

The following local businesses and agencies may be interested parties:

- Calpine
- Holland Mulch
- Bay Shippers
- Merchant's Square

- Wilmington Wastewater Treatment Plant/Veolia
- Delaware Solid Waste Authority
- Fox Point State Park/Delaware State Parks

CEP4.3 Elected and Appointed Officials

The following elected and appointed officials may take an interest in the project:

- Federal
  - U.S. Senator Lisa Blunt Rochester
  - U.S. Senator Christopher Coons
  - U.S. Representative Sarah McBride
- State
  - Governor Matt Meyer
  - Secretary of State Charuni Patibanda Sanchez
  - Secretary of Transportation Shante Hastings
  - State Senator Darius Brown – District 2
  - State Senator Daniel Cruce – District 1
  - State Representative Debra Heffernan District 6
  - State Representative Franklin Cooke – District 16
  - State Representative Nnamdi Chukwuocha – District 1
  - State Representative Stephanie Bolden - District 2
- New Castle County
  - County Executive Marcus Henry
  - County Council President Monique Johns
  - Councilman John Cartier
- City of Wilmington
  - Mayor John Carney

CEP4.4 Agencies

The following agencies may take an interest in the project:

- Federal
  - EPA Region 3
  - U.S. Army Corps of Engineers (USACE)
  - Delaware River Basin Commission
- State
  - DNREC
    - Division of Waste and Hazardous Substances
    - Division of Water
    - Division of Parks and Recreation
    - Division of Watershed Stewardship
    - Delaware Department of Transportation

- Local
  - New Castle County

CEP5. Key Personnel

The following are key contacts for the project:

- Property Owner: DSPC – Brian Devine
- Property Manager: Enstructure DCT LLC - Diego Lopez
- Jacobs (Consultant to DSPC) - Louis Kaminski
- DNREC-Remediation Section – Project Officer Katie Faulkner

CEP6. Anticipated RCRA Related Activities

The following RCRA related activities are anticipated during project, and may be of interest to the community.

- **Environmental Issues:**
  - Disturbance of legacy industrial site with environmental conditions
  - Potential air quality impacts from emissions associated with ships, trucks, and equipment
  - Potential impacts to aquatic resources of Delaware River from stormwater runoff during construction
  - Temporary impacts to integrity of the SWMUs during construction, until full remediation by site capping is complete
  - Management of potentially contaminated soils
  - Air quality and particulate impacts during construction
  - Onsite worker safety and site security
  - Potential impacts to Fox Point State Park

CEP7. Description of Early Consultation

This section describes the consultation that has taken place so far for the project.

CEP7.1 Port of Wilmington Master Plan

In January 2016, the DSPC held an open house regarding the Port of Wilmington's Strategic Master Plan, which was developed to guide the port in sustaining and expanding upon its role as a significant contributor to Delaware's economic vitality. The open house was attended by more than 100 people, and provided an update about how the plan was being developed and progress to date. The DSPC solicited

feedback about issues, alternatives, and potentially significant impacts for consideration in future analyses. Information was provided about four areas of study:

1. Operations & Capacity
2. Marketing & Economic Impacts
3. Environmental Concerns
4. Expansion Opportunities

Public comments included:

- Expansion Opportunities
  - Accommodation of deep draft vessels
  - Improve and better use existing port
  - Provide support for expansion beyond existing port footprint, including access to the Delaware River
- Local Employment Opportunities
  - Need for high-paying local jobs that do not require college education
  - Desire to maintain union representation
  - Suggestion for maritime technology program
  - Suggestion for cost benefit analysis
- Environmental Issues
  - Concern about the restrictive DE Coastal Zone Act and how it may restrict expansion opportunities
  - Emphasis on including National Environmental Policy Act reviews
- Funding
  - Preference for evaluating Public/Private Partnerships
  - Stressed need for intergovernmental coordination
- Transportation
  - Public transportation and linkages need to be factored in Strategic Plan

CEP8. Public Involvement Through Local, State, Regional, Federal Permitting Process

This section describes how the public were engaged through the local, state, regional, and federal permitting processes.

CEP8.1 New Castle County Board of Adjustment Public Hearing

A public hearing took place June 4, 2020, regarding the DSPC's request for a number of variances to redevelop the former Edge Moor Plant related to buffer yard, landscaping, setbacks, and light height requirements.

CEP8.2 DNREC Public Notices and Hearings

The following points provide an overview about DNREC public notices and hearings.

- DNREC issued a notice on August 23, 2020, soliciting public input for the Subaqueous Lands Permit application, the federal consistency application, and the RCRA Permit for Corrective Action and Post-Closure Care. The public was able to offer comments on the proposed project and permit applications.
- A public hearing took place on September 29, 2020, regarding the DSPC's applications for a Wetlands and Subaqueous Lands Permit, a Federal Consistency Certification, and an RCRA Corrective Action Permit renewal. More than 50 people attended the hearing.
- Following the September 29, 2020, public hearing, DNREC extended the written public comment period and accepted written public comments on the permit applications through December 1, 2020. During that time, any member of the public could offer comments regarding the Edgemoor proposal. More than 100 comments were received as part of this process, many of which were supportive of the project.

CEP8.3 Delaware River Basin Commission Hearing

On November 10, 2021, the Delaware River Basin Commission held a public hearing to solicit comments from the public, and extended the written comment period to November 15, 2021, during which members of the public were able to offer comments regarding the project. Forty-six comments were received; of those, 44 were in support of the project.

CEP8.4 USACE Public Notices and Outreach

USACE Edgemoor Project, Mitigation Plan and Replacement Capacity under Section 217(a):

- USACE issued *National Environmental Policy Act* scoping letters on December 17, 2018, to solicit comments from 20 public, federal, state agencies, programs, and recognized Tribes and Nations on the project.
- USACE conducted public outreach from January 2020 until March 2020, before the submittal of permit applications to DNREC; this included meetings with civic organizations; briefings with local conservation organizations; briefings with local, state, federal elected officials; and an open public meeting on March 11, 2020.
- USACE issued a public notice on July 24, 2020, to solicit comments from the public, federal, state, and local agencies, and extended the comment period to October 1, 2020. During that period, any member of the public was free to offer comments regarding the project.
- USACE issued a supplementary public notice on November 10, 2021, to solicit comments from the public, federal, state, and local agencies, and further extended the comment period to December 10, 2021. The supplementary public notice was intended to solicit comments regarding the Preliminary Compensatory Mitigation Plan, dated October 15, 2021, and to notify the public of additional updates to the project.
- USACE issued a public notice on November 4, 2022, regarding the construction of replacement capacity of dredged material placement facilities for the initial 20 years of maintenance dredging for the access channel in connection with the Edgemoor project and Section 217(a). The only written comments received were from Phila Port, filed on December 4, 2022.

CEP8.5 Delaware Legislative Engagement and Oversight

In April 2018, the Delaware General Assembly passed House Concurrent Resolution 76, which addressed the DSPC's efforts to develop the Edgemoor property. The Concurrent Resolution's passage followed a public presentation by the Chair of the DSPC Board to the Joint Committee on Capital Improvement. This resolution involved a public meeting and consideration by the Delaware General Assembly, before it received the unanimous support of the House of Representatives and the Delaware State Senate.

On June 30, 2021, Governor Carney signed the *Fiscal Year 2022 Bond and Capital Improvements Act* (the Bond Bill) after it passed both Chambers of the General Assembly with near-unanimous support. The Bond Bill includes an appropriation supporting the DSPC's mitigation efforts at Fox Point State Park as part of the Edgemoor expansion permitting effort.

CEP8.6 Estimated Level of Public Interest in RCRA Process

The following points estimate the level of public interest in the RCRA process:

- Interested Parties are not likely to focus only on RCRA issues; however, the RCRA may serve as gateway to broader community concerns identified in Section CEP6.
- It is anticipated that the public will want to be assured that site conditions are managed to minimize impacts to public health and environment.
- Because site work near stakeholders may revisit site history and data about legacy contaminants, outreach activities and materials will focus on the current condition, protective remedy, site materials management during construction, and a Health and Safety Plan.
- DNREC's issuance of the RCRA permit was not appealed; however, several parties appealed DNREC's Subaqueous Lands Permit. If additional public notices or public hearings by state agencies are required, that may provide opportunities for stakeholders to raise concerns about the project.

CEP9. Verdantas's Public Participation Activities in 2022 to 2023

The following public participation activities took place between 2022 and 2023:

- Fact sheets were distributed, and a website was developed for the Edgemoor Activity Review of EPA Environmental Justice Screen (refer to Appendix C).
- Briefings took place for elected officials.
- Meetings took place with civic and environmental organizations.
- A public community meeting took place.

CEP10. References

Verdantas. 2023. *Corrective Measures Implementation Workplan. Prepared for Department of Natural Resources and Environmental Control (DNREC).* January.

Corrective Measures Permitting Plan

CMP1. Introduction

The purpose of the Corrective Measures Permitting Plan (CMPP) is to identify federal, state, interstate, regional, and local permits, approvals, easement agreements, and site access agreements required to implement corrective measures. The corrective measures are required by the Permit for Corrective Action and Post-Closure Care issued by the State of Delaware, DNREC to the DSPC on April 29, 2021 (Permit HW31B04) for the Former Chemours (DuPont) Edge Moor Plant (the site). This CMPP was prepared pursuant to Module II.G.2.a of permit HW31B04. DNREC signed a Final Decision and Response to Comments (FDRTC), representing a Corrective Measures Remedy for the site, on October 6, 2021 (Appendix).

The corrective measure is to cover the site surface with pavements and buildings. The existing impervious capping system on Solid Waste Management Units (SWMUs) 6A, 6B, 6C, and 6D will be maintained, or will be replaced if it is disturbed during corrective measure implementation before it is covered by pavement. The Post-Closure Care Plan monitoring of the site (visual inspections and groundwater monitoring) will continue as part of the corrective measure. All permits, approvals, and agreements mentioned in this CMPP are necessary to implement the corrective measure.

CMP2. Required Permits and Approvals

The responsibilities and jurisdiction of the U.S. Environmental Protection Agency (EPA) *Resource Conservation and Recovery Act* (RCRA) program have been delegated to the State of Delaware. While the State of Delaware is the delegated agency, RCRA is a federal program, and is listed as such here.

CMP2.1 Federal (RCRA Permits Delegated to the State of Delaware)

The Permit for Corrective Action and Post-Closure Care became effective April 29, 2021, and is effective until April 29, 2031. Along with this permit, DNREC-RS issued a Statement of Basis on April 29, 2021. DNREC also signed an FDRTC on October 6, 2021, representing a Corrective Measures Remedy for the site.

The following deliverables will be submitted to DNREC-RS for approval before corrective measures are implemented:

- This Corrective Measures Implementation Work Plan
- Revised Excavation Material Handling Contingency Plan (Re-submitted March 2026 and Approved May 2026)
- 90% Corrective Measures Design Report
- Final Corrective Measures Design Report
- Proposed RCRA Cap Design Repair Plan
- Return to compliance letter
- Permit Modification Request (submitted to DNREC-RS as per RCRA requirements upon completion of the paving of the Site during Phase 2 of construction for SMWU 6)

Verdantas has already submitted and received approval for the following permits and actions:

- An Individual Permit and Section 408 Permission, per Section 10 of the *Rivers and Harbors Appropriation Act* of 1899 and Section 404 of the *Clean Water Act,* have also been issued by the U.S. Army Corps of Engineers, Philadelphia District as of August 4, 2022 (CENAP-OPR-2019-00278-86 and CENAD- PD-O [11-2a4]). This permit covers dredging the harbor, constructing the bulkhead and wharf, and placing fill behind the bulkhead to the current mean high-water line onsite.
- Permission has also been given to connect the dredged harbor at the Site with the federal navigation channel in the Delaware River, per Section 14 of the *River and Harbors Appropriation Act of 1899* (33 United States Code 408) as of August 4, 2022.

CMP2.2 State

The State of Delaware, rather than the New Castle County Department of Land Use, has the authority to review and approve all land use development submittals, because the DSPC is a state agency developing state-owned land for a purpose that is of statewide concern. As such, Jacobs is submitting a revised Exploratory Land Development Plan to the DNREC Land Development Program for review. If the Exploratory Land Development Plan requires a renewal or extension, DNREC will be the responsible agency. In addition to the aforementioned plans, DNREC will need to approve Record Plans, which will include 90% complete design drawings. In 2020, New Castle County approved the Exploratory Land Development Plan and Demolition Plans submitted by Verdantas.

Prior Permits issued under Verdantas:

- Delaware Department of Transportation (DelDOT) has approved the Entrance Plan, which allows for 10 variances. Variances 1, 8, and 9 allow for total paving of the site to achieve the corrective measure. The Entrance Plan and variances were approved per the New Castle County's Board of Adjustment Notice of Decision on June 4, 2020 (Reference 2020-0216-A). DelDOT issued a Letter of No Objection to Recordation in July 2023 and issued an Entrance Permit in October 2023.
- The State of Delaware issued a Section 401 Water Quality Certification, which is part of the Subaqueous Lands Permit required to dredge the Delaware River, construct a wharf and bulkhead, fill intertidal lands, and beneficially reuse dredged material onsite. This permit also covers the discharge of a dewatered dredge slurry through Outfall 001 during construction. The permit was issued on September 30, 2021, as Subaqueous Lands Permit SP-101/20.
- The State of Delaware has issued a Consistency with the Federally-Approved Coastal Zone Management Plan for the maritime water associated with the project. This approval was issued with the Subaqueous Lands Permit on September 30, 2021, and is required to obtain the Federal Individual Permit issued per Section 10 Rivers and Harbors Act and Section 404 of the *Clean Waters Act.*
- DNREC – Wetlands and Subaqueous Lands Section approved a Monitoring Plan for Construction Dredging and Dredged Slurry as part of the Subaqueous Lands Permit issued September 30, 2021. This monitoring plan specifies the monitoring of dredge material slurry being placed onsite and the monitoring of the decant water effluent discharging to the Delaware River. Dredged material will not be placed at the site, which was originally considered. Instead, it will be transported via pipeline from the dredge areas offshore of the Site to the U.S. Army Corps of Engineers-operated Wilmington Harbor South Confined Disposal Facility. Decant water effluent from the dewatering of dredged material at the Wilmington Harbor South placement site will be monitored at the discharge point(s) into the Delaware River, per the Subaqueous Lands Permit issued to the Wilmington Harbor South facility during dredging.

Additional Permits Needed:

- A Water Service utility approval and utility permit will be needed from Veolia Water Delaware, Inc. An Entrance Plan Permit will be required from DelDOT.
- A Grading and Stormwater Management Permit will be submitted for Phase 1 of construction for DNREC – Division of Watershed Stewardship's approval.
- A separate Grading/Stormwater Management Permit submittal for Phase 2 will be submitted to DNREC - Division of Watershed Stewardship for approval.
- A Wastewater Construction Permit will need to be approved by DNREC.
- In association with buildings on the site, State Fire Marshall Approval will be necessary from the State Fire Marshall's Office.
- A Natural Minor Air Quality Permit will be obtained from DNREC's Division of Air Quality to monitor dust emissions from the crushing of concrete.
- Per Section CMP2.1, the corrective measures planning and implementation aspects of the federal RCRA program have been delegated to DNREC for review and approval. Similarly, DNREC issues Corrective Action permits.

CMP2.3 Interstate

No interstate permits or approvals are required in association with the corrective measures at the site.

CMP2.4 Regional

A Polychlorinated Biphenyl Minimization and Monitoring Plan has been approved by the Delaware River Basin Commission (DRBC) that involves semiannual monitoring of polychlorinated biphenyl concentrations in stormwater from each outfall location onsite during a qualifying storm event. DRBC approved a DRBC docket authorizing construction of the harbor (Docket D–2020-003 CP-1) as of March 9, 2022.

Verdantas has been doing the polychlorinated biphenyl monitoring to date, and either Verdantas, or another qualified consultant will continue the monitoring through construction and operations, per the DRBC docket requirements.

CMP2.5 Local

Sanitary sewer approval, and possibly a utility permit, will be needed from New Castle County Department of Public Works. The utility permit will be necessary if the utilities connect to the right-of-way.

Various building permits for retaining walls and structures will need approval by New Castle County.

CMP3. Required Agreements with Adjoining Landowners

This section discusses agreements that will be required with adjoining landowners.

CMP3.1 Site Access Agreements

Land-based access to the site is from Hay Road and existing railroad tracks. Water-based access is from the Delaware River.

Up-river of the site is Fox Point State Park, which is accessed by Lighthouse Road. Lighthouse Road and the entrance to Fox Point Park will be improved as part of the corrective measures. An agreement with DNREC may be required to construct the park entrance once limits of access for construction are fully vetted. Otherwise, adjoining landowner agreements are not required for site access.

CMP3.2 Easement Agreements

All easements are shown on the Exploratory Minor Land Development plans Jacobs prepared.
The following easements are associated with the corrective measures at the site:

- DelDOT
- Delaware Power & Lighting Company
- Air Reduction Company
- Verizon Delaware LLC
- United States of America (United States Coast Guard)

CMP4. CMPP Requirements

The following permits and approvals will be issued before the corrective measures are implemented

- Submittals for DNREC-RS approval, per RCRA requirements:
  - This Corrective Measures Implementation Work Plan– Submitted February 2026
  - Excavation Material Handling Contingency Plan – Approved May 2026
  - 90% Corrective Measures Design Report (to be submitted upon approval of this revised CMIWP)
- Grading/Stormwater Management Permit Phase 1

The following permits and approvals are anticipated during or following the Phase 1 corrective measures' construction:

- Grading/Stormwater Management Permit for Phase 2
- Exploratory Plan renewal/extension
- Water Service Utility approval and Utility Permit for Veolia Water Delaware, Inc./DelDOT – before Record Plans approval
- Sanitary Sewer Approval and Possible utility permit to New Castle County Department of Public Works – before Record Plans approval
- Wastewater Construction Permit – before Record Plans approval and one month or more after sanitary sewer approval
- State Fire Marshal approval – prior to Record Plans approval
- A Natural Minor Air Quality Permit
- Record Plan approval – after Letter of No Objection to Recordation, Grading Plan, Sanitary Sewer approval, State Fire Marshal approval, and Stormwater Management Permit for Phase 1 and Phase 2 are issued

- Entrance Permit
- Final Corrective Measures Design Report – to be submitted after approval of final design plans
- Permit Modification for Phase 1 RCRA corrective action permit
- Permit Modification for Phase 2 RCRA corrective action permit

The schedule of permits and approvals aligns with the current design phasing described in the Corrective Measures Implementation Work Plan.

Appendix A
Key Resumés

Christopher Lawrence, PE

Principal Port Engineer

Profile

Chris is Jacobs' Chief Engineer and Principal Project Manager for Ports & Maritime with over 35 years of experience. He is responsible for the management of major port development projects and has worked at most of the major ports in the United States (U.S.) and at many globally. His project responsibilities have included initial planning, alternatives development and feasibility evaluation, conflict identification and solution development, design, plans and specifications, and detailed cost. Chris has specific expertise in the planning, design, and construction management of civil infrastructure to support new and reconstructed wharves, and in expanding active container terminals to minimize impacts on existing operations. Chris is also Engineer-of-Record for many of the projects he manages.

Key skills | Areas of expertise	▪ 35 years of experience in planning, alternatives development and feasibility evaluation, conflict identification and solution development, design, plans and specifications, and detailed cost estimates ▪ Extensive background of managing major port projects, including major port development efforts ▪ Specializes in initial planning, alternative development and feasibility evaluation, conflict identification and solution development, and detailed cost estimating for capital improvements. ▪ Project manager for several assignments for the Port Authority of New York and New Jersey under an on-call agreement to sustain increased cargo flow through the Port and major reconstruction activities at Maher Terminals at the Elizabeth Marine Terminal in New Jersey
Education | Qualifications	▪ MS, Civil Engineering, Drexel University, 1987 ▪ BS, Civil Engineering, Drexel University, 1985
Registrations | Certifications	▪ Professional Engineer: – Pennsylvania (1996, (#051939-E) – New Jersey (2000, #24GE04228900)
Memberships | Affiliations	▪ American Society of Civil Engineers ▪ American Society for Testing and Materials ▪ Society of American Military Engineers

Relevant Project Experience

Port Projects

Delaware Container Terminal Owner's Technical Requirements, Wilmington, DE, 2024

Client: Enstructure

Role: Principal Engineer

Responsibilities: Jacobs is providing technical services to Enstructure as part of its efforts to develop the new greenfield Delaware Container Terminal. Jacobs' scope consists of preparing terminal layouts and a Basis of Design, as-needed consulting to support with execution of a $50M MARAD grant (for which Jacobs

separately led the application), and electrical engineering and utility support and coordination. The documents will be used in a Progressive Design Build procurement process.

Clean Ports Program Grant Application, Wilmington, DE, 2024

Client: Diamond State Port Corporation

Role: Principal Engineer

Responsibilities: Principal Engineer for development of an FY2024 U.S. Environmental Protection Agency (EPA) Clean Ports Program grant application.

Clean Ports Program Grant Application, Philadelphia, PA, 2024

Client: Philadelphia Regional Port Authority

Role: Principal Engineer

Responsibilities: Jacobs' Principal Engineer for development of an FY2024 EPA Clean Ports Program grant application.

Paulsboro Marine Terminal, Paulsboro, NJ, 2009-Ongoing

Client: South Jersey Port Corporation

Role: Principal-in-Charge/Engineer-of-Record

Responsibilities: Construction of the Paulsboro Marine Terminal on three former brownfield sites that are being redeveloped to attract new services and restore family sustaining jobs to the area. The project included construction of a new 2500-foot (ft) wharf, including provisions for future Super post-Panamax gantry cranes (wharf completed in 2020), in addition to major civil construction over the 180-acre facility. Work included planning; all technical surveys; securing all environmental permits; estimating capital and operating costs; preparing conceptual and detailed engineering design; planning the projects' implementation; and providing input and consulting services during design and construction of multiple projects. Extensive agency coordination and development of innovative solutions was required to secure the required environmental permits. The project was the first new terminal and wharf developed on the Delaware river in over 50 years. Construction is ongoing with over 28 contracts currently completed. Project Costs to date are in excess of $250M. Construction is being completed in phases, which are generally design-bid-build.

Seagirt Yard Electrification, Baltimore, MD, 2020-Ongoing

Client: Ports America Chesapeake

Role: Principal Engineer

Responsibilities: Densification of an existing container terminal including design of infrastructure to support the transition to electric rubber tire gantry cranes (eRTGs). Project includes planning and design for the densified/optimized yard layout, supporting civil and electrical infrastructure, and phasing to minimize impact to existing operations. Alistair is the project manager and lead planner for the project, working with the owner and equipment vendors to develop new terminal/yard layouts, and prepare and deliver construction drawings and specifications. Key challenges include coordination with multiple vendors for new cargo handling equipment and conductor busbars to support electrification and developing a phasing strategy that will minimize impact to existing operations.

Port Newark Container Terminal (PNCT) Expansion Master Plan, NJ, 2019-2023

Client: PNCT

Role: Principal Engineer

Responsibilities: PNCT appointed Jacobs to prepare a 50-year master plan. Alistair is project manager and lead planner providing technical expertise in container operations, terminal capacity assessment, dredging and reclamation, and port infrastructure. The proposed roadmap for development includes an assessment of on-terminal and off-terminal elements including terminal design and efficiency, permitting and environmental regulations, intermodal, costs, and development risks and opportunities.

Port Privatization, Expansion, and New Terminal Development, Wilmington, DE, 2018-2021

Client: Gulftainer

Role: Project Principal/Lead Engineer

Responsibilities: Supported Gulftainer USA's 50-year concession with the Diamond State Port Corporation to expand and densify an existing multipurpose port facility and design, build, and operate a new marine container terminal. Work included evaluating and developing terminal layouts and operational parameters; identifying short, medium, and long-term development scenarios; all technical surveys; developing environmental and permitting requirements; estimating capital and operating costs; preparing conceptual and detailed engineering design; planning the projects' implementation; and providing input and consulting services during design and construction of multiple projects.

APM Terminals, Moin, Costa Rica, 2013- 2019

Client: Moin Container Terminal

Role: Project Manager

Responsibilities: Planning, design, and construction of a new $1B dedicated container terminal on the Caribbean Coast of Costa Rica in what was originally unsheltered, open water. Responsible for planning and concept development support associated with concession proposal. Led the extensive field investigation campaign, hydraulic modeling for evaluation of protection structures and ship motion, and other basic design studies. Also was the Engineer-of-Record responsible for the design of all terminal components including dredging, land reclamation, shore protection, civil works, marine structures, and all vertical structures in this highly seismic area. Collaborated with the Client in iterating the master operational plan for the terminal, including analysis and layout of automation technologies and use of wide-span cranes for management of empty containers. The terminal became fully operational in February 2019 and exceeded original operational milestones. The project was delivered as design-bid-build; however, bidders were limited and there was an extensive early contractor involvement phase during which Jacobs worked collaboratively with the two final shortlisted bidders to prepare their proposals.

Packer Avenue Terminal, Philadelphia, PA, 2018- 2021

Client: PhilaPort

Role: Senior Technologist and Principal-in-Charge

Responsibilities: The reconstruction and extension of approximately 1700 ft of crane beam and rail to allow installation of new Super post-Panamax Container Cranes at the Packer Avenue Marine Terminal. Work included planning; all technical surveys; estimating capital and operating costs; preparing conceptual and detailed engineering design; securing building permits, planning the projects' implementation; and providing input and consulting services during design and construction while maintaining terminal operations. Project was publicly procured as design-bid-build. Project cost was approximately $60M.

On-Call Assignments (several on-call agreements), 1999 –2009

Client: PANYNJ

Role: Project Manager

Responsibilities: Managed assignments under a "call-in agreement" to sustain increased cargo flow through the Port. Major projects assigned under the agreement include:

- The master plan for automobile terminal development, including evaluation of fixed parking structures and other parking technologies. The master plan included developing a forecast of the automobile trade through 2040, a vessel forecast and navigation analysis, an inland transportation costs analysis, inventory of existing facilities, and development of design alternatives and associated costs.
- The master plan for rail facilities development, including over 120,000 linear feet of new track (40,000 feet of working track and 80,000 linear feet of support track). Stakeholder (rail and terminal operator) meetings and consensus building was a key element in developing the master plan. Intermodal container transfer facilities in Newark, Elizabeth, and Staten Island were all reviewed and redesigned as part of these efforts. The impacts to existing local roadways were evaluated for the various designs developed.

Evaluation of Stabilization Alternatives, South Dredge Material Disposal Area, MD

Client: U.S. Army Corps of Engineers Wilmington Harbor

Role: Project Engineer

Responsibilities: The evaluation involved review and field studies of design, implementation, and performance of high strength geotextile and prefabricated vertical drains used for the stabilization of very soft dredged soils placed during the construction of the Seagirt container yard near Baltimore, Maryland.

Environment

Land Recycling and Remediation Standards Act (Act 2) Releases, PA

Client: Pennsylvania Utility

Role: Project Manager and Technical Lead

Responsibilities: Responsible for securing Act 2 Releases for six parcels associated with a power station in Northwestern Pennsylvania. The project involved reviewing pervious investigations and remedial actions conducted at the parcels, identifying data gaps, conducting additional Geoprobe and test pit sampling to fill the gaps, and to prepare final site characterization reports. As the projects have been active for almost a year, CH2M HILL personnel have been working with the original draft standards and revised standards, as well as the final standards. This involvement with the Act through its development has made CH2M HILL familiar with all aspects of Act 2. These were among the first releases provided by the NW (Meadville) district.

for arsenic, remediation through removal of contaminated soil, and securing Act 2 releases from liability.

Land Selection, Alternative Development, and Design for Wetland Restoration, Cumberland County, NJ

Client: PSE&G Facility

Role: Lead Project Engineer and Task Manager

Responsibilities: Responsible for collecting field data, preparing feasibility studies, and developing hydraulic metrics and design alternatives. Extensive involvement in the land selection and design processes made him familiar with the parameters that impact coastal marsh habitats, including ground elevation, tides, hydraulic distribution and wave action.

EPA Superfund Sites

Client: EPA

Role: Various Roles

Responsibilities: Site manager for remedial action at a site near Flint, Michigan. Other Superfund site activities included installing monitoring well networks, developing a groundwater monitoring program, and evaluating existing caps during a remedial investigation. Performed technology screening, alternatives development and evaluation, and cost estimating for containment alternatives for feasibility studies and remedial designs for various sites. For the Laskin Poplar site in Jefferson, Ohio, developed several remedial containment alternatives to contain large volumes of contaminated non-source soil, including the selected alternative consisting of groundwater diversion and a cap with geosynthetic components.

EPA Superfund Site, MI

Client: EPA

Role: Site Manager

Responsibilities: The remedial design included installing monitoring wells, installing dedicated pneumatic sampling pumps, and sampling and analyzing groundwater. At a Superfund site in Wisconsin, supervised the excavation of deep test pits in a landfill to locate potential contaminant source areas and the excavation of shallow test pits through the existing landfill cap to evaluate its adequacy at a Superfund site in Wisconsin. Performed field infiltrometer and density tests to assist in evaluating the existing cap. Estimated costs for containment alternatives, such as slurry and interceptor trenches, soil/geomembrane cover and cap technologies, and onsite landfilling for various Superfund sites.

Geosynthetic Research Institute

Client: Drexel University

Role: Research Associate of the Geosynthetic Research Institute

Responsibilities: Performed field research on biologic clogging of landfill leachate collection systems and laboratory research on the hydraulic and mechanical behavior of high flow drainage geocomposites, geotextiles, and geomembranes. Performed many types of geosynthetic tests to ASTM and GRI standards, and assisted in developing an EPA-sponsored geosynthetic design guidance manual for hazardous waste landfill cells and surface impoundments.

Water/Wastewater

Field Quality Control Program for the GIS/Mapping Program, PA

Client: Philadelphia Water Department

Role: Task Manager

Responsibilities: The field QC portion of the program requires inventorying PWD features, specifically inlets and fire hydrants, throughout the city and comparing this inventory to the GIS database. Performance of this project requires a thorough knowledge of PWDs distribution and collection systems and nuances of the various features.

Design of a Municipal Water Distribution System Expansion, PA

Client: West Caln Township

Role: Lead Civil and Geotechnical Engineer

Responsibilities: Elements of the project included installation of a new 3.6-mile water main and 200,000 gallon elevated storage tank. Responsible for performing geotechnical design investigation, subsurface profile along pipeline alignment, foundation report, and technical specifications.

Published Papers

- With Songtao Yang, P.E., Arundhati Bhosle, P.E., and Lou Allora, C.P.E. "Innovative Deepening of Maher Container Terminal Berths 64/66": ASCE Ports '22.
- With Michael G. Wagner, P.E., M.ASCE. "Paulsboro Marine Terminal Wharf Design and Construction":
- With P. Cline and E. Miesner. "Risk Analysis: Natural Attenuation Alternative for Trichloroethene. In Situ and On-Site Remediation": Volume 3, Battelle Press, 1997.
- With R. M. Koerner. Prefabricated Drainage Geocomposites for Landfills and Surface Impoundments. APCA Proceedings on Technical Issues and Hazardous Waste Siting. Air Pollution Control Association. 1986.
- With R. M. Koerner and J. Fowler. Soft Soil Stabilization Study for Wilmington Harbor South Dredge Material Disposal Area. Final Report. Vicksburg, Mississippi: USAE Waterways Experiment Station. 1986.

Louis Kaminski, PE

Senior Ports and Maritime Project Manager/Design Manager/Group Leader

Profile

Louis Kaminski is a professional engineer in New York with 20years of experience in marine related projects involving project management, design management, rehabilitation and design, berthing analysis, cost estimation, and port evaluation. His background includes onsite construction management, resident engineering, and marine structure inspections. For the past year, he has served in an internal leadership position, managing 15 staff. The role entails workload assignment and balancing, career development, and corporate messaging to achieve a cohesive and functioning team. He has overseen the construction and design of more than 3 miles of bulkheads and revetment structures around the New York Harbor.

Education | Qualifications	▪ BS, Civil Engineering (Concentration in Construction Management), School of Engineering and Applied Sciences, Columbia University, 2005
Registrations | Certifications	▪ Professional Engineer: New York (#088824, 2011) ▪ Occupational Safety and Health Act (OSHA), 10-hour Construction Industry Outreach Training Program ▪ NSC Defensive Driving ▪ Transportation Worker Identification Credential (TWIC)

Relevant Project Experience

TI-167 Tallman Island Bulkhead and Dock Improvements, 2018 – Ongoing

Client: New York Department of Environmental Protection (NYCDEP)

Role: Design Manager

Responsibilities: Coordinates a multidisciplinary team for the rehabilitation of the bulkhead, electrical, and mechanical upgrades, as well as landscaping. The bulkhead is approximately 2,865 feet long, and portions are in various states of disrepair. Tallman Island Water Resource Recovery Facility (WRRF) is along the Upper East River in the Borough of Queens, just west of the Bronx-Whitestone Bridge, which exposes the WRRF and surrounding bulkhead to harsh environmental conditions, such as ocean winds, salt spray, and storm surge. The project consists of a detailed inspection of the entire bulkhead and dock above and below the waterline from the top of the structure to the mudline; determining locations and extents of all existing bulkheads and other adjacent structures; designing new bulkheads for the entire plant given environmental and plant operation constraints; replacing sludge valves; modifying the valve arrangement for the transfer of sludge on the pier; replacing the ship-to-shore power; replacing the lighting of the pier and bulkhead; development of topographic, bathymetric, utility, property line and United States (U.S.) bulkhead line surveys; geotechnical investigation program. The project also includes implementing NYDEP sustainability goals, as well as all federal, state and local permitting.

Andrew Haswell Green Phase 2B, New York, NY, 2017 – 2023

Client: NYCEDC

Role: Project Manager

Responsibilities: Andrew Haswell Green Park-Phase 2B is between East 60th and East 62nd Streets along the East River in Manhattan. The Project Site is a 1.1-acre open space that will connect with the greater East River Esplanade. The project is separated into two main areas: the existing concrete ramp structure and

the existing wharf. The design of the ramp will include the rehabilitation of the 27,530-square-foot ramp. The ramp improvements will provide new surface treatments, including the creation of an overlook area near the entrance at East 60th Street, and the installation of new lighting, fencing/railings, and other utility improvements. The design of the wharf will include the replacement of the existing timber pile-supported waterfront structure. The pile-supported wharf structure is approximately 272 feet long and 80 feet wide. The project will demolish the wharf and construct a replacement pile-supported pier in the footprint of the existing wharf. New steel pipe piles, a steel sheet pile cutoff wall, and a new concrete deck slab will be installed to support the landscaping, which includes benches, lighting, terraced stairs leading from the ramp to the esplanade, a grass lawn sloping down toward the river, a terraced garden, and irrigation and plumbing systems.

On-call, Various Projects, 2014 – 2019

Client: New York City Economic Development Corporation Asset Management

Role: Construction Manager

Responsibilities: Provided construction management diving services at multiple sites across New York City. Responsibilities included coordination with construction manager, client, and contractor, directing dive team's scope and reviewing daily inspection memos.

Preliminary and Final Design, New York, NY, 2018 – 2020

Client: East Side Coastal Resiliency (ESCR)

Role: Construction Phasing and Scheduling Task Lead

Responsibilities: Responsibilities included construction phasing and scheduling for the entire project during design. This post-Superstorm Sandy federally funded resiliency project includes the design of a continuous flood protection barrier in the lower east side of Manhattan from Montgomery Street to East 25th Street along the East River. In addition to the flood protection barrier to protect the city from storm surge, the ESCR project comprises enhancements to the resiliency and programming of the existing parks within the project area, improved connectivity between the city and the waterfront, and enhancing the overall recreational and urban environment. Jacobs' scope during this second phase of the ESCR project included the development of design criteria for the flood protection system, detailed construction documents, construction cost estimates, a construction phasing and scheduling study, condition assessments of the existing drainage infrastructure and East River Park promenade, development of an operations and maintenance manual for the flood protection system, and participation in stakeholder and community engagement sessions. The project includes extensive coordination with various City agencies, including Con Edison, to identify key utilities and other infrastructure that will be impacted by the proposed work and to develop innovative solutions that will minimize impacts on the community and integrating the flood barrier with the City's key infrastructure to protect it from future storm surge events.

Global Marine Terminal and Container Services/Weeks Marine, Bayonne/Jersey City, NJ, 2011 – 2013

Client: East Berth Extension

Role: Resident Engineer

Responsibilities: Oversaw the 900-foot extension of the existing Global Marine container terminal. Responsibilities included quality assurance, special inspections and associated coordination, and collaboration with design-build partner (Weeks Marine) and client. Works include backfill and compaction, soil settlement monitoring, revetment placement, vibration monitoring, concrete/H/sheet pile driving, precast concrete caps and planks placement, cast-in-place concrete, steel girder installation, high strength bolting, crane rail/bollard/fender installation, storm drainage, paving, striping, and cathodic protection.

Port Newark, Berth 3 Replacement Stage 1 Study, NJ 2010 – 2011

Client: Port Authority of NY & NJ

Role: Project Manager

Responsibilities: Stage 1 study of the replacement of the Berth 3 structure. Structure included concrete piles and deck, sheet pile wall, intricate construction staging around active highway. Oversaw the development of the engineer estimate and report, which included figures with conceptual plans and cross sections.

Broad Channel Streets and Bulkheads Reconstruction- Phase 2, Queens, NY, 2017 – 2021

Client: New York City Department of Design and Construction

Role: Project Manager

Responsibilities: Engineering design and support services for the Broad Channel Streets and Bulkheads Reconstruction. The project will construct/reconstruct bulkheads on six streets that experience several days of considerable flooding each month due to both lunar induced high tides and severe weather events improving the resiliency of the structures and of the area. Specific tasks include performing the geotechnical and structural analysis and providing plans and details for the new bulkheads.

Pile Remediation – Construction Management & Diving Inspection Services, New York, NY, 2015

Client: Battery Park City Authority

Role: Project Manager

Responsibilities: Construction management services at Battery Park City for the fourth phase of the pile rehabilitation program. This phase rehabilitated approximately 211 piles in and around the North Cove Marina. Scope of services included constructability reviews, management of the project, office engineering, and dive construction inspection services from award of the contract through closeout of construction. Jacobs was responsible for project coordination, preparation of overall project schedule and review/tracking of contractor schedule, as well as the financial aspects, including cost estimates and financial reporting for the project.

East River Esplanade Wharf Replacement, New York, NY, 2014 - Ongoing

Client: New York City Economic Development Corporation (NYCEDC)

Role: Project Manager and Lead Structural Engineer

Responsibilities: Construction management services at the East River Esplanade Wharf Replacement at East 38th Street, Manhattan, NY. Work includes progress dive inspections of contractor's work, pile driving oversight, pier demolition oversight, precast and cast-in-place concrete oversight, and timber fendering installation. Project also includes management of subconsultant for pile driving, field welding, concrete and grout special inspection, flood zone compliance, and mechanical demolition.

Hunter's Point South – Phase 2, Queens, NY, 2014 - 2015

Client: NYCEDC

Role: Project Manager

Responsibilities: Redevelopment of Hunter's Point South, Queens, New York. Design includes shoreline protecting revetment, sub-base for wetlands planting and restoration, bathymetric survey and geotechnical investigation.

Manhattan Cruise Terminal Pier 88 & 90, Manhattan, NY, 2014

Client: NYCEDC

Role: Project Manager

Responsibilities: Construction management services at the Manhattan Cruise Terminal Pier 88&90. Work includes progress dive inspections of contractor's work and management of subconsultant for concrete and grout special inspection.

Manhattan Cruise Terminal Pier 92, New York, NY, 2013 - 2014

Client: NYCEDC

Role: Project Manager

Responsibilities: Inspection and rehabilitation design of the Manhattan Cruise Terminal Pier 92 Rehabilitation, Manhattan, New York. Design includes timber pile posting, protective encapsulations of timber piles, mass cellular concrete encapsulation of pile clusters and underdeck shotcrete repairs. Project also include obtaining waterfront permits from U.S. Army Corps of Engineers (USACE) (nationwide verification), New York State Department of Environmental Conservation (DEC) and New York City Departments of Small Business Services (SBS). DEC permitting required mitigation utilizing past earned credits.

Beach Channel Drive Bulkhead Replacement, Queens, NY, 2013 - 2014

Client: NYCEDC

Role: Project Manager

Responsibilities: Reconstruction of bulkhead replacement Beach Channel Drive, between 143rd St and 117th St for NYC DOT and between Wainwright Ct and 105th St. for NYC DPR. Design includes sheet pile (including seismic considerations), reinforced concrete cap, soil anchors and cathodic protection. Project also include obtaining waterfront permits from USACE (nationwide verification), NYCEDC and New York City Departments of SBS, New York City Departments of Environmental Conservation (DEP). DEC permitting required mitigation taken from a planned but still not funded project.

Rockaway Beach Boardwalk Reconstruction, Queens, NY, 2016 - 2018

Client: NYCEDC

Role: Civil Engineer

Responsibilities: Detailed design of Phase 6 of the Rockaway Beach boardwalk reconstruction project. The new 4.7-mile boardwalk replaces the previous boardwalk that was destroyed during Superstorm Sandy. The boardwalk is made of steel and concrete capable of handling HS20 truck loading. Specific tasks include performing the geotechnical and structural analysis for an h-pile retaining wall system and steel pipe piles as well as preparing calculations and design for reinforcement in concrete pile caps and prestressed concrete planks with architectural grade concrete and strict cracking and deflection requirements. The project also includes the design of a solider pile retaining wall and importing beach sand.

Pier 17 – South Street Seaport, Manhattan, NY, 2014

Client: Howard Hughes Corporation

Role: Assistant Project Manager

Responsibilities: Reconstruction of Pier 17 South Street Seaport, New York. Work includes demolition drawings design, permitting and reconstruction design. Project also includes coordination with other design firms; architectural, structural building, mechanical, electrical and landscape.

Pier 36, Brooklyn Army Terminal Pier 4 and 52nd St Pier Diving Inspection, Manhattan and Brooklyn, NY, 2014

Client: NYCEDC

Role: Project Manager

Responsibilities: Routine inspection of Pier 36, Manhattan, New York, Brooklyn Army Terminal Pier 4, Brooklyn, New York and the rapid inspection of 52nd Street Pier, Brooklyn, New York. Work includes dive inspections of the wharf and pier structures and corresponding evaluations and reports according to NYCEDC Standard Inspection Guidelines.

Southeast Federal Center, Pier Connection, Washington, District of Columbia (DC), 2010 - 2012

Client: Office of the Deputy Mayor for Planning and Economic Development

Role: Project Manager

Responsibilities: Oversight of the bidding and design of over-water esplanade connecting two existing city parks. Developed project specifications and coordinated work with owner, construction manager, architect and permitting subconsultants.

Southeast Federal Center, Flood Control Study, Washington, DC, 2010 - 2011

Client: Office of the Deputy Mayor for Planning and Economic Development

Role: Project Manager

Responsibilities: Oversight of the bidding and design of steel plate designed to keep out flood waters. Project involved studying current flood levels in relationship with existing structures, accounting for sea-level rise. Also evaluated any other potential routes for flood water intrusion into existing structure. Developed project drawings and coordinated work with architect.

Arthur Kill Lift Bridge Cofferdam Rehabilitation, Arthur Kill, NY/NJ, 2009 - 2011

Client: NYCEDC

Role: Project Engineer

Responsibilities: Performed and supported pre-design above and underwater inspection of structure and created comprehensive report. Developed specifications for rehabilitation and final design basis for design-build contract. Also acted as the project manager and special inspector for the construction portion of project.

Michael Sheeley, PE

Program, Project, and Construction Manager

Profile

Michael has more than 25 years of construction experience with civil and structural engineering, as well as project and program management. His experience includes extensive involvement in the design, analysis, price estimation, construction, rehabilitation, installation, and project management of a wide variety of civil and marine projects. Michael's design skills and resident engineer skills are reinforced with more than 8 years of previous practical construction experience. The projects he's involved with range from residential development to large-scale mass transportation tunneling projects, to bridge inspection, design, and remediation, to dock replacement and dolphin installation.

Education | Qualifications	▪ MS, Civil/Geotechnical Engineering, Syracuse University, 2000 ▪ BS, Wood Product Engineering & Construction Management, SUNY-Environmental Science & Forestry, 1997
Registrations | Certifications	▪ Professional Engineer: Mississippi, Alabama, and New York (#085539, 2008)
Memberships | Affiliations	▪ Project Management Institute, National and New York City (NYC) Chapter ▪ Construction Management Association of America

Employment History

- 2006 – present – Jacobs (Halcrow and CH2M)
- 2005 – 2006 – Urbitran Associates
- 2004 – 2005 - Gall Zeidler Consultants
- 2001 – 2004 – STV, Inc.
- 1997 – 2001 - Medenbach & Eggers Civil Engineering and Land Surveying, PC
- 1988 -1995 - DA Sheeley Contracting Co.

Relevant Project Experience

Portsmouth Marine Terminal (PMT) Offshore Wind Development, Portsmouth, VA

Client: Virginia Port Authority

Role: Construction Manager

Responsibilities: The project will transform PMT into a modern offshore wind staging port capable of receiving, storing, finishing, and pre-assembling wind turbine components that will be installed offshore as part of the Coastal Virginia Offshore Wind (CVOW) project. Project required a compressed construction schedule with multiple turnover milestones that allowed the tenant to begin early assembly of the wind turbine components. Managed a team of inspectors, document controllers, schedulers, and office engineers. Responsible for keeping the project on time and on budget while maintaining the required quality. Completed project with minimal change orders contributing to 6% of the total cost. Cost: $235M

Gulfport Restoration Program, Gulfport, MS

Client: Mississippi State Port Authority

Role: Program Manager

Responsibilities: Managed HUD-funded rebuild, upgrade, and 80-acre expansion of the Port of Gulfport, which was destroyed in Hurricane Katrina in 2006. To promote local economic growth, the client required that local design consultants be used, and that construction contracts be divided into smaller packages ($1M to $60M) for bidding by local general contractors. Initially integrated into project to edit program construction management manual and provide guidance and oversight of the local construction management (CM) team. Provided key guidance to client and developed stronger, enforceable specification language for construction schedules and the change order process. Responsible for the coordination and letting of all contracts for bidding, developing and negotiating task orders for each design consultant, review of critical construction change orders, coordination between contracts, and directly interfacing with client finance lead and executive director. Worked with Port Authority, potential port operator, and U.S. Army Corps of Engineers (USACE) in attempt to obtain permit to deepen and widen the Federal Navigation Channel from its currently authorized depth of 36 feet to a deeper 46 feet. After 3.5 years as Deputy Program Manager(DPM), transitioned to Program Manager for the remainder of the contract. Cost: $569M.

Port of Alaska, Anchorage, AK

Client: Port of Alaska

Role: Change Order Specialist/Claims Support

Responsibilities: Provided change order and claims support to Program Management and CM team for project affected by the Corona Virus pandemic. A construction contract for a new petroleum and cement terminal was bid in early 2020 with a single-season construction timeline. When the pandemic affected the port's ability to provide owner-supplied materials, the contractor was delayed into a second season, which required numerous, extensive change orders to allow the contractor to demobilize before the ice-in of the river and remobilize after iceout in the spring. Additionally, the contractor made numerous claims for cost escalation due to the delay. Reviewed and negotiated the changes on behalf of the port, as well as rejected numerous unfounded claims. Worked directly with the contractor and the port to develop a negotiated settlement to satisfy the delay costs to the contractor while decreasing overall exposure for the port. Cost: $1.7B.

Malcolm X Avenue Interchange Improvement Project, Washington DC

Client: District Department of Transportation (DDOT)

Role: Change Order Specialist/Claims Support

Responsibilities: Specifically requested by past-project colleague to temporarily join project to help 'fix' the backlog of change orders and claims from the contractor. The DDOT change order process, from scoping to negotiating to processing, is labor intensive and requires mathematical and linguistic precision in order to allow final acceptance by the procurement division. Within the first 6 months of construction, a backlog of over 30 change orders had accumulated and none had been accepted by procurement. Within a few weeks of being onsite, the change orders began to be processed and accepted by procurement due to my direct involvement. Additionally, specific negotiating or denial guidance was offered to the client relating to delay claims as well as cost claims. Cost: $100M.

Rockaway Wastewater Treatment Plant, Rockaway, Queens, NY

Client: NYC Department of Environmental Protection (NYCDEP)

Role: Resident Engineer

Responsibilities: Provided substantial project support in technical details to post-Hurricane Sandy plant damage including the issuing and resolution of over 300 work orders. Individually and entirely responsible for the processing of all contractor time and materials invoices per NYCDEP and NYCDEP Comptroller contractual requirements and format. Contractor invoices in excess of 1500 pgs for each of 4 major contractors with multiples subcontractors due to a 6 month delay in agency providing contracts. Provided review of invoices in a format pleasing to NYC Engineer Audits Office, allowing for easy spot checks by auditors. Responsible for all questions from auditors and responding to contractors about invoice deductions. Cost ~$20M

Coney Island Wastewater Treatment Plant Outfall Reconstruction, Sheepshead Bay, Brooklyn, NY

Client: NYCDEP

Role: Resident Engineer

Responsibilities: CM and Resident Engineers services for outfall reconstruction project. Leading of team of office engineers and constructions inspectors, I was responsible for ensuring that the project was built on time, on budget, and the to the quality required by the contract. Duties consist of all project administration including hosting preconstruction meeting, site safety walk through, monthly reports, permitting tasks, subcontractor approvals, submittal reviews, requests for information (RFIs), project invoicing, change order negotiation and subconsultant coordination. Cost: $13.5M.

Roberto Clemente State Park, Bronx, NY

Client: New York State (NYS) Parks Department

Role: Project Manager Mentor

Responsibilities: Provided key project management and client relations mentoring to intermediate staff during the transition from 90% design drawings to construction documents for bulkhead design project for park incorporating extensive civil/utility upgrades and architectural element additions such as saltwater marsh learning area. Reviewed drawings and provided additional quality assurance and control measures to specifications for client's protection. Reviewed proposals and oversaw design for additional preliminary design work for shoreline stabilization at north end of park to be developed into potential Major League Baseball junior league training camps. Cost: $40M.

Catskill Delaware Aqueduct Interconnector, Maybrook, NY

Client: NYCDEP

Role: Lead Structural Forensic Investigator

Responsibilities: After a double fatal accident occurred at key client project site, provided third-party preliminary investigation report of observations and findings into potential causes of concrete form failure during concrete pour of bulkheads adjacent to mock-up aqueduct. Reporting included onsite findings as well as computation analysis of concrete anchor capacity and formwork analysis per ACI 324.

Metro North Railroad Projects, New York, NY

Client: Federal Transit Administration (FTA)

Role: Oversight Engineer, Project Management Oversight Contractor

Responsibilities: Oversight engineer to provide continual review and evaluation of FTA grantees with statutory, regulatory, and administrative requirements for 4 major Metro North Railroad projects; Tarrytown Station Rehab, Upper Hudson Rehab of 3 Stations, Grand Central Terminal Elevator Rehab, and GCT Employee Facilities. Responsibilities include performing site inspections, attending progress meetings, review of safety inspections, construction scheduling, changes orders, material submittals, and contractor invoicing, DBE requirements and compliance, and any construction or contract issues, and provide official project management oversight consulting (PMOC) reporting to the FTA. The PMOC acts as the "eyes and ears" of the FTA so FTA requirements are met, and to report any concerns if the project is in jeopardy, or out of compliance. $5M.

Kingsborough Community College (KCC), Sheepshead Bay, NY

Client: KCC

Role: Project Manager

Responsibilities: While using the docks at KCC for a disembarking point for the NYCDEP Coney Island project, developed relationship with college staff to provide services related to post-Hurricane Sandy Federal Emergency Management Agency (FEMA) damage analysis, which then developed into to a full dive inspection analysis of over 5000 feet of waterfront structures and incorporation of an inspection program.

69th Street Transfer Bridge Historic Preservation and Reuse Plan, New York, NY

Client: The Riverside Park Fund

Role: Construction Support Engineer/Project Manager

Responsibilities: Project elements included restoration of the deteriorated bridge foundations, construction of access platforms, restoration of the bridge superstructure, and installation of a ferry floating landing. As construction support engineer, worked with the contractor to ensure our design was completed safely and according to specifications. Facilitated the transition to NYC Department of Buildings (DOB) special inspection requirements. Provided substantial onsite inspections to allow work to proceed and according to NYC Department of Parks and Recreation contract requirements and to be completed prior to moratorium. Also, facilitated pile driving analysis. Responsible for all submitted reviews, attending progress meetings, client invoicing, and internal program management. Although Jacobs (as CH2M) served as a subconsultant to the Extell Development Co. for this project, the end-user, the Department of Parks and Recreation, appreciated Jacobs' extensive input, which was above and beyond the responsibilities of construction support staff. $2.5M.

Published Papers

- Sheeley, M., and Negussey, D., "*An Investigation of Geofoam Interface Strength Behavior*", ASCE Geo-Institute Special Publication #112, Soft Ground Technology Conference, Noordwijkerhout, Netherlands, May 28-June 2, 2000.
- Bartlett, Negussey, Kimble, and Sheeley, "*Use of Geofoam as Super-Lightweight Fill for I-15 Reconstruction*", Transportation Research Board Publication
- "*Slope Stabilization Utilizing Geofoam*", Master's Thesis.

Sonny Rutkowski, PE

Senior Ports and Maritime Project Manager and Dredging Design SME

Profile

Sonny Rutkowski has more than 30 years of experience leading projects from feasibility through final design. His expertise includes civil and environmental engineering, dredging, hydrologic and hydraulic studies and design, water resources, coastal and terrestrial flood mitigation, and water/wastewater balance engineering. He has developed engineering designs, supporting calculations, analysis, and reports for marine projects including Ro/Ro, piers, bulkheads, dredging and spoil disposal facilities, constructed wetlands, and mitigation designs. Sonny has directed high profile port facility and infrastructure projects through complex Environmental Impact Statements through National Environmental Policy Act, Coastal Zone Management, Clean Water Act, and Clean Air Act, Endangered Species Act. He has developed engineering designs, supporting calculations, analysis, and reports for Port and Navigation projects including roll-on, roll-off (Ro/Ro), piers, bulkheads, dredging and spoil disposal facilities, constructed wetlands, and mitigation designs. Assembled and led teams of engineers, planners, economists, and biologists to deliver solutions for multifaceted infrastructure projects with multiple stakeholders, funding sources, and regulatory agencies.

Education | Qualifications	▪ MS, Ocean Engineering, Stevens Institute of Technology, 1998 ▪ BS, Civil Engineering, Lehigh University, 1993
Registrations | Certifications	▪ Professional Engineer: Pennsylvania (#PE062672, 2003); New Jersey (#24GE04293700, 2001)
Memberships | Affiliations	▪ Maritime Exchange of the Delaware River ▪ American Society of Civil Engineers COPRI ▪ Society of American Military Engineers

Employment History

- Worley Parsons 10/13 – 7/16
- Weston Solutions 8/01 – 10/13
- Duffield Associates 6/00 – 8/01
- Parsons Brinkerhoff 8/98 – 6/00
- Davidson Laboratory 8/96 – 7/98
- Great Lakes Dredge and Dock Co. 12/93 – 8/96
- Philadelphia Water Department 8/93 – 12/93
- Ocean City Beach Patrol 6/88 to 8/93 (Summers)

Relevant Project Experience

South Brooklyn Marine Terminal, October 2020 - Ongoing

Client: Equinor

Role: Dredging Design & Permitting Lead

Responsibilities: Led the conceptual design and permitting to construct a new Ro/Roroll-on roll-off berth and dredging for creation of new deep draft berths and mooring structures. This multidisciplinary-disciplinary, time critical project involved completing conceptual design of the terminal, design of the access channel, and design and permitting for dredging and disposal. Completed all federal, state, and local

permitting, including Section 10/404 permitting, NJDEP state WQC for dredging and beneficial use of dredged material. Prepared an Environmental Impact Statement and Section 7 Endangered Species Act Consultation. Coordinated all technical staff efforts concurrent with design of the project, and managed an aggressive schedule including field studies that involved multi-seasonal aquatic biota and terrestrial habitat, and sediment characterization (physical and analytical).

Paulsboro Marine Terminal Ro/Ro Berth, Paulsboro NJ, October 2020 - Ongoing

Client: South Jersey Port Corporation

Role: Senior Project Manager, Dredging Design & Permitting Lead

Responsibilities: Led the conceptual design and permitting to construct a new Ro/Ro berth and dredging for creation of new deep draft berths and mooring structures. This multidisciplinary, time critical project involved completing conceptual design of the terminal, design of the access channel, and design and permitting for dredging and disposal. Completed all federal, state, and local permitting, including Section 10/404 permitting, NJDEP state WQC for dredging and beneficial use of dredged material. Prepared an Environmental Impact Statement and Section 7 Endangered Species Act Consultation. Coordinated all technical staff efforts concurrent with design of the project, and managed an aggressive schedule including field studies that involved multi-seasonal aquatic biota and terrestrial habitat, and sediment characterization (physical and analytical).

Packer Avenue Marine Terminal Port Development Plan Design Services, Philadelphia, PA, 2017-2020

Client: Philadelphia Regional Port Authority (PhilaPort)

Role: Project Manager

Responsibilities: Design and bid documentation for wharf improvements and warehousing demolition and construction as part of the $300M Commonwealth of PA allocation for capital infrastructure improvements. Jacobs is assisting PhilaPort make the following upgrades at the Packer Avenue Marine Terminal, PhilaPort's main container terminal that is operated by Greenwich Terminals:

- Berth infrastructure improvements to support new, larger cranes and larger vessels
- Terminal electric grid enhancements to support additional load from the new cranes and expanded terminal, and allowances for implementation of cold-ironing capabilities
- Purchase of new ship-to-shore (STS) cranes
- Relocation of 365,000 square feet of warehouse space to an area offsite of the terminal
- Demolition of current warehousing to generate new terminal yard capacity
- Demolition and removal of two of the current STS cranes
- Conversion of the two Hyundai STS cranes (H-6 and H-7) from diesel to electric power

PhilaPort's investment is being complemented by Greenwich Terminal's contribution of 40 acres of the adjacent Publicker site for expansion of dedicated container operations and the purchase of two new STS cranes. The cumulative investment at PAMT will increase the overall capacity to 900,000 TEU per year, providing significant additional capacity from the 353,318 TEU throughput.

Lake Carnegie Maintenance Dredging, Princeton, NJ, May 2017 - March 2020

Client: Princeton University

Role: Senior Project Manager and Lead Coastal Engineer

Responsibilities: Completion of a dredging design project from feasibility study, through permitting, contractor procurement and construction phase services. The design considered the economic, environmental, value engineering, and public relations factors unique to Lake Carnegie and the surrounding

area for the maintenance dredging of accumulated sediments within Lake Carnegie. The feasibility study screened dredging and dewatering technologies, performed a removal volume analysis, and compared available upland processing areas. Upon selection of feasibility study alternatives, a design was completed for the removal of sediments and the processing and dewatering of the dredged material for sustainable beneficial use as topsoil and construction grading material. This included dredge prism design, upland site development plans, temporary pipeline bridge construction, and grading plans.

Feasibility Study, Basis of Design Report (BODR) and 30% Design - Berry's Creek Study Area Remediation, Bergen County, NJ

Client: Multiple Potentially Responsible Parties

Role: Senior Technical Advisor

Responsibilities: Served as a senior technical advisor for dredging and capping for the Feasibility Study (FS), BODR, and 30% Remediation Design including engineer's estimate. The Berry's Creek Study Area is an urban watershed located in the Hackensack River Meadowlands of New Jersey, a densely populated urbanized area. The 12-square mile watershed includes approximately 1.6 square miles of tidal zone. Sediment within the tidal zone has been impacted by historical industrial and municipal discharges resulting in elevated levels of several contaminants of concern in a dynamic tidal wetland. The primary remedy components includes construction of a sediment management area, installation of a pier structures and temporary hydraulic control structure (to control water surface elevation during remediation), bank-to-bank partial soft sediment removal followed by backfill/capping, sediment processing, water treatment and offsite transportation and disposal.

Berth Deepening, Maher Terminals at the Elizabeth Marine Terminal, Elizabeth, NJ, 2016-2018

Client: Maher Terminals: Maher Terminals Inc.

Role: Project Principal/Permitting Engineer of Record

Responsibilities: Elements of the project included development of topographic surveys, Holocene and Pleistocene delineation for material separation including geotechnical and analytical borings for dredging and disposal at both upland and offshore placement sites. Deepening of berths to 50 feet and other improvements were completed to accommodate super Post-Panamax cranes and terminal substation and distribution systems, a fuel storage facility, an enclosed equipment wash pad, and associated construction services. Lead permit engineer for US Army Corps of Engineers (USACE) Section 10 and NJDEP WQC.

Southport Expansion Project Preliminary Design and Environmental Permitting, Philadelphia, PA, 2009-2012 & 2016

Client: Philadelphia Regional Port Authority, Department. of General Services

Role: Senior Project Manager

Responsibilities: d the design and permitting of a profile project to construct a new $500M state of the art container terminal and dredging 1,008,000 yd^3 for creation of new deep draft berths and access channels. This multidisciplinary, time critical project involved completing conceptual design of the terminal, design of the access channel, and design and permitting for dredging and disposal. Managed and completed all federal, state, and local permitting, including Chapter 404, Section 10, Chapter 105, and an Environmental Impact Statement. Coordinated all technical staff efforts and managed an aggressive the schedule and $1.75M budget including over $600,000 of field studies that involved multi-seasonal aquatic biota and terrestrial habitat, and sediment characterization (physical and analytical). Completed the conceptual design of the terminal and dredging and disposal plans 6 weeks ahead of schedule.

Bangor Quarry Ash Disposal Site, Portland, PA, 2015

Client: GenOn Energy,

Role: Project Manager/Principal Engineer

Responsibilities: Managed leachate monitoring program and prepared annual reports for the phased capping and closure of an ash landfill. Developed and executed regulatory compliance strategy to meet total maximum daily loading in accordance with the NPDES and closure permit. Evaluated alternatives for sampling and monitoring of leachate and prepare construction documents for selection of monitoring equipment. Coordinate with utility staff to install monitoring equipment. Prepare process flow diagrams, and calculate projected flow and contaminant loading and prepare monthly environmental compliance report updates. Implement compliance schedule considering environmental risk and implementation costs.

Enbridge Oil 6B Pipeline Break Spill Response, Kalamazoo River, Marshall, MI, 2012 - 2013

Client: EPA Superfund Technical Assessment and Response Team

Role: Lead Sediment Containment and Dredging Engineer

Responsibilities: Responsible for containment, assessment and remedial dredging of oiled sediment for an Emergency Response involving over $1B in cleanup efforts of the Kalamazoo River oil spill. The July 2010 pipeline rupture released approximately 819,000 gallons of oil, impacting over 35 miles of the Kalamazoo River and associated flood plain and tributaries, and making it the largest inland oil release in US history. From 2012 to 2013, served as Task manager of the Dredging Team & Containment Team, responsible for hydraulic assessment of the waterway, fate and transport solutions, completing a dredging feasibility assessment for dredging and processing including target dredge areas and design of disposal sites. Provided oversight of dredging and processing of the contaminated sediments and compliance with state and local permits. Assisted EPA with engineering support and drafting compliance orders to PRP for implementation of the containment and remedial plan for residual product. Developed a long-term Net Environmental Benefit Analysis action plan.

Maintenance Dredging Characterization, Permitting and Dredged Material Management Plan, Philadelphia, PA, 2003

Client: Confidential Refinery Client

Role: Senior Project Engineer

Responsibilities: Designed a Dredged Material Management Plan for maintenance dredging of approximately 800,000 cubic yards of material from 8 separate facilities using a clamshell dredge. Prepared Sampling and Analysis Plan for environmental testing to characterize sediments to be removed and geotechnical testing and design of placement sites. Prepared a detailed Sediment Characterization Report and Management Plan for permit applications. Obtained USACE Section 10/404 and 401 WQC.

Baltimore Harbor and Channels Dredged Material Management Program and Dredging and Disposal Strategies, Baltimore District, Various Locations, 2002

Client: USACE

Role: Lead Engineer

Responsibilities: Coordinated a project team to assess dredged material placement and beneficial use alternatives for USACE Federal Channel and Maryland Port Administration maintenance dredging. The project will be accomplished in multiple phases including evaluating the USACE Planning Guidelines using Habitat Units (Habitat Evaluation Procedure analysis) and incremental cost analysis. Responsibilities included evaluation of open water placement alternatives for all of the Chesapeake Bay and Chesapeake and Delaware canals including ecological, environmental, water quality, recreational, and commercial benefits

and impacts. Also responsible for conducting project cost analysis and addressing regulatory and permitting issues.

Delaware City Flood Mitigation Plan, Delaware City, DE, 2000

Client: Delaware City Flood Mitigation: Delaware City, DE

Role: Project Engineer

Responsibilities: Conducted a flood study and prepared a report for submittal to the FEMA detailing the flood risks of a small coastal town on the Delaware Bay. Responsibilities included identifying general flood risks and specific high-risk areas, compiling historic flood data, and creating conceptual designs of infrastructure projects to mitigate potential flood hazards. The report successfully secured FEMA funding for select mitigation projects suggested in the report.

Ordnance Reconnaissance Study for the Sandy Hook to Barnegat Inlet, Beach Erosion Control Project, New Jersey, 1998

Client: USACE New York District

Role: Project Engineer

Responsibilities: Conducted a study and prepared a comprehensive report recommending the most economical and safest alternative to complete the largest beach nourishment project in the U.S. in which live ordnance was found in the sand borrow area. Alternatives included using magnetometers to detect and remove ordnance from the borrow area, mechanical screening of the ordnance during dredging operations, and delineating new sand borrow sources.

Various Projects, Oakbrook, IL, 1993 – 1996

Client: Lakes Dredge & Dock Company

Role: Project Engineer

Responsibilities: Daily reporting, survey and dredge positioning, production, and compliance management on multiple marine construction projects, beach nourishment, coastal protection, and navigation channel maintenance dredging. Select projects included:

- Ocean City & Great Egg Harbor Inlet, NJ shore protection
- Cape May Point, NJ Beach Nourishment
- Sandy Hook to Manasquan Beach Nourishment
- Fire Island, NY Beach Nourishment
- Tybee Island GA, Navigation Channel Maintenance Dredging
- Lake Worth FL Maintenance Dredging and Beach Fill
- Miami Beach, FL Beach Nourishment
- Coos Bay OR, Navigation Channel Maintenance Dredging

ANDREW SAUNDERS, PE

Landside Project Manager

KEY QUALIFICATIONS

Andrew has extensive knowledge of construction methods, equipment, controls, quality, and safety along with an engineering background.
Andrew continually strives for complete client satisfaction while maximizing commercial potential. Andrew executes production planning, procurement of material and tooling, equipment & staffing selection, and day-to-day operations. He works closely with the client project representatives, from bid award through project completion. He is responsible for the compliance with contract plans and specifications, as well as all corporate safety, health, and environmental regulations. Andrew is fully responsible for profit and loss on projects. He develops and improves company-wide systems such as change order tracking, contracts review, material procurement, job cost & revenue management, and equipment management.

EDUCATION/PROFESSIONAL REGISTRATIONS/CERTIFICATES

- Bachelor of Science, Civil Engineering, University of New Haven
- Professional Engineer – CT
- M.ASCE
- OSHA 30 Hour
- First Aid, AED & CPR

EXPERIENCE

14 Years Relevant Experience
14 Years with Walsh Construction

HIGHLIGHTED PROJECT EXPERIENCE

WAWA STATION AND LENNI YARD BUILDINGS CONSTRUCTION - MEDIA, PA | $45,073,514

Role: Project Manager. As the new terminus of SEPTA's existing Media/Elwyn line, this project built on the infrastructure constructed in the Elywn to Wawa, R3-2 project. Work included the construction of new 574 car architectural precast concrete parking deck, three cast-in-place retaining walls, a new ADA accessible station building and high-level passenger platform with architectural canopies. Work also included the construction of a new crew reporting building, associated roadways and parking lots and water, sewer, gas and electrical site utilities.

ELWYN TO WAWA - R3-2 RIGHT OF WAY IMPROVEMENTS - MEDIA, PA | $85,870,441

Role: Project Manager. As part of SEPTA's goal to reestablish service to Wawa, Pennsylvania on its Media/Elywn line, this project included reconstruction of 3.15 miles of continuous welded rail track, replacement or rehabilitation of overhead catenary structures with drilled shaft foundations, four new steel girder railroad bridges, one pedestrian tunnel, six retaining walls,

I-95 RECONSTRUCTION/WIDENING - BENSALEM, PA | $239,305,274

Role: Project Manager. This project consisted of the reconstruction and widening of 1.5 miles of I-95 including eight bridges (seven steel girders and one prestress concrete beam) and fourteen retaining walls (thirteen T-walls and one CIP wall). The project has six storm sewer outfalls draining from the mainline of I-95 into the Delaware River with RCP piles installed on timber and H-piles pile cap and cradle. The storm pipe for outfalls vary from 36-inch to 84-inch diameter. Mainline I-95 was paved with 15-inch PCC pavement. The project also included relocation of a 93-inch watermain per wet tap method.

RECONSTRUCTION OF THE MOSES WHEELER BRIDGE – MILFORD, CT | $201,812,625

Role: Project Manager. This project consisted of a 34-span plate girder structure of approximately 3,196 foot span with a concrete deck measuring 90 feet wide, carrying the north and southbound traffic of Interstate 95 between Milford and Stratford Connecticut included reconstruction of the existing Moses Wheeler Bridge to a 14-span late girder structure with concrete deck measuring 133 feet wide. The bridge was originally opened to the public in 1958 over the Housatonic River between Stratford and Milford Connecticut. This project also included reconstruction of three other single span bridges over Barnum Avenue Connector, East Main Street, and Naugatuck Avenue and the construction of three MSE Walls, a Noise Wall, a state boat launch, three wet ponds, and three wet land mitigation areas. Work was executed in four stages allowing the public traffic to maintain three travel lanes through the construction zone.

I-95/I-91/RTE 34 INTERCHANGE RECONSTRUCTION - NEW HAVEN, CT | $97,677,077

Role: Assistant Project Manager. Project consisted of electrical & mechanical rehabilitation of the Harlem River Lift Span of the Triborough Bridge; modifying existing span drive system; removal and replacement of the main & auxiliary counterweight ropes and tower elevators; rehabilitation and replacement for the HVAC systems and windows in machinery room and tower house; main span motors and power distribution; installation of transformers, power & lighting panels, motor control center, cables, lighting receptacle, intercom, telephone, security and fire alarm systems; lead and asbestos abatement, and; furnish and install new sanitary sewage and holding tank.

LMCR THE BATTERY - NEW YORK, NEW YORK | CONTRACT VALUE: $94,928,490

Role: Project Controls Manager. This project consists of the demolition of the existing 1500' long Manhattan Battery Wharf. Removal and disposal of concrete pavers, soil, concrete bulkhead, and the timber pile supported wharf structure. Extraction of timber piles and existing steel pipe piles. Demo of an existing 2 span bridge structure over the Hugh L. Carey Tunnel. Installation of a 1500' long sheet pile bulkhead wall and installation of over 200 new 24" concrete piles. Installation of precast pile caps, precast beams and precast wharf fascia panels.

BRIAN MIDLICK

Design Coordinator

KEY QUALIFICATIONS

As Design Project Coordinator, Brian is responsible for project administration, including project start-up, staffing, and contract negotiation with subcontractors. He oversees maintenance of quality control systems, schedule requirements, cost accountability, and the establishment of management systems. It is his duty to ensure close coordination among all project team members, ensuring owners a successful project delivery.

EDUCATION/PROFESSIONAL REGISTRATIONS/CERTIFICATES

- Bachelors Degree, Civil Engineering, Pennsylvania State University
- OSHA 30-hour
- First Aid/CPR

EXPERIENCE

23 Years Relevant Experience
14 Year with Walsh Construction

HIGHLIGHTED PREVIOUS PROJECT EXPERIENCE

PENNDOT CSVT SOUTHERN BRIDGES - NORTHUMBERLAND, PENNSYLVANIA I CONTRACT VALUE: $106,296,348

Project Role: Sr. Project Manager. Nine New Bridge Structures, Four Noise Walls and minor drainage work for SR 15 in Union and Snyder Counties.

PENNDOT SR 981 - MOUNT PLEASANT, PENNSYLVANIA I CONTRACT VALUE: $55,902,434

Project Role: Project Manager The reconstruction and realignment of SR-981 from intersection of SR-819 in Mount Pleasant, Pennsylvania to Kecksburg Road in Norvelt, Pennsylvania for PennDOT District 12

T100-HILLTOP TACOMA LINK EXTENSION - TACOMA, WASHINGTON I CONTRACT VALUE: $192,228,191

Project Role: Project Manager. The Hilltop Tacoma Link Extension project includes the construction of 2.4 miles of light rail transit service, with six new stations, one relocated station, and four traction power substation sites. The project also includes expanding the existing Operations and Maintenance Facility (OMF) near the Tacoma Dome Station, and demolishing an existing warehouse at the OMF site. Two-way train tracks will be in existing road lanes shared with cars and buses, and will be compatible with on-street parking and existing bicycle facilities.

I-95 RECONSTRUCTION/WIDENING - BENSALEM, PENNSYLVANIA I CONTRACT VALUE: $239,305,27

Project Role: Project Manager. This project consisted of the reconstruction and widening of 1.5 miles of I-95 including eight bridges (seven steel girders and one prestress concrete beam) and fourteen retaining walls (thirteen T-walls and one CIP wall). The project has six storm sewer outfalls draining from the mainline of I-95 into the Delaware River with RCP piles installed on timber and H-piles pile cap and cradle. The storm pipe for outfalls vary from 36-inch to 84-inch diameter. Mainline I-95 was paved with 15-inch PCC pavement. The project also included relocation of a 93-inch watermain per wet tap method and a box sewer.

P3 PENNSYLVANIA RAPID BRIDGE REPLACEMENT - PITTSBURGH, PENNSYLVANIA I CONTRACT VALUE: $944,873,610

Project Role: Project Manager. This public-private partnership (P3) Rapid Bridge Replacement Project was awarded by the Pennsylvania Department of Transportation (PennDOT) to the consortium of Plenary Walsh Keystone Partners (PWKP). The Commonwealth of Pennsylvania took advantage of the new P3 tool, signed into law in 2012, to address the state's roughly 4,500 structurally deficient (SD) bridges. The project was an initiative to replace 558 aging bridges throughout Pennsylvania. Replacing the bridges provided motorists with new, modern structures and allowed PennDOT to remove them from their structurally deficient list. The work included lead abatement and asbestos removal on the rehabilitated structures. The bridges were primarily crossings on smaller state highways, many in rural areas, rather than interstate bridges or large river crossings.

MAINLINE RECONSTRUCTION (A20-A26) - BLUE BELL, PENNSYLVANIA I CONTRACT VALUE: $180,278,742

Project Role: Project Manager. The project provides for the staged full depth roadway reconstruction and widening of the Turnpike from 2 lanes in each direction to 3 lanes in each direction and replacement of 7 mainline bridges. The project includes the removal of three single span reinforced concrete bridges, one single span multi-beam bridge, one 3 span steel multi-beam bridge, two 3 span continuous steel multi-girder bridges, construction of two single span composite concrete spread box beam bridges, three single span composite steel multi-girder bridges.

MICHAEL SPRANGERS

Safety Manager

KEY QUALIFICATIONS

As Safety Manager, Michael conducts regular safety meetings with all project personnel, performs safety inspections and enforces compliance to industry standards. He conducts safety training, accident investigations, monitors all subcontractors' insurance compliance and general liability, and is responsible for Worker's Compensation relations.

EDUCATION/PROFESSIONAL REGISTRATIONS/CERTIFICATES

- OSHA 30-hour
- First Aid/CPR
- S1 Safety First Drug Collect

EXPERIENCE

25 Years Relevant Experience
9 Year with Walsh Construction

HIGHLIGHTED PREVIOUS PROJECT EXPERIENCE

NYC DEP C547A SHAFTS 17B-1 AND 18B-1, CITY TUNNEL NO. 3, STAGE 2 - LONG ISLAND CITY, NEW YORK | CONTRACT VALUE: $363,269,697

Project Role: Safety. The project entails the excavation of two towering 760-foot deep shafts, with the upper section nestled in soil and the lower portion in solid rock. The top part of the shafts will descend to a depth of 120 ft and 240ft, each with a diameter of 50 ft. To support the excavation of the soil in the upper section, crews will use a ground freezing technique. The lower shaft will be carved using a combination of drilling, blasting, rock bolts, and shotcrete, and will boast a more compact diameter of 20 ft. Both shafts will be reinforced with concrete and fortified with a waterproof membrane for added protection. One shaft is positioned directly above an existing water tunnel, while the other connects to an adit. The construction will also include the installation of four 60-inch stainless steel riser pipes and two 30-inch pipes in each shaft, which will be stabilized with concrete backfill. Additionally, the project will see the repair of a 12-mile long tunnel.

STONE ARCHES PHASE 2 REHAB: LANSDALE LINE - MEDIA, PENNSYLVANIA | CONTRACT VALUE: $4,665,509

Project Role: Safety. Project includes rehabilitation of existing culverts 17.31 and 4.87 supporting the Southeastern Pennsylvania Transit Authority Regional Rail. Rehabilitation and replacement of the existing stone masonry bridge wingwalls, spandrel walls, headwalls, retaining walls, and kneewalls including masonry cleaning, spall repairs, crack repairs, pressure grouting, repointing, and resetting/replacement of missing stones. Fabrication and Installation of a steel liner along the entire length of the stone arch culverts including protecting in place and replacement of the existing sewer mains, construction of new concrete slabs and grouting of the steel liners.

GLENSIDE BRIDGES M.P. 11.62 AND M.P. 11.83 DB - MEDIA, PENNSYLVANIA | CONTRACT VALUE: $11,498,929

Project Role: Safety. Rehabilitation of Main Line Bridge 11.62 over Keswick Avenue and Bridge 11.83 over Easton Road. Keswick Bridge rehab includes removal and replacement of structural steel superstructure in an accelerated bridge construction process.

SHARON HILL TROLLEY LINE RT 102 CULVERT REPL & FLOOD MIT DB - MEDIA, PENNSYLVANIA | CONTRACT VALUE: $9,692,766

This design-build Project consists of increased stormwater storage on SEPTA ROW with conveyance/ storage from SEPTA ROW to a detention basin on PECO ROW and discharge from the detention basin to the Hermesprota Creek. On the PECO property, the system has a lift station, gravity flow box and an outfall box. The gravity flow box allows minor storms to discharge by gravity through the system and diverts water to the lift station for pumped discharge during more severe events. The discharge box is designed so that the proposed discharge does not exceed the existing 25-year discharge rate to Hermesprota Creek.

WAWA STATION AND LENNI YARD BUILDINGS CONSTRUCTION - MEDIA, PENNSYLVANIA | CONTRACT VALUE: $45,073,514

Construction of a roadway, 574 car parking deck, 3 retaining walls, a new station, high-level passenger platform and canopies and a new crew reporting building at Lenni.

ELWYN TO WAWA - R3-2 RIGHT OF WAY IMPROVEMENTS - MEDIA, PENNSYLVANIA | CONTRACT VALUE: $85,870,441

This project included construction of 3.15 miles of continuous welded rail track, replacement or rehabilitation of overhead catenary structures, four new steel girder railroad bridges, one pedestrian tunnel, several retaining walls, five culvert replacements, and other incidental work consistent with restoration to service of a commuter rail line.

I-95 RECONSTRUCTION/WIDENING - BENSALEM, PENNSYLVANIA | CONTRACT VALUE: $239,305,274

This project consisted of the reconstruction and widening of 1.5 miles of I-95 including eight bridges (seven steel girders and one prestress concrete beam) and fourteen retaining walls (thirteen T-walls and one CIP wall). The project has six storm sewer outfalls draining from the mainline of I-95 into the Delaware River with RCP piles installed on timber and H-piles pile cap and cradle. The storm pipe for outfalls vary from 36-inch to 84-inch diameter. Mainline I-95 was paved with 15-inch PCC pavement. The project also included relocation of a 93-inch watermain per wet tap method and a box sewer.

Appendix B
Sediment and Stormwater Management Plan Phase 1 Proof of Concept

ACREAGE BY DRAINAGE AREA	
AREA A	3.43 AC
AREA B	41.53 AC
AREA C	8.92 AC
AREA D	1.95 AC
AREA E	4.67 AC
AREA F	0.71 AC

SEQUENCING NOTES:

1. PRIOR TO ANY EARTHWORK COMMENCING, THE FOLLOWING BMPs SHALL BE INSTALLED:
   - 1.1. ORANGE CONSTRUCTION FENCE
   - 1.2. SUPER SILT FENCE
   - 1.3. STABILIZED CONSTRUCTION ENTRANCE
   - 1.4. CONCRETE WASHOUT
   - 1.5. INSTALL TEMPORARY SEDIMENT BASIN AND RIP RAP OUTLET SEDIMENT TRAPS
   - 1.6. MODIFY GRADING OF SWALES AS NECESSARY TO ACCOMMODATE INTERMEDIATE SITE GRADING.
2. IMMEDIATELY FOLLOWING INSTALLATION OF STORMWATER DRAINAGE INFRASTRUCTURE IN EACH AREA, THE FOLLOWING BMPs SHALL BE INSTALLED:
   - 2.1. FILTER SOCK
   - 2.2. INLET PROTECTION
   - 2.3. OUTLET ENERGY DISSIPATER
   - 2.4. EROSION CONTROL MATTING REQUIRED ON ALL SLOPES GREATER THAN OR EQUAL TO 3:1 SLOPES. SEE DNREC MANUAL FOR CONTROL MATTING TYPES.
3. ALL BMPs SHALL REMAIN IN PLACE UNTIL FINAL PAVING HAS BEEN COMPLETED AND UPON APPROVAL BY ENGINEER.
4. AN EQUIPMENT WASH AND DECONTAMINATION AREAS WILL BE LOCATED AT THE EDGE OF EACH SWMU DURING THE EXCAVATION OPERATIONS.

LEGEND

- DRAINAGE BOUNDARY
- ADJACENT PROPERTY LINE
- EXISTING SURFACE CONTOUR (1.0 FT MAJOR CONTOURS)
- POST CONSTRUCITON SURFACE CONTOUR (1.0 FT MAJOR CONTOURS)
- PROPOSED STOCKPILE LOCATIONS
- PROPOSED STORMWATER DRAINAGE PIPE
- PROPOSED SLOT DRAIN
- SWALE CENTERLINE
- PROPOSED SEDIMENT TRAPS/ SEDIMENT BASIN
- EXISTING SOLID WASTE MANAGEMENT UNITS
- EXISTING SOLID WASTE MANAGEMENT, NFA PENDING ONGOING SAMPLING

HAY ROAD
EDGEMOOR ROAD
LIGHTHOUSE ROAD
PROPOSED RIP RAP OUTLET SEDIMENT TRAP
TEMPORARY PROPOSED STOCKPILE LOCATION
PROPOSED TEMPORARY SEDIMENT BASIN
RESERVED FOR WHARF CONSTRUCTION
DELAWARE RIVER
SWMU-1
SWMU-2
SWMU-4
SWMU-5
SWMU-6A
SWMU-6B
SWMU-6C
SWMU-6D
SWMU-20

PERMIT SET
NOT FOR CONSTRUCTION

0 200 400 600
1" = 200'

NO.	DATE	REVISION	BY	APVD
0	01.30.26	ISSUED FOR PERMITTING	LM	SR

DSGN A. DUBOSE | DR L. MARTIN | CHK S. RUTKOWSKI | APVD C. LAWRENCE

Jacobs
SOLETANCHE BACHY INTERNATIONAL
WALSH
ENSTRUCTURE
DIAMOND STATE PORT CORPORATION

DELAWARE CONTAINER TERMINAL
EDGEMOOR, DELAWARE
ENSTRUCTURE DCT LLC

SEDIMENT AND STORMWATER MANAGEMENT PLAN - PHASE 1
PROOF OF CONCEPT

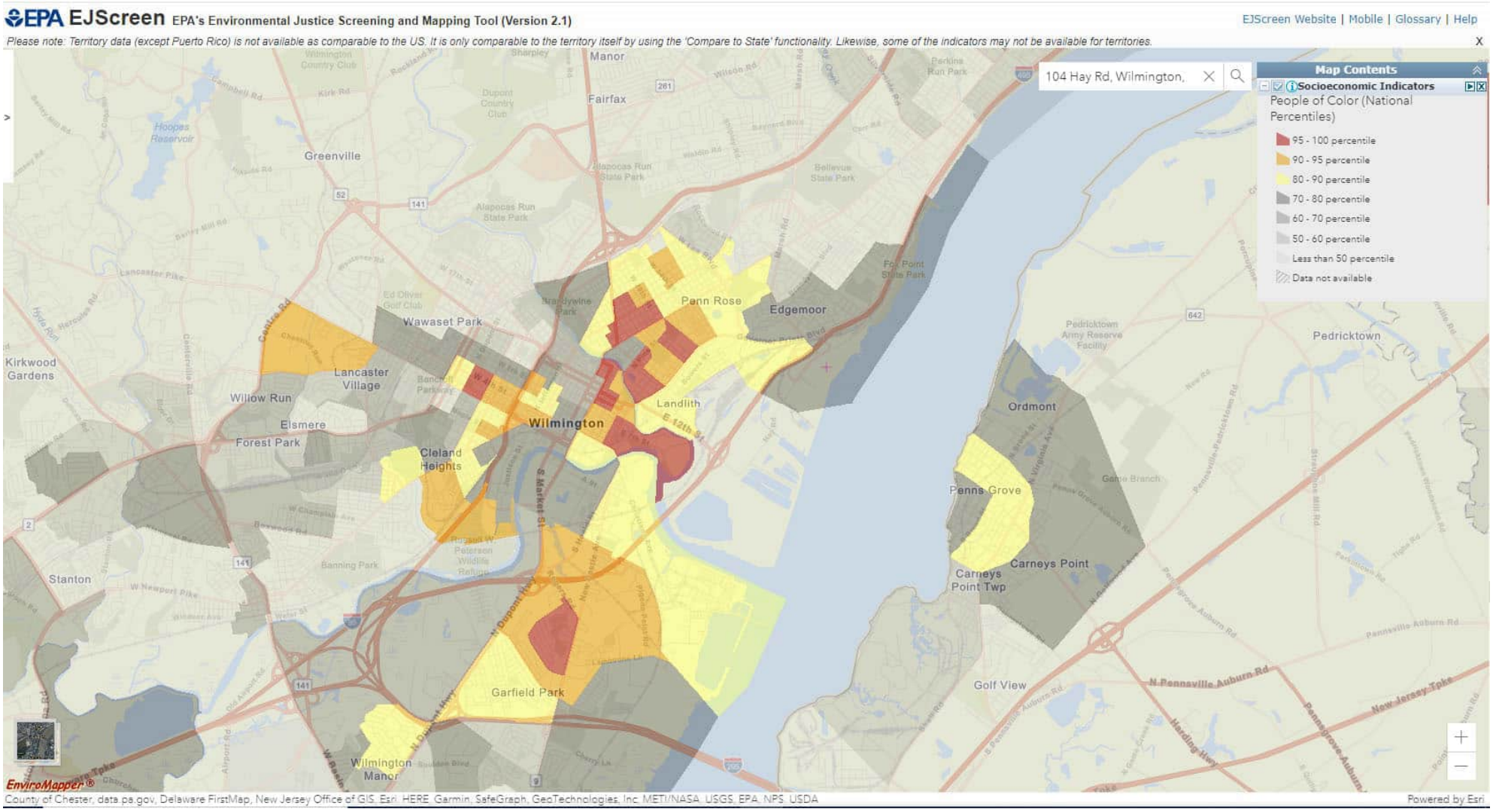
AS SHOWN
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING, 0 1"
DATE JANUARY 2026
PROJ D3958901
DWG ATTACHMENT 1
SHEET

PERMIT SET (DRAFT)

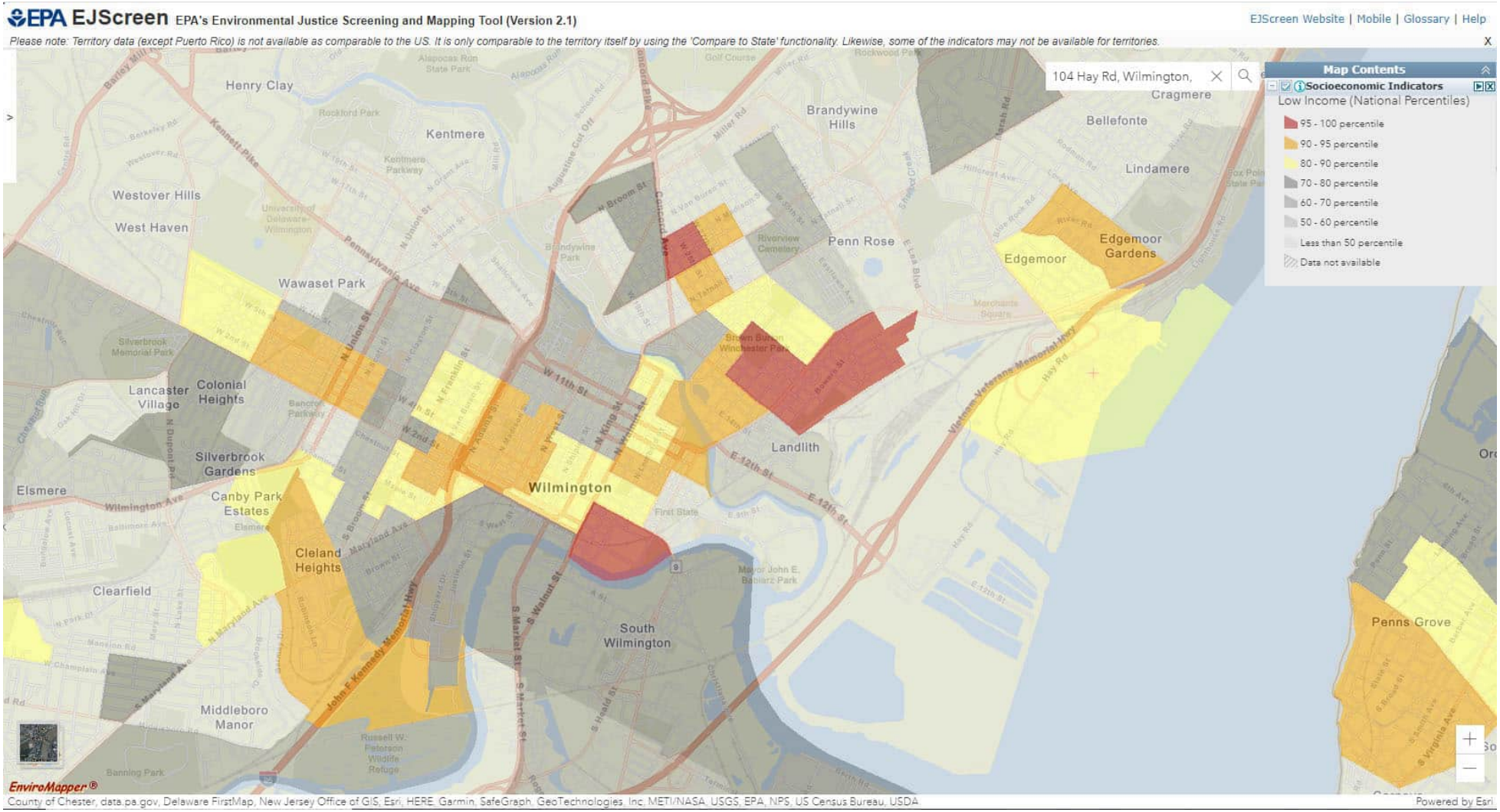
REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF JACOBS AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF JACOBS. JACOBS 2026. ALL RIGHTS RESERVED.

Appendix C
United States EJ Screen Output

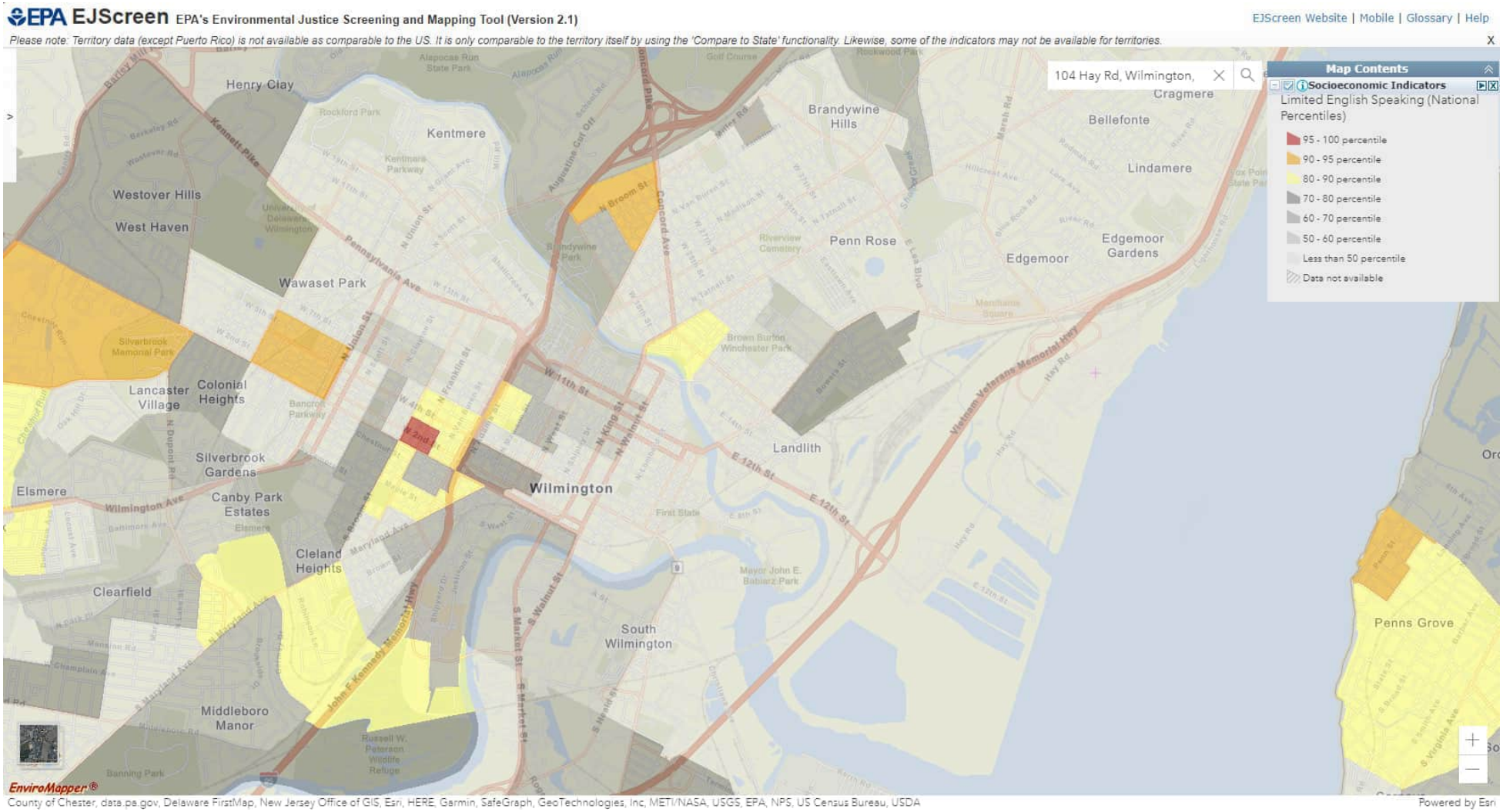
People of Color
Community Engagement Plan
DuPont Edge Moor Site



Low Income
Community Engagement Plan
DuPont Edge Moor Site



Limited English Speaking
Community Engagement Plan
DuPont Edge Moor Site



EJScreen Report (Version 2.1)

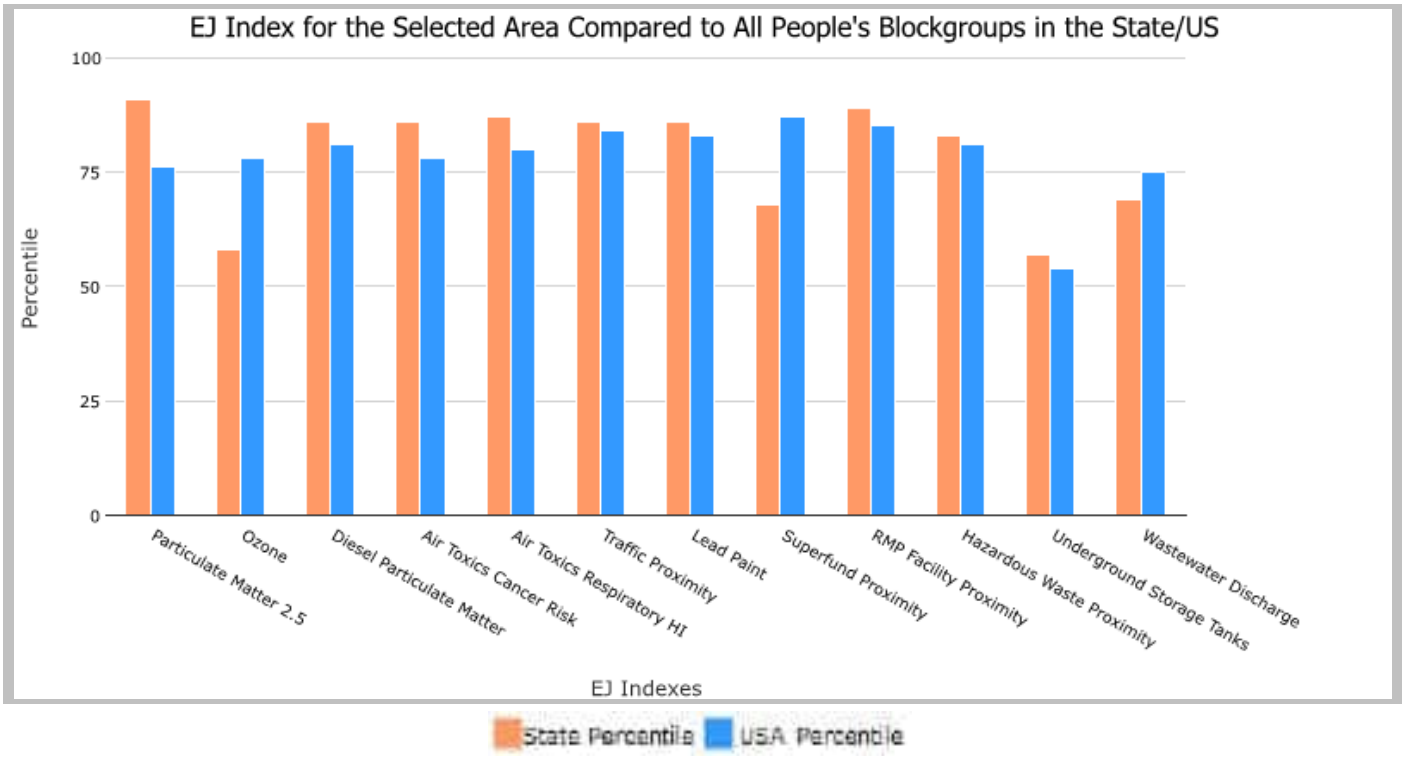
1 mile Ring Centered at 39.748920,-75.500385, DELAWARE, EPA Region 3

Approximate Population: 4,882

Input Area (sq. miles): 3.14

DuPont Edge Moor (The study area contains 2 blockgroup(s) with zero population.)

Selected Variables	State Percentile	USA Percentile
Environmental Justice Indexes		
EJ Index for Particulate Matter 2.5	91	76
EJ Index for Ozone	58	78
EJ Index for Diesel Particulate Matter*	86	81
EJ Index for Air Toxics Cancer Risk*	86	78
EJ Index for Air Toxics Respiratory HI*	87	80
EJ Index for Traffic Proximity	86	84
EJ Index for Lead Paint	86	83
EJ Index for Superfund Proximity	68	87
EJ Index for RMP Facility Proximity	89	85
EJ Index for Hazardous Waste Proximity	83	81
EJ Index for Underground Storage Tanks	57	54
EJ Index for Wastewater Discharge	69	75



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.1)

1 mile Ring Centered at 39.748920,-75.500385, DELAWARE, EPA Region 3

Approximate Population: 4,882

Input Area (sq. miles): 3.14

DuPont Edge Moor (The study area contains 2 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EJScreen Report (Version 2.1)

1 mile Ring Centered at 39.748920,-75.500385, DELAWARE, EPA Region 3

Approximate Population: 4,882

Input Area (sq. miles): 3.14

DuPont Edge Moor (The study area contains 2 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 (µg/m^3)	8.85	7.82	91	8.67	58
Ozone (ppb)	42.7	42.7	37	42.5	55
Diesel Particulate Matter* (µg/m^3)	0.357	0.252	78	0.294	70-80th
Air Toxics Cancer Risk* (lifetime risk per million)	30	26	93	28	80-90th
Air Toxics Respiratory HI*	0.4	0.29	99	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	1100	640	81	760	83
Lead Paint (% Pre-1960 Housing)	0.48	0.23	75	0.27	72
Superfund Proximity (site count/km distance)	0.19	0.33	48	0.13	85
RMP Facility Proximity (facility count/km distance)	1.5	0.56	91	0.77	84
Hazardous Waste Proximity (facility count/km distance)	2.3	1.9	69	2.2	73
Underground Storage Tanks (count/km^2)	2	2.3	62	3.9	58
Wastewater Discharge (toxicity-weighted concentration/m distance)	7.1	1.7	96	12	97
Socioeconomic Indicators					
Demographic Index	50%	31%	81	35%	74
People of Color	60%	38%	78	40%	73
Low Income	40%	26%	79	30%	68
Unemployment Rate	13%	6%	88	5%	88
Limited English Speaking Households	0%	2%	0	5%	0
Less Than High School Education	5%	9%	41	12%	34
Under Age 5	4%	6%	41	6%	35
Over Age 64	11%	19%	27	16%	32

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

Appendix D
October 6, 2021 DNREC Final Decision and Response to Comment (FDRTC)

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF WASTE AND HAZARDOUS SUBSTANCES REMEDIATION SECTION

FINAL DECISION AND RESPONSE TO COMMENTS

FINAL REMEDY FOR DIAMOND STATE PORT CORPORATION, EDGEMOOR, DE FACILITY DED 00800284

PURPOSE:

The Delaware Department of Natural Resources and Environmental Control (DNREC) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) selecting the Final Remedy for the Diamond State Port Corporation (DSPC) facility located in Edgemoor, DE (hereinafter referred to as the Facility). The Final Decision is issued pursuant to Delaware's Regulations Governing Hazardous Waste (Regulations).

On August 23, 2020, DNREC issued a Statement of Basis (SB) in which it described the information gathered during environmental investigations at the Facility and proposed a Final Remedy for the Facility.

THE SITE

The property (tax parcels: 0615300006 and 0615300003) is the location of the former Chemours titanium dioxide production facility. It lies along the Delaware River between Fox Point State Park, to the north, and industrial facilities to the south. The site operated as a titanium dioxide production facility through 2016. That facility was demolished before the sale of the property to the Diamond State Port Corporation in February of 2017.

SB JUSTIFICATION

This SB provided for a presumptive remedy based upon the site's proposed reuse as a container offloading, storage and transportation port, and as such did not require a Corrective Measures Study. This remedy is justified based on the data obtained from the extensive site investigation, site hydrogeology, and human health and environmental risk assessments (RAs). The RAs determined that residual site contaminants posed no ongoing risk to human health or the environment.

CORRECTIVE ACTION PERMIT

Concurrent with issuing the SB, DNREC issued a draft Corrective Action Permit (CAP).

PUBLIC PARTICIPATION

The draft SB and CAP underwent public notice procedures according to the Regulations. DNREC held a public hearing on September 29, 2020 for an open discourse on the SB and CAP. Post-hearing, DNREC extended the public comment period through December 1, 2020, for the SB and draft Corrective Action Permit.

A Technical Response Memo (TRM) was prepared to address comments specific to the CAP. No comments specific to the SB were received. Both the CAP and SB were executed per a Secretary's Order on April 29, 2021. The SB and CAP are hereby incorporated into this Final Decision by reference and made a part hereof as Attachments A and B.

This FDRTC selects the remedy that DNREC evaluated under the SB. It is consistent with the public participation provisions under Delaware's Regulations and RCRA.

FINAL DECISION REMEDY

DNREC's Final Remedy for the Facility consists of the following:

(1) The majority of the site is to be paved with an asphalt cap.

(2) The approved Contaminated Materials Management Plan (CMMP) is to be implemented during any construction or disturbance of the site.

(3) Groundwater Monitoring will continue around the closed surface impoundments per the site Post Closure Care Plan (PCCP). This PCCP will be amended to include provisions for any additional operations and maintenance items regarding the asphalt cap or post-port construction features integral to the remedy.

(4) A Uniform Environmental Covenant Act (UECA) covenant with be executed upon remedy completion to protect the remedy in perpetuity.

DECLARATION

Based on the Administrative Record compiled for the corrective action at the DSPC Edgemoor site, I have determined that the remedy selected in this Final Decision and Response to Comments, which incorporates the April 29, 2021, Statement of Basis and CAP, is protective of human health and the environment.

Date: 10/6/2021

Qazi Salahuddin
Environmental Program Administrator
Remediation Section
Division of Waste and Hazardous Substances

Attachment A: Statement of Basis and Permit (April 29, 2021)

Attachment B: Corrective Action Permit (April 29, 2021)

Attachment A

Statement of Basis



State of Delaware
Department of Natural Resources
and Environmental Control

FINAL
STATEMENT OF BASIS

Diamond State Port Corporation
Edgemoor Site (Formerly Chemours)

EDGEMOOR, DELAWARE

Prepared by
Remediation Section
Division of Waste and Hazardous Substances
April 29, 2021

Table of Contents

Section 1: Introduction....1
Section 2: Facility Background....2
Section 3: Summary of Environmental History....2
Section 4: Proposed Remedy....5
Section 5: Environmental Indicators....5
Section 6: Public Participation....6

Attachments

Attachment 1: Index to Administrative Record....9

Figures

Figure 1: Location map
Figure 2: Facility layout

Section 1: Introduction

The Delaware Department of Natural Resources and Environmental Control (DNREC) has prepared this Statement of Basis (SB) on its final remedy decision for the Diamond State Port Corporation's Edge Moor Facility located on the Delaware River at 104 Hay Road in Edge Moor, DE. DNREC's review of available information indicates that there are no unaddressed releases of hazardous waste or hazardous constituents from the Solid Waste Management Units (SWMU) identified in the site investigation completed at the facility. Based on that assessment, DNREC's final decision is that no further investigation or cleanup is required for these units at the Facility. The DNREC has determined that its final remedy is protective of human health and the environment. This SB highlights key information relied upon by DNREC in making its final remedy decision.

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 et seq. (Corrective Action Program). The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property. The State of Delaware is authorized for the Corrective Action Program under Section 3006 of RCRA. Therefore, it retains primary authority in Delaware for the Corrective Action Program under 7 Del C., Chapters 60 and 63.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which DNREC's final remedy decision is based. The Index to the AR may be found in Attachment #1.

Concurrently with this SB, DNREC solicited comments on a final Corrective Action Permit (Permit). Pursuant to 40 C.F.R. §124.7 and Part 124 of Delaware's Regulations Governing Hazardous Waste, DNREC has prepared this SB to describe the background and basis for the final Permit and the reasons supporting the final remedy. The final Permit incorporates the remedies in this SB.

The DNREC has made a final decision on the draft Permit after considering all information submitted during the public comment period. Applicable public comments were addressed in a Technical Response Memo and determined to be non-substantive. The final Permit will be signed and will become effective upon signature. Otherwise, the final Permit will become effective forty-five (45) days after the service of notice of the final remedy or upon conclusion of any appeals filed
Information on the Corrective Action Program as well as a fact sheet for the Facility can be found by navigating http://www.epa.gov/reg3wcmd/correctiveaction.htm.

Section 2: Facility Background

The Facility consists of 2 parcels of approximately 115 acres located in Edge Moor, Delaware on the Delaware River in New Castle County. The Facility is bounded by Hay Road to the west; industrial properties to the south; Fox Point State Park to the north; and the Delaware River to the east. The larger 112-acre parcel, is all located east of Hay Road. A 3-acre parcel is identified as SWMU 30 and is west of Hay Road at the former plant's main entrance. A location map and the former Facility layout with SWMUs delineated are attached as Figures 1 and 2, respectively.

DuPont purchased a TiO2 production facility being operated on the site from the Krebs Company in 1935. The TiO2 production facility was continuously operated by DuPont and later Chemours until 2016, when production ceased, and the plant was demolished prior to being sold to the Diamond State Port Corporation in February of 2017.

Gulftainer USA, the port operator, plans to redevelop the site as a two-berth shipping container offloading, storage and intermodal transportation facility.

Section 3: Summary of Environmental History

A November 2001 Consent Order with EPA required that DuPont obtain a RCRA Corrective Action Permit for the site to address previously identified SWMUs. DuPont prepared the Corrective Action Plan in 2004 to initiate the facility wide investigation per the Permit requirements. The initial Permit expired in 2014 while the site was transitioning to Chemours. Plant operations ceased in 2016 prior to the property's sale to the DSPC. The Permit being considered in conjunction with this SB is a renewal of the previous permit and is designed to be a Corrective Measures Implementation permit to regulate the remedy here proposed.

Over the site's corrective action history, a total of 30 SWMUs have been identified. Prior to conducting the Phase I RCRA Facility Investigation (RFI) a no further investigation status was granted to SWMUs 7A, 7B, 9, 10, 11, 12, 14, 19, 22, and 26. SWMU 2 continued to operate and SWMU 6 was closed in place and a PCCP (Post Closure Care Plan) implemented. Phase I and II RFIs were conducted at the remaining 19 SWMUs and reports generated. A site wide hydrogeologic investigation was completed which indicated a general lack of connectivity between water bearing zones onsite eliminating a pathway for the migration of groundwater to the Delaware River. This report is listed in the document appendix. Groundwater is not used for potable water on the site.

Table 1 below describes the 19 SWMUs covered and their status in this SB.

Groundwater monitoring will continue to be performed at the site per the Post Closure Care Plan (PCCP) associated with the closed surface impoundments, and as a function of the proposed remedy. Located at the northern portion of the site, this area is the only portion of the site which still contains any process waste. The waste in these 4 impoundments was stabilized in place, capped and surrounded by 10 monitoring wells. These wells will be extended to the new post construction grade and will continue to be monitored per the attached PCCP as a part of the Permit.

Complete details, including sampling data, can be found in the individual reports which are listed in the Administrative Record (AR).

Table 1

Solid Waste Management Units/ Areas of Concern	Description	Current status
SWMU 1/3	Wastewater Treatment System	NFA (No Further Action), No Unacceptable Risks to HH&E (Human Health and the Environment)
SWMU 2	Pond E Process Water	No Longer in Use
SWMU 4	Former Solid Waste Landfill	NFA, No Unacceptable Risks to HH&E
SWMU 5	Waste Settling Area	NFA, No Unacceptable Risks to HH&E
SWMU 6	Ponds A, B, C and D	Stabilized in Place, PPCP Approved 2010
SWMU 8	Former <90 Day HW Accumulation Area	NFA No longer in Use
SWMU 13A	Process Sewers	NFA, No Unacceptable Risks to HH&E
SWMU 13B	Process Sewers	NFA, No Unacceptable Risks to HH&E
SWMU 15	Former Unpaved Ditch	NFA, No Exceedance of Direct Contact (DC) or Ingestion of Groundwater (IGW) Screening Criteria
SWMU 16	Scrap Metal Area	NFA, No Unacceptable Risks to HH&E

SWMU 17A	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 17B	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 17B	Former UST Area	NFA, No Unacceptable Risks to HH&E
SWMU 18	Iron Rich Staging Area	NFA, No Unacceptable Risks to HH&E
SWMU 20	Former Fuel Oil ASTs	NFA, No Unacceptable Risks to HH&E
SWMU 21	Copper Vanadium Sludge Pad	NFA, No Exceedance in DC or IGW Screening Criteria
SWMU 23	Recovered Ore Storage Area	NFA, No Unacceptable Risks to HH&E
SWMU 24	Oil Water Separator	NFA, No Exceedance of DC or IGW Screening Criteria
SWMU 25	Ferric Chloride Railcar Area	NFA, No Unacceptable Risks to HH&E
SWMU 27	Fuel Oil Stained Soil Area	NFA, No Unacceptable Risks to HH&E
SWMU 28	Caustic Storage Area	NFA, No Exceedance of DC or IGW Screening Criteria
SWMU 29	Southland Tank	NFA All pH Results Above 2

SWMU 30	Former Yard Waste Site Across Hay Road	NFA, No Unacceptable Risks to HH&E

Section 4: Final Remedy

DNREC has determined that the units described in Table I do not pose any unacceptable risk to human health or the environment and DNREC proposes these units for No Further Action. The final remedy is presumptive and is being considered based upon the results of the extensive site investigation, site specific geology and hydrogeology, the human health and environmental risk assessment, and the site's proposed reuse. The remedy is being prescribed to assure that the low levels of contamination identified in the site investigation do not pose any future threat to human health or the environment. The final remedy is asphalt capping, a contaminated materials management plan (CMMP) to be implemented during construction and institutional controls in the form of an environmental covenant per the Uniform Environmental Covenant Act (UECA) covenant to be established after the remedy is complete. The covenant will establish areas where institutional controls will remain in place in perpetuity.

Current site conditions do not present an unacceptable risk of vapor intrusion.

Preliminary construction plans call for paving 80 percent of the site or more. It is anticipated that site regrading will consist mainly of filling with minimal cutting. Offsite disposal of media encountered during construction will not be required if the media can be reutilized on site. Any materials requiring disposal will require adequate characterization per the CMMP.

As regrading and pavement capping is the final remedy, upon construction completion, a cap inspection, maintenance and repair plan shall be submitted for review and approval.

Groundwater monitoring will continue to be conducted at the site as described in the PCCP for the four (4) closed surface impoundments and as required in the Corrective Action Permit. This monitoring is currently required as process waste was stabilized in place here as a part of an interim corrective action measure.

With the exception of the monitoring wells surrounding the closed surface impoundments, wells associated with the RFI, process wells and any other wells discovered during the construction phase must be properly abandoned by a Delaware licensed well driller.

Section 5: Environmental Indicators

EPA sets national goals to measure progress toward meeting the nation's major environmental goals. For Corrective Action, EPA evaluates two key environmental indicators for each facility: (1) current human exposures under control and (2) migration of contaminated groundwater under control. The EPA has determined that the Facility met the current human exposures under control indicator on 9/28/2012. The EPA has determined that the Facility met the migration of contaminated groundwater under control indicator on 9/08/2012.

Section 6: Public Participation

A public hearing was held on September 29, 2020, followed by an extended public comment period that concluded on December 1, 2020. While comments were received from the public concerning this matter, no comments specifically related to this SB were received. Thus, the Department may now move forward directly to issue a Final Decision and Response to Comments (FDRTC)for the remedy chosen.

In response to public comments received regarding the draft Corrective Action Permit (proposed concurrently with the remedy SB), a Technical Response Memo determined that all such comments were adequately addressed by the site investigation and that no substantive changes would be required to the proposed draft permit. Therefore, a Corrective Action Permit will be finalized as HW31B04 and signed to implement the remedy chosen in the final SB.

Date: _____

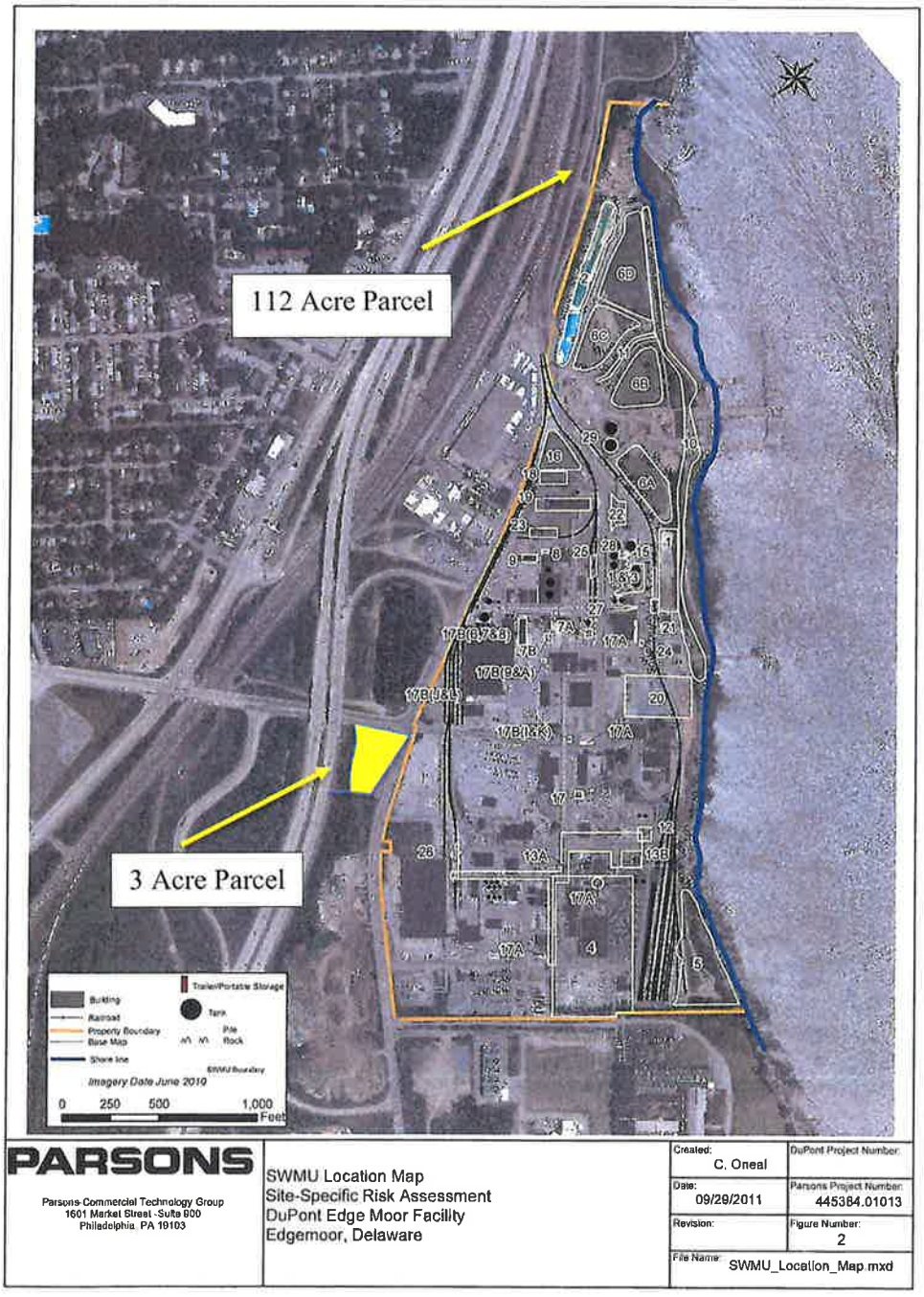
Figure 1



Former
DuPont Edge Moor Plant

1. **Facility-Wide Corrective Action - Corrective Action Permit HW-03A16**
2. **Closure of Surface Impoundments (Ponds A-D)**

Figure 2



PARSONS

Parsons Commercial Technology Group
1601 Market Street - Suite 800
Philadelphia, PA 19103

SWMU Location Map
Site-Specific Risk Assessment
DuPont Edge Moor Facility
Edgemoor, Delaware

Created: C. Oneal	DuPont Project Number:
Date: 09/29/2011	Parsons Project Number: 445384.01013
Revision:	Figure Number: 2
File Name: SWMU_Location_Map.mxd	

Attachment #1

Index to Administrative Record

Title	Author	Date
Contaminated Materials Management Plan	Duffield	2019
Post Closure Care Plan for 4 Surface Impoundments	Parsons	2011
Environmental Indicator Determination Report Migration of Contaminated Groundwater under Control	Parsons	6/2012
Environmental Indicator Determination Report Human Health Exposure	Parsons	6/2012
Phase I RFI Data Summary Report	Dupont CRG	4/2009
Phase II RFI Data Summary Report	Parsons	3/2011

Acronyms:

CRG - Corporate Remediation Group
RFI – RCRA Facility Investigation

Attachment B

Permit

PERMIT FOR CORRECTIVE ACTION AND POST-CLOSURE CARE

Effective Date: April 29, 2021

Expiration Date: April 29, 2031

Permittee: Diamond State Port Corporation
104 Hay Road
Edgemoor, DE 19809

State Permit Number: HW31B04

EPA Identification Number: DED000800284

Pursuant to Title 7 of the Delaware Code (Del. C.), Chapter 63, and the *Delaware Regulations Governing Hazardous Waste* (DRGHW), this Permit is issued to the Diamond State Port Corporation to perform a facility-wide corrective action and post-closure care activities at the four (4) closed surface impoundments located at the Port of Wilmington Edge Moor site (formerly the Chemours Edge Moor White Pigment Plant) in Edge Moor, Delaware, at latitude 39° 44' 81" north and longitude 75° 30' 38" west.

The Permittee must comply with all terms and conditions of this Permit. This Permit consists of the conditions contained herein (including those in any attachments) and the applicable regulations contained in the DRGHW, Parts 260 through 264, 122 and 124 as specified in the Permit. Applicable regulations are those which are in effect on the date of issuance of this Permit in accordance with the DRGHW, §122.32(c). This authorization shall not be used as a reason for noncompliance with any other State or Federal Regulation.

This Permit is based on information provided to the State of Delaware Department of Natural Resources and Environmental Control (DNREC) by the Permittee.

Any inaccuracies found in this submitted information may be grounds for the termination, revocation and re-issuance, or modification of this Permit in accordance with the DRGHW, §§ 122.41, 122.42, and 122.43. The Permittee must inform DNREC of any deviation from or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.

This Permit is effective as of April 29, 2021 and shall remain effective until April 29, 2031 unless revoked or reissued under the DRGHW, § 122.41, terminated under the DRGHW, § 122.43, or continued in accordance with the DRGHW, § 122.51(a).

Qazi Salahuddin
Environmental Program Administrator
Remediation Section
Division of Waste and Hazardous Substances

April 29, 2021
Date

MODULE I

STANDARD PERMIT CONDITIONS

I. A. EFFECT OF PERMIT:

1. This Permit authorizes the implementation of corrective actions and post closure care as necessary to protect human health and the environment.

2. Issuance of this Permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize any injury to persons or property, or invasion of other private rights, or any infringement of State or local laws or regulations (DRGHW §§ 122.30(g) and 122.40(b) and (c)). Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 7 Del. C., Chapters 60 and 63, except for those requirements not included in the permit which become effective by statute or which are promulgated under the DRGHW, §§ 268 and 122.4(a). Compliance with the terms of this Permit does not constitute a defense to any Order issued or any action brought under 7 Del. C., Chapter 60; 7 Del. C., Chapter 63; 7 Del. C., Chapter 91; §§ 3008(a), 3008(h), 3013, or 7003 of RCRA; §§ 106(a), 104 or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et. seq. Commonly known as CERCLA); or any other law providing for protection of public health or the environment.

I.B. PERMIT ACTIONS:

1. Permit Modification, Revocation and Reissuance, and Termination:

   This Permit may be modified, revoked and reissued, or terminated for cause, as specified in the DRGHW, §§ 122.41, 122.42, and 122.43. The filing of a request for a permit modification, revocation and reissuance, termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any permit condition (DRGHW § 122.30(f)).

2. Permit Renewal:

   a. This Permit may be renewed as specified in the DRGHW, § 122.30(b) and Permit Condition I.E.2.

   b. Review of any application for a permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations and laws.

3. The post-closure care obligations contained in this permit shall continue regardless of whether the Permittee continues to operate or ceases operation and closes. The Permittee is obligated to continue to implement post-closure care under the conditions of this Permit regardless of the operational status of the facility. The Permittee must submit an application for a new permit at least 180 days before this permit expires pursuant to DRGHW §122.10(h), unless the Permit has been modified to terminate the post-closure care schedule of compliance and the Permittee has been released from the requirements for financial assurance for post-closure care.

I.C. SEVERABILITY:

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby (DRGHW § 124.12(a)(2)).

I.D. DEFINITIONS:

For purposes of this Permit, terms used herein shall have the same meaning as those in the DRGHW, unless this Permit specifically provides otherwise; where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by 7 Del. C. or a standard dictionary reference or the generally accepted scientific or industrial meaning of the term. The following definitions also apply to this Permit:

1. Day – A calendar day, the mean solar day beginning at midnight.

2. Facility – For the purpose of management of a hazardous waste and implementing corrective action in Module II, as required by the DRGHW, § 264.101, facility means all contiguous property under the control of the owner or operator.

3. Hazardous Constituent – Any constituent identified in Appendix VIII of the DRGHW § 261, or any constituent identified in Appendix IX of the DRGHW § 264.

4. Secretary – Secretary of DNREC or his/her designee or authorized representative.

5. Release – Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.

6. Solid Waste Management Unit – Any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released.

I.E. DUTIES AND REQUIREMENTS:

1. Duty to Comply:

The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by a variance issued pursuant to 7 Del. C., § 6314. Any permit noncompliance, other than noncompliance authorized by a variance, constitutes a violation of 7 Del. C., Chapters 60 and 63 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Duty to Reapply:

If the Permittee wishes to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a new permit at least 180 days prior to the permit expiration.

3. Permit Expiration:

Pursuant to § 122.50 of the DRGHW, this Permit shall be effective for a fixed term of ten (10) years. Pursuant to § 122.51 of the DRGHW, as long as DNREC is the permit issuing authority, this Permit and all conditions herein will remain in effect beyond the Permit's expiration date, if the Permittee has submitted a timely, complete application and, through no fault of the Permittee, the Secretary has not issued a new permit under § 124.15 of the DRGHW on or before the expiration date of this Permit.

4. Need to Halt or Reduce Activity Not a Defense:

It shall not be a defense for the Permittee, in an enforcement action that it would have been necessary, to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

5. Duty to Mitigate:

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures to prevent significant adverse impacts on human health and/or the environment.

6. Proper Operation and Maintenance:

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance/quality control procedures.

7. Duty to Provide Information:

The Permittee shall furnish to the Secretary, within a reasonable time, any relevant information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Secretary, upon request, copies of records required to be kept by this Permit (DRGHW §§ 122.30(h) and 264.74(a)).

8. Inspection and Entry:

Pursuant to the DRGHW, § 122.30(i), the Permittee shall allow the Secretary, or an authorized representative, upon the presentation of credentials and other documents, as may be required by law, to:

a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

b. Have access to and copy any records that must be kept under the conditions of this Permit;

c. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

d. Sample or monitor for the purposes of assuring permit compliance or as otherwise authorized by 7 Del. C., Chapter 63 and the DRGHW, any substances or parameters at any location.

9. Monitoring and Records:

Pursuant to § 122.30(j) of the DRGHW, the Permittee shall comply with the following requirements:

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. All sampling and analyses shall be of adequate quality, scientifically valid, of known precision and accuracy, and of acceptable completeness, representativeness, and comparability. Laboratory analysis of each sample must be performed using an appropriate method for testing the parameter(s) of interest taking into account the sample matrix. The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method from Appendix I of the DRGHW, § 261, or an equivalent method approved by the Secretary. Analytical methods must be the appropriate method as specified in "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846", 3rd edition as updated or an equivalent method as approved by the Secretary.

b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, the certification required by the DRGHW, § 264.73(b)(9), and records of all data used to complete the application for this Permit, for a period of at least three (3) years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of the Secretary at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility (DRGHW § 264.74). The Permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations for the active life of the facility, and, for disposal activities, for the post closure care period as well (DRGHW § 122.30(j)(2)).

c. Pursuant to DRGHW, § 122.30(j)(3), records of monitoring information shall specify:

i. The dates, exact place, and times of sampling or measurements;
ii. The individual(s) who performed the sampling or measurements;
iii. The dates analyses were performed;
iv. The individual(s) who performed the analyses;
v. The analytical techniques or methods used; and
vi. The results of such analyses.

10. Reporting Planned Changes:

The Permittee shall give notice to the Secretary, as soon as possible, of any planned physical alterations or additions to the facility that may impact the Solid Waste Management Units (SWMUs).

11. Reporting Anticipated Noncompliance:

The Permittee shall give advance notice to the Secretary of any activity or planned changes in the SWMUs, which may result in noncompliance with permit requirements.

12. Transfer of Permits:

a. This Permit is not transferable to any person, except after notice to the Secretary (DRGHW § 122.30(1)(3)). The Secretary may require modification or revocation and reissuance of this Permit pursuant to the DRGHW § 122.40, in order to identify the new Permittee and incorporate such other requirements as may be necessary under the appropriate Act.

b. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of the DRGHW, §§ 264 and 122 and this Permit (DRGHW § 264.12(c)).

13. Incident Reporting:

a. The Permittee shall comply with Permit Conditions I.E.13.b and c, pursuant to the DRGHW, §§ 264.56 and 122.30(1)(6).

b. The Permittee shall report to the Secretary any noncompliance which may endanger human health or the environment. Any such information shall be reported immediately from the time the Permittee becomes aware of the circumstances, provided there is no delay in emergency response results. The report shall include the following:

i. Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies;

ii. Any information of a release or discharge of hazardous waste, or of a fire or explosion from the hazardous waste management facility which could threaten the environment or human health outside the facility; and

iii. The description of the occurrence and its cause shall include:

1) Name, address, telephone number of the owner or operator;
2) Name, address, telephone number of the facility;
3) Date, time, and type of incident;
4) Name and quantity of materials involved;
5) The extent of injuries, if any;
6) An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

7) Estimated quantity and disposition of recovered material that resulted from the incident.

c. A written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period(s) of noncompliance (including exact dates and times), whether the noncompliance has been corrected, and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Secretary may waive the five (5) day written notice requirement in favor of a written report within fifteen (15) days.

14. Other Noncompliance:

The Permittee shall report all instances of other noncompliance, not reported under I.E.13, immediately to DNREC. The reports shall be made within the timeframes and contain the information of Permit Conditions I.E.13.b and c.

15. Other Information:

Whenever the Permittee becomes aware that it failed to submit any relevant facts in the application, or submitted incorrect information in an application or in any report to the Secretary, the Permittee shall promptly submit such facts or information.

I.F. SIGNATORY REQUIREMENT:

All applications or reports submitted to or requested by the Secretary, his/her designee, or authorized representative, shall be signed and certified in accordance with the DRGHW, §§ 122.11 and 122.30(k). In addition, certification by a Professional Engineer or Geologist registered in the State of Delaware shall be provided as required by the DRGHW.

I.G. APPROVAL/DISAPPROVAL OF SUBMISSIONS:

DNREC will review the plans, reports, schedules and other documents (hereinafter collectively referred to as "submission") submitted which require DNREC approval. DNREC will notify the Permittee in writing of DNREC's approval, conditional approval, or disapproval of each submission.

Each submission required by this Permit is, upon approval by the Secretary, incorporated into this Permit. Any non-compliance with such DNREC-approved submission shall be deemed noncompliance with this Permit. A conditionally approved submission including any terms of such conditional approval set forth in DNREC's decision, shall constitute the DNREC-approved submission and shall be incorporated into this Permit.

In the event of DNREC's conditional approval of submission, DNREC shall specify, in writing, any deficiencies in the submission and the terms upon which approval of the submission is conditioned. If the Permittee disputes any term upon which approval of the submission was conditioned, the Permittee may initiate Dispute Resolution pursuant to Permit Condition I.I. In the event of DNREC disapproval of a submission, the Secretary shall specify the deficiencies in writing. Such disapproval shall not be subject to the Dispute Resolution provision set forth in Permit Condition I.I. The Permittee shall modify the submission to correct/address the specified

deficiencies within a reasonable time period established by the Secretary taking into account the tasks to be performed, and submit the revised submission to DNREC for approval. If the revised submission is disapproved, DNREC will notify the Permittee of the deficiencies in writing and specify a schedule for the Permittee to correct the deficiencies as directed by DNREC and forward the revised submission to DNREC within the time period specified by DNREC. In the event the Permittee disagrees with DNREC's disapproval of the revised submission the Permittee shall notify DNREC in writing and the disagreement shall be resolved in accordance with the Dispute Resolution provision in Permit Condition I.I. of this Permit.

I.H. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE SECRETARY:

The Permittee shall provide all reports, notifications, or submissions in two paper copies, plus one copy by way of an electronic medium acceptable to both the Permittee and the Department. The electronic submittal shall be provided as a single electronic document such as a Portable Document Format (.pdf) file, or other electronic format acceptable to both the Permittee and the Department.

In addition to all other formats and submittals, all monitoring analytical results and measurements shall be provided to DNREC in an electronic format specified by the policy of the Remediation Section (RS) of DNREC that is in effect at the time of submission. All submissions shall be in accordance with the Site-wide Data Management Plan (Permit Attachment 2).

I.I. DISPUTE RESOLUTION:

Except as otherwise provided in this Permit, in the event the Permittee disagrees, in whole or in part, with DNREC disapproval of any submission required by this Permit, the Permittee shall notify DNREC in writing of its objections, and the basis therefore, within thirty (30) days of receipt of DNREC's disapproval.

Such notice shall set forth the specific matters in dispute, the basis for the Permittee's belief that its position is consistent with the permit requirements, and any supporting documentation.

DNREC and the Permittee shall have an additional thirty (30) days from DNREC's receipt of the notification to meet or confer to resolve any dispute. In the event an agreement is reached, the Permittee shall submit the revised submission and implement the same in accordance with such agreement.

In the event DNREC and the Permittee are not able to reach an agreement within this thirty (30) day period, the Permittee shall have the opportunity to submit written comments regarding DNREC's decision to, and receive a written decision from the DNREC Secretary or his delegate. DNREC will notify the Permittee in writing of its decision and the Permittee shall comply with the terms and conditions of DNREC's decision. The Permittee does not waive its right to assert any and all available defenses in a proceeding to enforce this Permit, nor does it waive any statutory or regulatory rights it may have, if any, to affirmatively challenge DNREC's decision in the dispute.

I.J. CONFIDENTIAL INFORMATION:

In accordance with the DRGHW, § 122.12, the Permittee may claim confidential any information required to be submitted by this Permit.

I.K. WASTE MINIMIZATION:

The Permittee shall certify no less often than annually that the Permittee has a program in place to reduce the volume and toxicity of hazardous waste that the Permittee generates to the degree determined by the Permittee to be economically practicable; and the proposed method of treatment, storage or disposal is that practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment. The Permittee shall maintain each such certification of waste minimization at the facility until closure of such facility (DRGHW § 264.73(b)(9)).

I.L. LAND DISPOSAL RESTRICTIONS:

All activities of the Permittee which involve the land disposal of hazardous waste are subject to the provisions of the DRGHW, § 268.

I.M. ANNUAL REPORTS:

Pursuant to the DRGHW, §§ 262.41 and 264.75, the Permittee shall meet Annual Reporting requirements. The Annual Report shall be submitted by March 1st of each calendar year and shall contain the information required in the DRGHW, §§ 262.41 and 264.75.

I.N. HAZARDOUS WASTE CONTINGENCY PLAN:

The Permittee shall maintain at the facility, for the duration of this Permit, a Hazardous Waste Contingency Plan to address potential releases from any SWMUs. This Hazardous Waste Contingency Plan shall be prepared in accordance with the applicable requirements of § 264 of the DRGHW.

I.O. DUTY TO MAINTAIN DOCUMENTATION AT THE FACILITY:

Pursuant to the DRGHW § 264.73, the Permittee shall maintain at the facility, during the term of this Permit, all documents required by this Permit and the DRGHW.

MODULE II

FACILITY-WIDE CORRECTIVE ACTION

II.A. CORRECTIVE ACTION FOR CONTINUING RELEASES; PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT:

1. Section 3004(u) of RCRA, 42 U.S.C. § 6924(u), and § 264.101 of the *Delaware Regulations Governing Hazardous Waste* (DRGHW), provide that all permits issued after November 8, 1984 must require corrective action as necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any solid waste management unit (SWMU), regardless of when waste was placed in the unit.

2. Under § 3004(v) of RCRA, 42 U.S.C. § 6924(v), §§ 6305(a)(3) and 6307(d) of 7 Del. C., Chapter 63, and § 264.101(c) of the DRGHW, DNREC may require that corrective action at a permitted facility be taken beyond the facility boundary where necessary to protect human health and the environment, unless the owner or operator of the facility concerned demonstrates to the satisfaction of DNREC that, despite the owner or operator's best efforts, the owner or operator was unable to obtain the necessary permission to undertake such action.

3. Section 3005(c)(3) of RCRA, 42 U.S.C. § 6925(c)(3), §§ 6305(a)(3) and 6307(d) of 7 Del. C., Chapter 63, and § 122.32(a)(2) of the DRGHW provide that each permit shall contain such terms and conditions as the DNREC determines necessary to protect human health and the environment.

4. This Permit requires the Permittee to conduct a RCRA Facility Investigation (RFI) for potential or suspected releases of hazardous waste or hazardous constituents at specified SWMUs identified at the facility. The RFI will be performed under two phases, a Phase I RFI and a Phase II RFI. The purposes of the Phase I RFI are to evaluate the nature and extent of potential or suspected releases from SWMUs, to screen SWMUs from further investigation, to focus the RFI, and to determine whether interim/stabilization measures are necessary. The purpose of the Phase II RFI is to thoroughly evaluate the nature and extent of suspected releases of hazardous waste and hazardous constituents, and their degradation by-products from regulated units and SWMUs, at the facility based upon the findings in the Phase I RFI. The RFI includes the collection of site specific data and an evaluation of potential impacts to human health and the environment from potential or suspected contamination from the facility. The RFI will gather all data necessary for the DNREC to determine whether a Corrective Measures Study (CMS) is required. If, on the basis of the RFI findings and any other relevant information, the DNREC determines that a CMS is necessary, the Permittee will be required to conduct a CMS for those releases from SWMUs which threaten human health or the environment.

5. The Permittee may have completed some of the tasks required by this Permit and may have some of the information and data required by this Permit. Previous work may be used to meet the requirements of this Permit. Unless previously approved by the DNREC, such previous work must be submitted to and approved by the DNREC in accordance with permit conditions I.G. (Approval/ Disapproval of Submissions).

6. The Permittee shall prepare facility-specific scopes of work and reports relating to Interim Measures, RCRA Facility Investigation, Corrective Measures Study, and any Risk Screening or Risk Assessment in accordance with EPA guidance documents available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. The Permittee shall establish specific and appropriate elements of such scopes and reports to the DNREC's satisfaction under conditions I.G. of this Permit (Approval/ Disapproval of Submissions).

7. Within 90 days following the effective date of this Permit, the Permittee shall submit a Public Participation Plan, developed in accordance with EPA's Guidance document (https://www.epa.gov/sites/production/files/2017-01/documents/final_rcra_ppm.pdf), and to DNREC's satisfaction under conditions I.G. of this Permit (Approval/Disapproval of Submissions). The Permittee shall implement the approved Public Participation Plan throughout all phases of Corrective Action subject to this Permit.

II.B. INTERIM MEASURES:

1. The Permittee may, at any stage of the RFI, if applicable, submit to the DNREC, in writing, a proposal to perform corrective action interim measures for the remediation of any release of hazardous waste or hazardous constituent at or from a SWMU. Any such proposal shall include a schedule for performance of such interim measures. For any releases to soil, groundwater, sediment and surface water, the Permittee must demonstrate in such proposal, to the DNREC's satisfaction, that the subsurface conditions and contaminant plume relating to such release have been adequately characterized and that the proposed interim measures will adequately remove, contain, or treat the released hazardous waste or hazardous constituents as necessary to protect human health and the environment. The nature and extent of releases to other media shall likewise be adequately characterized and evaluated by the Permittee in such a proposal. The DNREC shall review such proposal and determine whether such a proposal will be considered for approval and whether such interim measures are of such scope that they require implementation of the public notice requirements specified under II.F.1, Corrective Measures Remedy Selection. The DNREC shall notify the Permittee of the approval or disapproval of the interim measures proposal. If the DNREC approves such a proposal, the Permittee shall be allowed to dispense with certain stages of the investigation, as described in the DNREC's approval of the interim measures proposal. No term or condition of this Permit, except as otherwise provided for by this Permit, shall be affected by such proposal until such time as this Permit has been modified to include such proposal. As appropriate, the DNREC or the Permittee may seek modification of this Permit pursuant to § 6305(a)(3) of 7 Del. C., Chapter 63, and §§ 122.41 and 122.42 of the DRGHW.

2. If the DNREC determines, on the basis of information submitted by the Permittee pursuant to Permit Condition II.D. (RCRA Facility Investigation – Phase I), II.E. (RCRA Facility Investigation – Phase II), II.I. (Emergency Response; Release Reporting), or II.K. (Solid Waste Management Unit Assessment) or any other information, that corrective action is necessary to protect human health or the environment from a release of hazardous waste or constituents from a SWMU, the Permittee may be required to implement Interim Measures.

a. Within ninety (90) calendar days of receipt of the DNREC's notice to implement corrective action Interim Measures at specified SWMUs, the Permittee shall submit to the DNREC an Interim Measures Plan (Plan). The Plan must be approved by the DNREC in accordance with Permit Conditions I.G. (Approval/Disapproval of Submissions) of this Permit. This Plan shall be developed in accordance with EPA Guidance for Interim Measures available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

b. According to the approved schedule, the Permittee shall submit to the DNREC the plans required by the Interim Measure Design Program, as described in the EPA Guidance document for Interim Measures available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. These plans must be approved by the DNREC in accordance with Permit Conditions I.G. (Approval/Disapproval of Submissions) of this Permit.

c. According to the approved schedule, the Permittee shall submit to the DNREC for approval the reports. The Interim Measures Report shall be developed in accordance with EPA Guidance for Interim Measures available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

d. Nothing in this Permit shall preclude the Permittee from performing Interim Measures at any time either to reduce or eliminate the risk to human health or the environment, or to prevent or reduce the spread of contamination. Such measures, (e.g., source removal, capping, groundwater pump and treat) may be taken at any time during the term of this Permit.

e. Nothing in this Permit shall limit the DNREC's authority to undertake or require any person to undertake response action or corrective action under any law, including but not limited to, 7 Del. C., Chapter 63, as amended. Nothing in this Permit shall relieve the Permittee of any obligation it may have under any Federal or State law, including, but not limited to, § 103 of CERCLA, to report releases of hazardous waste, hazardous constituents or hazardous substances to, at, or from the facility.

II.C. RCRA FACILITY ASSESSMENT – RFA:

The EPA identified seventeen (17) potential Solid Waste Management Units ("SWMUs") at the facility in a letter, dated August 8, 1986. Additional SWMUs were identified by the Permittee after August 8, 1986, for a total of twenty-seven (27). All twenty-seven (27) of these potential SWMUs are listed in the Permittee's Facility-Wide Corrective Action Plan (CAP), dated November 23, 2004. The DNREC approved this document on December 2, 2004. In October 2005 and October 2008, following completion of the CAP, two (2) additional SWMUs were identified by the Permittee for a total of twenty-nine (29). These additional SWMUs (identified as SWMU 28 and SWMU 29) were incorporated and investigated in the Phase I and II RCRA Facility Investigations.

The RCRA Facility Assessment was completed with the above submittals.

II.D. RCRA FACILITY INVESTIGATION – RFI PHASE I:

1. Phase I RCRA Facility Investigation Plan Submission:

Within ninety (90) days of the effective date of this Permit, the Permittee shall submit for DNREC's approval, a Phase I RCRA Facility Investigation (RFI) Work Plan. The Phase I RFI Work Plan must be approved by the DNREC in accordance with Permit Conditions I.G. (Approval/Disapproval of Submissions Resolution).

2. Phase I RCRA Facility Investigation Report:

a. The Permittee shall submit a Phase I RCRA Facility Investigation (RFI) Report to the DNREC. The Phase I RFI Report shall include an analysis, summary and results of all investigations performed pursuant to the Phase I RFI Plan. The objectives of the Phase I RFI Report are to document that the investigation and data are sufficient in quality (e.g., quality assurance and quality control (QA/QC) procedures have been followed) and scope (quantity) to adequately characterize the nature and extent of contamination, potential threat to human health and the environment, and to support the Corrective Measures Study. The Phase I RFI Report shall conform to the applicable RFI requirements of EPA Guidance for RCRA Facility Investigations, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

b. The Phase I RFI Report shall include a discussion of the need for and feasibility of implementing interim measures immediately, (see Permit Condition II.B., Interim Measures).

c. The Phase I RFI Report was submitted to the Department by the Dupont CRG in April of 2009.

II.E. RCRA FACILITY INVESTIGATION – RFI PHASE II:

Within ninety (90) days after the receipt of DNREC's approval of the Phase I RFI Report, the Permittee shall submit to DNREC, a Phase II RFI Work Plan.

1. Phase II RCRA Facility Investigation Report:

a. The Permittee shall submit a Phase II RCRA Facility Investigation (RFI) Report to the DNREC. The Phase II RFI Report shall include an analysis, summary and results of all investigations performed pursuant to the Phase II RFI Plan. The Phase II RFI **Report shall also summarize the salient findings under the Phase I Report. The** objectives of the Phase II RFI Report are to document that the investigation and data are sufficient in quality (e.g., quality assurance and quality control (QA/QC) procedures have been followed) and scope (quantity) to adequately characterize the nature and extent of contamination, potential threat to human health and the environment, and to support the Corrective Measures Study. The Phase II RFI Report shall conform to the applicable RFI requirements of EPA Guidance for RCRA Facility Investigations, available at: http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

b. The Phase II RFI Report shall include a discussion of the need for and feasibility of implementing interim measures immediately, (see Permit Condition II.B., Interim

Measures).

c. The Phase II RFI Report was submitted to the Department by Parsons in March of 2011.

II.F. CORRECTIVE MEASURES STUDY:

1. If the DNREC determines, on the basis of the RFI or any other information, that corrective measures for releases of hazardous waste or hazardous constituents are necessary to protect human health or the environment considering site-specific risk and other factors, the DNREC will advise the Permittee of this determination, and the reasons therefore, in writing. The Permittee shall submit to the DNREC for approval a Corrective Measures Study (CMS) Plan within ninety (90) days of receipt of notification of such determination. The CMS Plan shall include a schedule for expeditious performance of the study. The plan shall fulfill the applicable requirements of EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. Corrective Measures Study Requirements, and must be approved by the DNREC, in accordance with Permit Condition I.G. (Approval/Disapproval of Submissions) of this Permit.

   While under the care of Chemours all work necessary prior to the CMS was completed. The Phase I and II site investigations indicated very limited impacts to the site. (attached) The site hydrogeologic investigation concluded that the Colombia sands were lenticular and disconnected and that upper water bearing units were perched and disconnected. (attached)Additionally, these upper deposits are underlain by a thick section of Potomac clay forming an aquitard. The Risk assessment concluded that any present contamination posed no immediate risk to human health or the environment as long as it remained in place. (attached)

   The property was acquired by the DSPC in 2017 as part of a expansion of the Port of Wilmington. The site's proposed reuse is for a two (2) berth container offloading and staging area. As such site construction plans call for a general site regrading with limited cutting and impervious capping of nearly the entire site.

   The detailed site investigation data, the lack of human health and environmental risk, and the site's proposed reuse provide for the Department's determination that a CMS study is not necessary and that a presumptive remedy of capping and implementation of a contaminated materials management plan (attached) during site construction will provide for adequate protection of human health and the environment and the most viable remedy alternative. Per the attached Statement of Basis that remedy is proposed.

   Following construction activities, a Uniform Environmental Covenant will be established for the site which will establish appropriate institutional controls protect the remedy in perpetuity.

II.G. CORRECTIVE MEASURES IMPLEMENTATION:

1. Corrective Measures Remedy Selection:

   Based on reports and information submitted by the Permittee during the RFI, the CMS, and other relevant information, the DNREC may require the Permittee to evaluate further,

and report upon, one (1) or more additional remedies or develop particular elements of one (1) or more proposed remedies. DNREC will evaluate the CMS and approve a remedy in accordance with the evaluation criteria in the CMS Guidance and other applicable requirements. Such remedial requirements will be incorporated into this Permit pursuant to § 6305(a)(3) of 7 Del. C., Chapter 63, and §§ 122.41 and 122.42 of the DRGHW.

2. Corrective Measures Implementation:

a. Within ninety (90) days of receipt of the DNREC's written approval of the Corrective Measures Remedy, the Permittee shall submit a Corrective Measure Implementation (CMI) Work Plan, including a Schedule, for the DNREC's approval in accordance with the EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. After approval of the CMI Work Plan, the Permittee shall submit the Corrective Measure Design Reports to the DNREC in accordance with the EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. Given that CMI in this case is contingent upon other permits and their associated actions submittal of a CMI Work Plan may be delayed.

b. The Corrective Measure Final Design Report shall be submitted to the DNREC as a Class III Permit Modification request in accordance with the requirements of § 122.42 of the DRGHW. Upon completion of the public notice and public meeting requirements and upon the DNREC's approval of the CMI Final Design Report, the Permittee shall develop and implement construction in accordance with procedures, specifications, and schedules in the approved Final CMI Design Report and CMI Work Plan in accordance with the EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

c. Upon completion of construction and upon an initial period of performance of monitoring the corrective measure(s), the Permittee shall prepare and submit copies of the final CMI Report to the DNREC which delineates the implemented corrective measures, design, operation and maintenance, and performance of the constructed system(s) and complies with the EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm. Final "as built" plans and specifications of the corrective measures systems shall be certified by a Professional Engineer registered with the State of Delaware and shall be submitted to the DNREC with the final CMI Report.

d. CMI Progress Reports shall be provided on a quarterly and annual basis to the DNREC as delineated in accordance with the EPA Guidance, available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

II.H. EVALUATION OF THE SELECTED REMEDY:

Commencing one (1) year from the submittal date of the final CMI Report, the Permittee shall submit an annual progress report on the remedy performance. If DNREC determines that the selected remedy will not comply with the media clean-up requirements, the DNREC may require the Permittee to perform additional studies and/or perform modifications to the existing Corrective Action remedy. If necessary, the DNREC or the Permittee may seek modification of

this Permit pursuant to § 6305(a)(3) of 7 Del. C., Chapter 63, and §§ 122.41 and 122.42 of the DRGHW to implement modifications to the existing Corrective Measures Remedy.

II.I. EMERGENCY RESPONSE; RELEASE REPORTING:

1. Emergencies:

If, at any time during the term of this Permit, the Permittee discovers that a release of hazardous waste or hazardous constituents at or from the facility is presenting or may present an imminent and substantial endangerment to human health or the environment, and such release is not subject to the Contingency Plan and Emergency Procedures as defined in the portion of the RCRA Permit issued by the DNREC, the Permittee shall:

a. Notify the DNREC as soon as practicable of the source, nature, extent, location and amount of such release, the endangerment posed by such release and the actions taken and/or to be taken, to the extent known, to address such release. Such notification shall be confirmed in writing within three (3) business days of discovery of such release.

b. Unless otherwise directed by the DNREC, immediately take such actions as are necessary and appropriate to address such release.

2. Releases:

The Permittee shall notify DNREC in writing of the nature, source, extent, and location of a release of hazardous waste or hazardous constituents at or from the facility within seven (7) business days of discovery of such release which:

a. Is not being addressed by corrective measures at the time of such discovery;

b. Is not being addressed pursuant to permit conditions II.B., Interim Measures, or II.I.1, Emergencies;

c. Is not being addressed under the Contingency Plan and Emergency Procedures; and

d. Is not subject to reporting under the "Reporting of a Discharge of a Pollutant or an Air Contaminant" program at 7 DE Admin. Code § 1143 because the release is believed to be at or below the Delaware Reportable Quantity for such hazardous waste or hazardous constituent.

3. Based on the information submitted in Permit Condition II.I.2 (Releases), the DNREC may require the SWMU to be included in an ongoing RCRA Facility Investigation or may require Interim Measures (see Permit Condition II.B.).

4. Nothing in this Permit shall limit the DNREC's authority to undertake or require any person to undertake response action or corrective action under any law, including but not limited to, 7 Del. C. Chapter 63, §§ 104 or 106 of CERCLA, 42 U.S.C. §§ 9604 or 9606, and § 7003 of RCRA, 42 U.S.C. § 6973. Nothing in this Permit shall relieve the Permittee of any obligation it may have under any law, including, but not limited to, §

103 of CERCLA, to report releases of hazardous waste, hazardous constituents or hazardous substances to, at or from the facility.

II.J. GUIDANCE DOCUMENTS:

In addition to the guidance documents specified elsewhere in this permit or attachments, the following websites provide links to all relevant guidance documents:

1. EPA's corrective action website: http://www.epa.gov/correctiveaction

2. EPA Region 3 website: http://www.epa.gov/reg3wcmd/correctiveaction.htm

II.K. SOLID WASTE MANAGEMENT UNIT (SWMU) ASSESSMENT:

1. The Permittee shall notify the DNREC in writing, of any newly identified SWMU at the facility, no later than thirty (30) days after the date of discovery. The notification shall include, but not be limited to, the following known information:

   a. A description of the SWMUs type, function, dates of operation, location (including a map), design criteria, dimensions, materials of construction, capacity, ancillary systems (e.g., piping), release controls, alterations made to the unit, engineering drawings, and all closure and post-closure information available, particularly whether wastes were left in place.

   b. A description of the composition and quantities of solid wastes processed by the units with emphasis on hazardous wastes and hazardous constituents.

   c. A description of any release (or suspected release) of hazardous waste or hazardous constituents originating from the unit. Include information on the date of release, type of hazardous waste or hazardous constituents, quantity released, nature of the release, extent of release migration, and cause of release (e.g., overflow, broken pipe, tank leak, etc.). Also, provide any available data that quantifies the nature and extent of environmental contamination, including the results of soil and/or groundwater sampling and analysis efforts. Likewise, submit any existing monitoring information that indicates releases of hazardous waste or hazardous constituents has not occurred or is not occurring. The Permittee may refer to information regarding releases previously submitted to the DNREC under Permit Condition II.I. (Emergency Response; Release Reporting) and II.B (Interim Measures).

   d. A discussion of the need for and feasibility of implementing interim measures immediately, see Permit Condition II.B. (Interim Measures).

2. Upon receipt of the notification of any newly identified SWMU, the DNREC will determine the need for corrective action at such SWMU. If corrective action is necessary to protect human health or the environment considering site-specific risk and other site-specific factors, the DNREC will determine whether a RCRA Facility Investigation will be performed and the need for and scope of any Interim Measures, and modify the Permit to include such requirements pursuant to DRGHW § 122.41.

3. Within the time specified in the approved RCRA Facility Investigation Plan, the Permittee shall submit the RCRA Facility Investigation Report fulfilling the requirements of Permit Conditions II.E.3 through II.E.5.

4. In lieu of a separate RCRA Facility Investigation, the Permittee may propose either to incorporate any newly identified SWMU into an ongoing RCRA Facility Investigation or to submit a proposal for the performance of corrective measures at such newly identified SWMU in accordance with the provisions of Permit Condition II.A. Any such proposal shall be submitted to the DNREC along with notification of the discovery of the SWMUs.

II.L. FINANCIAL ASSURANCE:

1. Initial Cost Estimate:

Assurances of financial responsibility for corrective action must be provided in accordance with conditions herein. Within ninety (90) calendar days of receipt of the Department's written approval of the Corrective Measures Remedy, the Permittee shall submit an initial cost estimate for completing the approved remedy(ies). The initial estimate may be based on the Corrective Measure Study, the approved remedy(ies), or any other available information.

2. Cost Estimate Updates:

The cost estimate for completing the approved remedy(ies) shall be updated pursuant to the development of more detailed information (e.g., Corrective Measure Design) and any modifications to the approved remedy(ies).

3. Financial Assurance Demonstration:

Within thirty (30) calendar days of approval of the initial cost estimate for financial assurance (see Permit Condition II.L.1.), the Permittee shall demonstrate compliance with financial assurance to the DNREC for completing the approved remedies in accordance with 40 C.F.R. § 264.101(b). Within thirty (30) calendar days of approval of any revised cost estimate (see Permit Condition II.L.2.), the Permittee shall demonstrate to the DNREC financial assurance for the updated cost estimates.

4. Per the DRGHW, the DSPC is a government entity and is therefore exempt from the Financial Assurance Requirements.

II.M. RECORDKEEPING:

Upon completion of closure of any SWMU, the Permittee shall maintain in the facility operating record, documentation of the closure measures taken.

II.N. ACCESS FOR CORRECTIVE ACTION OVERSIGHT:

The DNREC and its authorized representatives shall have access to the facility at all reasonable times for the purpose of monitoring compliance with the provisions of this Permit. The Permittee shall use its best efforts to obtain access to property beyond the boundaries of the facility at which corrective action is required by this Permit (see § 3004(v) of RCRA, 42 U.S.C. § 6924(v) and §

264.101(c) of the DRGHW); (1) for itself and any contractor of the Permittee for the purpose of taking corrective action required by this Permit, and (2) for DNREC and its authorized representatives for the purposes described in this paragraph.

II.O. COMPLETION OF REMEDY:

Within ten (10) days of receipt of notification by the DNREC that the remedy is complete, the Permittee shall submit a written certification to the DNREC registered mail stating that the remedy has been completed in accordance with the requirements of this Permit Modification. The certification must be signed by the Permittee and by an independent registered Professional Engineer registered in the State of Delaware.

II.P. EXTENSION OF DEADLINES:

Extensions of the due date for any submittal under this Permit may be granted by DNREC without a permit modification, based on the Permittee's demonstration that sufficient justification for the extension exists. Unless exigent circumstances are determined by DNREC to exist, all requests for an extension shall be submitted in writing no less than two weeks before the applicable deadline, and no extension shall be effective until DNREC approves the request in writing.

MODULE III

POST-CLOSURE CARE

III.A. MODULE HIGHLIGHTS:

See "Introduction" of the approved Final Post-Closure Care Plan (see Attachment 1).

III.B. UNIT IDENTIFICATION:

The Permittee shall provide post-closure care for the four (4) surface impoundments (i.e. Ponds A, B, C and D), subject to the terms and conditions of this Permit, and as described in the approved Final Post-Closure Care Plan (see Attachment 1).

III.C. POST-CLOSURE PROCEDURES AND USE OF PROPERTY:

1. The Permittee shall conduct post-closure care for the four (4) surface impoundments listed in Permit Condition III.B. above, to begin after completion of closure and continue for thirty (30) years after that date, except that the thirty (30) year post-closure care period may be shortened upon application and demonstration approved by DNREC that the facility is secure, or may be extended by DNREC if the Secretary finds this is necessary to protect human health and the environment.

2. No later than September 23, 2029, if the landfill is still in the post-closure period at that time, the permittee shall evaluate the waste containment systems and monitoring data and provide a recommendation for continuing, amending, or discontinuing post-closure care of the landfill.

3. The Permittee shall maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of DRGHW § 264 Subpart F during the post-closure period.

4. The Permittee shall conduct groundwater monitoring in accordance with the approved Final Post-Closure Care Plan (see Attachment 1).

5. The Permittee shall comply with the requirements for landfills as follows:

    a. The Permittee shall continue all maintenance activities as described in the approved Final Post-Closure Care Plan;

    b. Maintain the final cover over the four (4) surface impoundments as per DRGHW § 264.118, and the approved Final Post-Closure Care Plan;

    c. Maintain the run-on and run-off control systems required under DRGHW §§ 264.301(g), 264.301(h), and 264.310, and the approved Final Post-Closure Care Plan;

    d. Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of the DRGHW § 264, Subpart F;

    e. Prevent run-on and run-off from eroding or otherwise damaging the units; and

f. Protect and maintain surveyed benchmarks used in complying with the surveying and recordkeeping requirements of DRGHW § 264.309.

6. The Permittee shall maintain monitoring systems as required by the DRGHW § 264.118 and the approved Final Post-Closure Care Plan (see Attachment 1), as follows:

   a. Monitoring well replacement; and

   b. Other equipment.

7. The Permittee shall comply with all security requirements, as per the DRGHW §§ 264.14, 264.117, and 264.118, and the approved Final Post-Closure Care Plan (see Attachment 1).

8. As per the DRGHW § 264.117(c), the Permittee shall not allow any use of the four (4) surface impoundments which will disturb the integrity of any components of the containment system, or the function of the facility's monitoring system during the post-closure care period.

9. As per the DRGHW §§ 264.117 and 264.118, the Permittee shall adhere to the approved Final Post-Closure Care Plan (see Attachment 1). All post-closure care activities must be conducted in accordance with the provisions of this Final Post-Closure Care Plan.

III.D. INSPECTIONS:

The Permittee shall inspect the components, structures, and equipment at the site in accordance with the DRGHW § 264.117 and the approved Final Post-Closure Care Plan (see Attachment 1).

III.E. NOTICES AND CERTIFICATION:

1. The Permittee has submitted to the local zoning authority, or the authority with jurisdiction over local land use, and to the Secretary a record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit of the facility. For hazardous wastes disposed of before January 1981, the Permittee has identified the type, location, and quantity of the hazardous wastes to the best of this knowledge and in accordance with any records he/she has kept.

2. The Permittee has within sixty (60) days of certification of closure of the first and last hazardous waste disposal unit:

   a. Recorded in accordance with 7 Del. C., Chapter 63, notation on the deed to the facility property or on some other instrument that is normally examined during the title search that will in perpetuity notify any potential purchaser of the property that:

      (1) The land has been used to manage hazardous waste;

      (2) Its use is restricted under the DRGHW § 264 Subpart G; and

      (3) The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or other hazardous waste disposal unit of the facility have been filed with the Secretary and the New Castle County Planning Office.

b. Submitted a certification to the Secretary, signed by the Permittee, that he has recorded the notation specified in Permit Condition III.E.2.a, including a copy of the document in which the notation has been placed.

3. If the Permittee or any subsequent owner or operator of the land upon which the hazardous waste disposal unit is located, wishes to remove hazardous wastes and hazardous waste residues, the liner, if any, or contaminated soils, than he/she shall request a modification to this Permit in accordance with the applicable requirements in DRGHW §§ 122 and 124. The Permittee or any subsequent owner or operator of the land shall demonstrate that the removal of hazardous wastes will satisfy the criteria of DRGHW § 264.117(c), which consists of the following:

   a. The removal of the notation on the deed to the facility property or other instrument normally examined during title search; or

   b. The addition of a notation to the deed of instrument indicating the removal of the hazardous waste.

4. No later than sixty (60) days after completion of the established post-closure care period for each hazardous waste disposal unit, the Permittee shall submit to the Secretary, by registered mail, a certification that the post-closure care for the hazardous waste disposal unit was performed in accordance with the specifications in the approved Final Post-Closure Care Plan. The certification must be signed by the Permittee and an independent Professional Engineer registered in the State of Delaware. Documentation supporting the engineer's certification must be furnished to the Secretary upon request until the Secretary releases the Permittee from the financial assurance requirements for post-closure care under DRGHW § 264.145.

III.F. FINANCIAL ASSURANCE:

1. The Permittee shall maintain financial assurance during the post-closure period and comply with all applicable requirements of DRGHW § 264 Subpart H, §§ 264.144 and 264.145. Changes in financial assurance mechanisms must be approved by the Secretary pursuant to the DRGHW § 264.145.

2. The Permittee shall demonstrate continuous compliance with the requirements of DRGHW § 264.147(a) to have and maintain liability coverage for sudden accidental occurrences in the amount of at least $1 million per occurrence, with an annual aggregate of at least $2 million, exclusive of legal defense costs.

   The Permittee shall also demonstrate continuous compliance with the requirements of DRGHW § 264.147(b) to have and maintain liability coverage for non-sudden accidental occurrences in the amount of at least $3 million per occurrence, with an annual aggregate of at least $6 million, exclusive of legal defense costs.

3. Per the DRGHW, the DSPC is a government entity and is therefore exempt from the Financial Assurance Requirements.

III.G. POST-CLOSURE PERMIT MODIFICATIONS:

In accordance with the DRGHW § 264.118, the Permittee must request a permit modification to authorize a change to the approved Final Post-Closure Care Plan. This request must be in accordance with the applicable requirements of DRGHW §§ 122 and 124, and must include a copy of the proposed amended Post-Closure Care Plan for approval by the Secretary. The Permittee shall request a permit modification whenever changes in operating plans or facility design affect the approved Final Post-Closure Care Plan, there is a change in the expected year of final closure, or other events occur during the active life of the facility that affect the approved Final Post-Closure Care Plan. The Permittee must submit a written request for permit modification at least sixty (60) days prior to the proposed change in facility design or operation, or no later than sixty (60) days after an unexpected event has occurred which has affected the Final Post-Closure Care Plan.

MODULE IV

GROUNDWATER DETECTION MONITORING

IV.A. DETECTION MONITORING NETWORK:

1. The detection monitoring system for the four (4) surface impoundments (i.e. Ponds A, B, C and D) shall yield groundwater samples from the uppermost aquifer that represent the quality of groundwater. The Permittee shall document compliance with this provision and place this documentation in the operating record.

2. The detection monitoring system for the four (4) surface impoundments shall consist of the monitoring wells described in the approved Final Post-Closure Care Plan (see Attachment 1).

3. The term, "uppermost aquifer", as referenced in this Module, refers to the first saturated sand horizon that is continuous beneath the four (4) surface impoundments.

IV.B. MONITORING WELL DESIGN, CONSTRUCTION, MAINTENANCE, AND CERTIFICATION REQUIREMENTS:

1. The Permittee shall construct and maintain wells monitoring the groundwater for the period specified in DRGHW § 264.96. Groundwater monitoring shall, at a minimum, consist of a detection monitoring system for the uppermost aquifer.

2. Maintenance of these wells, and any future design and construction considerations, shall be performed in accordance with the November 1992 EPA document entitled, "RCRA Ground-Water Monitoring: Draft Technical Guidance".

3. The Permittee shall complete construction of any new monitoring wells in accordance with the requirements of this Permit and shall certify such proper construction in accordance with any applicable rules, except that the certification shall be prepared by a qualified Hydrologist, Geologist, or Geotechnical Engineer. Each monitoring well certification report shall be an accurate log of the soil boring which thoroughly describes and depicts the location, latitude and longitude, material setting elevations, material specifications, construction details, and soil conditions encountered in the boring for the well. In addition, location determinations (including latitude and longitude, top of casing elevation, ground surface elevation at well location) of all new monitoring wells shall be performed by a Surveyor licensed in the State of Delaware.

4. Well numbers (i.e. DNREC I.D. Number; Local I.D. Number) shall be permanently marked on each well at the site. These wells shall be raised to the new grade of completed site construction and adequately protected given the site's reuse.

5. Maintenance of all monitoring wells shall be performed in accordance with the approved Final Post-Closure Care Plan (see Attachment 1).

6. Well integrity inspections for all wells comprising the detection monitoring system shall be performed as specified in the approved Final Post-Closure Care Plan (see Attachment 1).

7. The Permittee shall replace any monitoring well that is removed from service with a new monitoring well. The replacement well shall be installed in accordance with the requirements

of this Permit. The Permittee shall notify the Secretary in writing of any damaged well within ten (10) days of such discovery, and replace such well prior to the next routine sampling event after written approval from the Secretary to replace the well removed from service.

8. All damaged monitoring wells removed from service shall be decommissioned in accordance with the *Delaware Regulations Governing Decommissioning of Water Wells*.

IV.C. MONITORING CONSTITUENTS:

1. The Permittee shall monitor for parameters and constituents listed in the approved Final Post-Closure Care Plan (see Attachment 1). Reassessment of the appropriateness of this list will be made as specified in the Final Post-Closure Care Plan (see Attachment 1).

2. The Permittee shall establish background water quality for each monitoring constituent and parameter based on data from groundwater wells of the four (4) surface impoundments. Background values for each constituent and parameter shall be re-determined following each sampling event by averaging values obtained from the latest four (4) consecutive rounds of sampling, unless such methodology adversely affects implementation of an appropriate statistical test, pursuant to Permit Condition IV.F.8.

IV.D. ELEVATION OF THE GROUNDWATER SURFACE:

1. The Permittee shall determine groundwater elevations in monitoring wells at the four (4) surface impoundments prior to each routine and non-routine sampling event. The Permittee shall determine all groundwater surface elevations during a single day, using the Electrical Tape Method or other method approved by the Secretary.

2. Annually, the Permittee shall determine groundwater flow rate and direction in the uppermost aquifer, and develop a contour map from the groundwater elevation data. This annual determination shall be based on groundwater elevations in all wells constructed at and near the four (4) surface impoundments, including wells not in the detection monitoring system.

IV.E. SAMPLING AND ANALYSIS PROCEDURES:

1. Samples shall be collected using the techniques described in the approved Final Post-Closure Care Plan (see Attachment 1).

2. Samples shall be preserved and shipped to offsite laboratories in accordance with the procedures specified in the approved Final Post-Closure Care Plan (see Attachment 1).

3. Samples shall be analyzed in accordance with the procedures specified in the approved Final Post-Closure Care Plan (see Attachment 1).

4. Samples shall be tracked and controlled using the chain-of-custody procedures specified in the approved Final Post-Closure Care Plan (see Attachment 1).

IV.F. MONITORING PROGRAM AND DATA EVALUATION:

1. The Permittee shall determine groundwater quality at each monitoring well using sampling and analysis techniques specified in the approved Final Post-Closure Care Plan (see Attachment 1).

2. The Permittee shall sample each monitoring well for parameters and constituents specified in the approved Final Post-Closure Care Plan (see Attachment 1). In addition to these parameters and constituents, the Permittee shall perform field parameter measurements (pH, specific conductance, temperature, and turbidity) and depth-to-well-bottom measurements for each monitoring well.

3. The Permittee shall sample the detection monitoring system at the frequency specified in the approved Final Post-Closure Care Plan.

4. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer at least annually, as described in Permit Condition IV.D.2.

5. The Permittee shall determine whether there is an increase over the background values for each parameter and constituent identified in the approved Final Post-Closure Care Plan (see Attachment 1). In determining whether such an increase has occurred, the Permittee shall perform the following procedures:

   a. The Permittee shall individually compare values for the monitoring parameters and constituents at each monitoring well against the screening levels described in the approved Final Post-Closure Care Plan (see Attachment 1). The results of the analysis shall be submitted within thirty (30) calendar days of receiving the complete results of the scheduled sampling event. If re-sampling is performed, then the results of the analysis for the parameter(s) in question shall be submitted with thirty (30) calendar days of receiving the re-sampling results.

6. If the analysis indicates that there is significant evidence of contamination for a monitoring parameter or constituent in any point of compliance well, then the Permittee shall follow the procedures set forth in the DRGHW § 264.98(g)(6).

7. If the Permittee determines that the detection monitoring program required by this Permit no longer satisfies the requirements of DRGHW § 264.98, the Permittee shall, within ninety (90) days of such determination, submit an application for a permit modification to make any appropriate changes to the program.

8. If the controls built into the prediction limit test or other statistical method(s) can demonstrate that the most recent data for any parameter are sufficiently auto-correlated, seasonal, or subject to any other deviation from assumptions that renders the statistical test inappropriate, the Permittee must apply an alternate test that complies with the performance standards set forth in DRGHW § 264.97. The Permittee shall document and justify any changes to the statistical method in the Annual Monitoring Report required by Permit Condition IV.G.

9. Within ninety (90) days after determining that the methods described in the approved Final Post-Closure Care Plan are not appropriate for any monitoring parameter, the

Permittee shall submit an application for a permit modification, proposing alternative procedures meeting the applicable requirements of DRGHW § 264.97.

IV.G. RECORDKEEPING AND REPORTING:

1. All field, sampling, and laboratory analytical data shall be documented and reported as specified in the approved Final Post-Closure Care Plan (see Attachment 1).

2. The Permittee shall submit an Annual Groundwater Monitoring Report within sixty (60) days of receipt of analytical data after each sampling event. The Annual Groundwater Monitoring Report shall include, at a minimum:

    a. Tables, along with discussion, summarizing the concentrations of the monitoring parameters and constituents in the background and point of compliance wells, and in the QA/QC blanks;

    b. Graphical plots for each parameter and constituent at each point of compliance well and each background well, showing every sample value since installation of the detection monitoring system, or during the previous three (3) years (three sampling events when the fourth round of post-closure is completed); or a statement asserting that the parameter or constituent was detected at most, once, during the past three (3) years, and giving the maximum value and detection limit(s) achieved;

    c. Tables, along with discussion, summarizing the results of the screening levels used to evaluate each parameter and constituent;

    d. A table summarizing field parameter measurements (pH, specific conductance, temperature, and turbidity), groundwater surface elevations, and depth-to-well bottom measurements; and

    e. Maps showing well locations, water level elevations, inferred groundwater flow directions and flow rates for the aquifer, and, if present, contaminant plume(s).

3. The Permittee shall comply with any additional reporting requirements as they become necessary under conditions set forth elsewhere in this Module.

4. The Permittee shall retain all information not required for formal submittal to the Secretary in the four (4) surface impoundments operating record, and such information shall be available for review by the Secretary.

HW31B04 PERMIT SYNOPSIS:

Appendix E
Supplemental Operational and Compliance Plans

Appendix E
Final Post-Closure Care Plan

DuPont Corporate Remediation Group
Chestnut Run Plaza, Building 715
4417 Lancaster Pike
Wilmington, DE 19805

March 18, 2010

Mr. Douglas Zeiters
Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Solid and Hazardous Waste Management Branch
89 Kings Highway
Dover, Delaware 19901

Post Closure Care Plan – Addendum 1
Revised Monitoring and Maintenance Plan
Closed Surface Impoundments
DuPont Edge Moor Plant
104 Hay Road, Edgemoor, Delaware
State Permit #: HW-03A16
US EPA Identification #: DED00800284

Dear Mr. Zeiters:

DuPont has prepared this Post Closure Care Plan – Addendum 1, Revised Monitoring and Maintenance Plan for the Closed Surface Impoundments at the DuPont Edge Moor Plant.

DuPont had originally submitted this document in September 2009, but based on comments and conversations with Delaware Department of Natural Resources and Environmental Control, the September 2009 Closure Care Plan – Addendum 1, Revised Monitoring and Maintenance Plan was revised. Enclosed are two hard copies and a CD containing an electronic version of the Closure Care Plan – Addendum 1, Revised Monitoring and Maintenance Plan.

Please contact me at 302-999-6195 or at michelle.m.thomson@usa.dupont.com if you have any questions.

Sincerely,

Michelle M. Thomson Ph.D.
Project Director

cc: CRG Central Files (7720)
Tushar S. Durve (DuPont Edge Moor Plant)
Douglas Groux (Parsons)

PARSONS

POST-CLOSURE CARE PLAN – ADDENDUM 1, REVISED MONITORING AND MAINTENANCE PLAN, CLOSED SURFACE IMPOUNDMENTS

DUPONT EDGE MOOR PLANT
EDGEMOOR, DELAWARE

Prepared for:

E. I. du Pont de Nemours and Company
Corporate Remediation Group
4417 Lancaster Pike
Wilmington, DE 19805

Prepared by:

PARSONS
1601 Market Street, Suite 900
Philadelphia, Pennsylvania 19103

March 2010

DuPont PN 507887
Parsons PN 445385

This page intentionally left blank

PROFESSIONAL SIGNATURES AND SEALS

Professional Engineer

Professional Engineer	Engineer License Number	Expiration Date
Satya N. Varadhi	**DAPE TP-358 - Delaware** **062 045181 - Illinois**	**12-09-2010** **11-30-2011**

Signature: Satya N. Varadhi Date: 3-17-2010

Telephone Number	FAX Number	E-mail
(312) 930-5178	**(312) 930-0018**	**Satya.Varadhi@parsons.com**

DOCUMENT: Post-Closure Care Plan – Addendum 1, Revised Monitoring and Maintenance Plan, Closure Surface Impoundments, DuPont Edge Moor Plan, Edgemoor, Delaware

Seals, as applicable: DAPE Temporary Permit No. TP-358
Exp. 12-09-2010



Satya Narayan Varadhi
expires 11-30-2011

The *Post-Closure Care Plan-Addendum 1, Revised Monitoring and Maintenance Plan* was initially prepared by URS Corporation in September 2009. At the request of DuPont, Parsons has revised the text as applicable, especially Sections 3 and 4, and finalized this report.

This page intentionally left blank

TABLE OF CONTENTS

1.0 Introduction 1
2.0 Physical Setting and Hydrogeology 3
3.0 Post-Closure Monitoring Program 5
3.1 Objective 5
3.2 Monitoring Network 5
3.3 Monitoring Parameters 5
3.4 Groundwater Sampling Methods 6
3.4.1 Sampling Equipment 6
3.4.2 Groundwater Sampling Procedure 7
3.4.3 Quality 8
3.4.4 Quality Assurance/Quality Control Samples 8
3.4.5 Analytical Data Package and Validation Review 9
3.4.6 Health and Safety 9
3.4.7 Waste Management 9
4.0 Data Evaluation 11
4.1.1 Review of Available Water Quality Criteria 12
4.1.2 Delaware River Flow Adjacent to the Site 13
4.1.3 Groundwater discharge to the Delaware River 14
4.1.4 Surface Water Protection Factor 14
4.1.5 Selection of Screening Criteria 15
4.1.6 Confirmation of an Exceedance 16
5.0 Post-Closure Maintenance Activities 18
5.1 Quarterly Inspections 18
5.2 Maintenance of the Waste Containment System 18
5.3 Maintenance of the Monitoring System 19
5.4 Maintenance of the Security System 19

6.0 Reporting 20

7.0 References 22

FIGURES

Figure 1 Site Location Map

Figure 2 Closed Surface Impoundments Monitoring Area

Figure 3 Screening Level Exceedance Action Matrix

TABLES

Table 1 Revised Sampling and Analysis Program

Table 2 Sample Container, Preservation, and Holding Time Requirements

Table 3 Human Health Protection Screening Level Selection

Table 4 Freshwater Aquatic Life Protection Screening Level Selection

Table 5 Selected Criteria and Benchmarks for Protection of Human Health and Aquatic Life

Table 6 Final Selected Groundwater Screening Levels for Closed Surface Impoundments

APPENDICES

Appendix A Groundwater Concentrations from the Baseline Groundwater Compliance Limits Letter, July 20, 2006

Appendix B Groundwater Analytical Results: PCBs, Dioxin TEQs, Semi-volatile Organic Compounds and Metals (May 2007 – October 2009)

Acronyms

Acronym	Definition / Description
BTAG	(USEPA) Biological Technical Assistance Group
cfs	Cubic feet per second
COC	Constituent of concern
DNREC	(Delaware) Department of Natural Resources and Environmental Control
DO	Dissolved oxygen
DRBC	Delaware River Basin Commission
DRGHW	Delaware Regulations Governing Hazardous Waste
DuPont	E. I. du Pont de Nemours and Company
ft/d	Foot per day
L/min	Liter per minute
µg/L	Micrograms per liter
mg/L	Milligrams per liter
msl	Mean sea level
NRWQC	National Recommended Water Quality Criteria
ORP	Oxidation-reduction potential
PCB	Polychlorinated biphenyls
PCCP	Post-Closure Care Plan
Ponds	Closed surface impoundments A, B, C, and D
PQL	Practical quantitation limit
QA/QC	Quality assurance/quality control
R.M.	River mile
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SHWMB	Solid and Hazardous Waste Management Branch
SVOC	Semi-volatile organic compound
SWPF	Surface water protection factor
SWQS	(Delaware) Surface Water Quality Standards
TEF	Toxicity equivalent factor
TEQ	Toxicity equivalent quotient
TCDD	Tetrachlorodibenzo(p)dioxin
UPL	Upper prediction limit
USEPA	U. S. Environmental Protection Agency
UTL	Upper tolerance limit
WMP	Waste management plan

This page intentionally left blank

1.0 INTRODUCTION

In August 2002, E.I. du Pont de Nemours and Company (DuPont) completed neutralization and stabilization activities for four surface impoundments (A, B, C, and D) located at the DuPont Edge Moor Plant in Edgemoor, New Castle County, Delaware (Figure 1). Between September 2003 and March 2004, DuPont installed a cap as a part of the closure of these units. These activities are discussed in the *Documentation of Neutralization and Stabilization Construction Activities for Four Surface Impoundments* (DuPont, 2002) and the Closure Certification Report for Four Surface Impoundments (DuPont, 2004a). The work was completed in accordance with a Consent Order (C.A. 01c-10-288CHT). The closure was certified by the Delaware Department of Natural Resources and Environment Control (DNREC) in a letter to DuPont dated September 23, 2004 (DNREC, 2004). As stated in the Delaware Regulations Governing Hazardous Waste (DRGHW) Section 264.117(a)(1), the date of the closure, September 23, 2004, marks the beginning of the 30-year post-closure care and monitoring period.

Following the closure, DuPont submitted the *Post Closure Care Plan* (PCCP) *for Four Surface Impoundments,* which discussed maintenance and monitoring activities for the closed ponds (DuPont, 2004b). The maintenance activities discussed in the PCCP have not been revised and are presented in this addendum for convenience. However, revisions to the post-closure monitoring are recommended and are the primary focus of this Addendum 1 to the post-closure plan.

The monitoring plan included in the 2004 PCCP outlined the following tasks:

- A hydrogeological investigation to assist in the monitoring network construction
- Phase I groundwater monitoring and baseline determination and development of upper tolerance limits (UTLs)
- Phase II groundwater monitoring, long-term semiannual monitoring, and comparison to UTLs

The first two tasks were completed and reported in the *Hydrogeological Evaluation Report* (DuPont, 2005) and the letter report to the DNREC dated July 20, 2006, regarding the Baseline Groundwater Compliance Limits (taken from the Baseline Report; DuPont, 2006b; see Appendix A). Since submittal of these documents, DuPont has conducted five rounds of groundwater sampling. The results of all groundwater sampling events are presented in Appendices A and B.

DuPont has prepared this addendum to the PCCP to formalize the final task of long-term monitoring. This document describes the proposed groundwater monitoring well system, analytical parameters, sampling methods, and sampling schedule for post-remedy detection monitoring at the closed impoundments.

This page intentionally left blank

2.0 PHYSICAL SETTING AND HYDROGEOLOGY

The four closed surface impoundments, identified as Ponds A through D, are located within the northern portion of the Edge Moor Plant area as shown in Figure 2. The DuPont Edge Moor Plant and Ponds A through D are located along the bank of the Delaware River in northeastern New Castle County, Delaware (see Figure 1). A detailed description of the physical setting is presented in the PCCP (DuPont, 2004b).

The Edge Moor Closed Surface Impoundments Area is situated within the Atlantic Coastal Plain physiographic province, which is locally composed of the unconsolidated sediments of Pleistocene (Columbia Formation) and Cretaceous ages (Potomac Formation). Under some portions of the site, natural sand, interpreted to belong to the Scotts Corners Formation, was present above the Potomac clay, with the greatest thicknesses generally along the Delaware River and in the central portion of the site. These unconsolidated sediments overlie the igneous and metamorphic basement rocks of the Wissahickon Formation and the Wilmington Complex. A detailed discussion of the regional geology can be found in the *Phase I RFI*[1] *Data Summary Report* (DuPont, 2009).

Underlying the area of the ponds is a fill zone that is 10 to 20 feet thick. Fill materials include unsaturated sand and gravel, silts, and silty clay (Zone A). In the southeastern portion of the pond area, the fill is underlain by a silty sand unit that extends southward along the river (Zone B). This zone pinches out and is absent in the northern area of the ponds, where a zone of inter-layered red and gray clays and silts with some sand lenses (Zone C) underlies Zone A. Below -30 feet mean sea level (msl), the sediments of Zone C become sandier with depth. Underlying Zone C is a weathered bedrock zone (Zone D) at elevations below -50 feet msl. The weathered bedrock (saprolite) is dark green clay to sandy clay.

The drilling logs from the construction of MW-02 and adjacent locations confirm historical records, which indicate that this area was formerly marshland and is underlain by a former channel of an unnamed stream. Dark, organic, fine-grained material underlies this area and is presumed to lie unconformably upon the Potomac Clays into which it cuts. Some boreholes indicate that this wedge of marshland material might have a basal unit that is coarser grained. The presence of the marshland deposits may be relevant because of differing organic-carbon content, clay mineralogy, pH, and oxidation-reduction conditions, in addition to physical hydrogeologic parameters.

There is no distinct, continuous, shallow water zone beneath the majority of the site (DuPont, 2009). Information obtained while installing the pond monitoring wells MW-01 through MW-10 indicated the presence of isolated water-bearing intervals within Zone C from -18 to -60 feet msl. This is the interval in which the pond monitoring wells are screened. Groundwater elevations range from approximately 10 feet msl in wells on the northwestern side of the ponds to approximately 5 feet msl in wells along the river.

[1] RFI – Resource Conservation and Recovery Act (RCRA) Facility Investigation

This page intentionally left blank

3.0 POST-CLOSURE MONITORING PROGRAM

As stated in the PCCP, post-closure monitoring consists of the following phases:

- Phase I: Establishment of baseline groundwater quality conditions for all wells
- Phase II: Long-term monitoring to ensure the effectiveness of the containment system and to monitor the detection of any potential releases

Phase I consisted of monthly groundwater sampling during the first year of monitoring to establish UTLs for each well as reported in the Baseline Report (DuPont, 2006b). The Phase II long-term groundwater monitoring was initiated in 2007 with semiannual sampling of the monitoring network. The analytical data collected from all events are presented in Appendices A, B and C. The program described in the following sections will be used to formalize the Phase II long-term monitoring program.

3.1 Objective

The purpose of the groundwater monitoring program is to monitor the efficacy of the remedial action completed at the former surface impoundments.

3.2 Monitoring Network

Ten monitoring wells (MW-01 through MW-10) comprise the monitoring well network for the closed surface impoundments. Seven of the wells (MW-01 through MW-07) are located between the closed surface impoundments and the Delaware River, and three wells (MW-08 through MW-10) are located on the upland side of the ponds. A summary of the monitoring network is presented in Table 1.

3.3 Monitoring Parameters

Groundwater samples will be collected on a semiannual basis and submitted for the following analyses:

Constituent	Analytical Method
Total and dissolved* antimony Total and dissolved* arsenic Total and dissolved* manganese Total and dissolved* thallium	SW-846 Method 6020
Hexachlorobenzene Hexachlorobutadiene Octochlorostyrene Pentachlorobenzene	SW-846 Method 8270C

* Dissolved samples will be collected and held at the laboratory in the event they are needed.

Groundwater samples and gauging data will be collected from monitoring wells MW-01 through MW-10 on an annual basis and submitted for the following analyses:

Constituent	Analytical Method
Polychlorinated biphenyls (PCBs)	U. S. Environmental Protection Agency (USEPA) Method 1668
Polychloronated dibenzo(p) dioxins and furans	USEPA Method 1613

Based on analytical results from the groundwater sampling to date, PCBs, dioxins, and furans are predominantly bound to particulates. Therefore, analysis of unfiltered samples may result in elevated levels and/or a false positive. To resolve this, an unfiltered replicate sample for PCBs, dioxins, and furans will be collected during the groundwater sampling event. The replicate sample will then be filtered in the laboratory, as needed, and held appropriately in laboratory custody

Table 2 lists the analytical methods, necessary preservatives, and allowable hold times for the monitored parameters. Preservatives will be placed in the appropriate sample containers by the laboratory before shipping them to the sample location. Analytical methods and laboratory quality control (QC) procedures are performed in accordance with the USEPA SW-846*, Test Methods for Evaluating Solid Waste.*

3.4 Groundwater Sampling Methods

Groundwater samples will be collected from the monitoring wells shown in Figure 2. The sampling procedures to be used for groundwater monitoring have been derived from the *Procedures for Sampling Ground Water from Monitoring Wells* (DNREC, 1995) and from the *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells* (USEPA, 1996).

3.4.1 Sampling Equipment

The following equipment will be used as a minimum to collect groundwater samples. Additional equipment may be deemed necessary depending on field conditions.

Extraction Device

An adjustable rate peristaltic pump or submersible pump (or similar type of device) will be used to draw samples from each well. The pump will be capable of extracting water at 0.1 to 0.5 liter per minute (L/min).

Tubing

If a peristaltic pump is used, dedicated polypropylene tubing will be placed in each of the network wells and will be used for all future sampling events. This tubing will have an inner diameter of 1/4 inch to 3/8 inch to ensure the tubing remains filled with liquid when pumping at low rates. The tubing will be placed such that the intakes are positioned in the midpoint of the screened interval. If a submersible pump is used, new disposable tubing will be used for each event.

Water-Level Probe

Groundwater elevations will be measured at mean tide during each groundwater sampling event. Because of tidal influence, measurements at wells MW-01 through MW-07 will be made as close as possible to the predicted mean tide. Measurements at

MW-08 through MW-10 will be collected immediately afterward. Water levels will be measured using an electronic water-level meter capable of measuring to 0.01-foot accuracy. In addition to the groundwater elevations, surface-water elevations will be measured in the Delaware River at SW-1 to monitor the interaction between groundwater and the Delaware River (Figure 2).

Flow Measurement

A container of known volume and a stopwatch will be used to measure the pumping rate.

Power Source

The electric power required to operate the peristaltic pump will be provided by an automobile battery or through an adapter plugged into the field vehicle cigarette lighter. In the event submersible pumps are used to collected groundwater samples, a gasoline-powered generator will be used as a power source.

Monitoring Instruments

Field parameters will be measured prior to sampling using instruments capable of measuring pH, turbidity, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature. Use of a flow-through cell is required for all parameters except turbidity. Each instrument will be calibrated daily, prior to sampling, following the manufacturer's directions.

Documentation

Field books will be used to record site activities. Appropriate field data will be recorded in a separate field log.

Sample Bottles

Sample preservatives will be added to the sample containers by the laboratory, as applicable, prior to shipping them to the site. To allow flexibility in sampling order, each well will have its own chain-of–custody forms.

3.4.2 Groundwater Sampling Procedure

The following procedures will be used when sampling the wells. The wells to be sampled are listed in Table 1.

1. Remove the well cap, and allow the well to equilibrate to atmospheric pressure before proceeding with water-level measurements and purging/sampling. Internal negative or positive pressure, if encountered when removing the well cap, will be noted.
2. Measure the water level before and during pumping, and record in field notes.
3. Connect the dedicated suction tubing to the peristaltic pump (or connect single use tubing to the submersible pump). A new section of flexible tubing for insertion around the pump rotor heads will be used at each well and will not be re-used between wells to prevent cross-contamination.
4. Start the pump and measure the discharge rate. The desired pumping rate is 0.1 to 0.5 L/min. Purge water will be collected and managed in accordance with Waste Management Plan (WMP; Appendix B, Phase II RFI Work Plan [DuPont, 2010]).

5. Record water levels during pumping. Adjust the pump speed to minimize drawdown to less than 0.3 feet. If the well goes dry, the sample will be collected after recharge. If the well does not recharge sufficiently within 24 hours, no sample will be collected.
6. Begin measurement of field parameters. Field parameters include turbidity, temperature, specific conductance, DO, ORP, and pH and will be measured every three to five minutes. Samples will be collected when the turbidity stabilizes at or below five NTUs and when successive readings are within 10% of each other for three consecutive readings as presented below:

Parameter	Stability Criteria - Micropurge
Turbidity	+/-10% (10 < Turbidity ≤ 50 NTUs)
pH	+/-0.1
Temperature	+/-1 º C
Specific Conductance	+/-3%
ORP	+/-10 millivolts
DO	+/-10% or +/-0.2 milligrams per liter (mg/L) when below 1 mg/L

7. Collect water samples by disconnecting the flow-through cell from the pump and filling the laboratory-supplied sample bottles directly from the pump discharge.
8. Pack samples on wet ice, and ship to the laboratory via laboratory courier. The date and time of sampling, sample identification, container type and volume, analytical method, and name and signature of samplers will be entered on the chain of custody, which will be enclosed in the cooler with the samples.

3.4.3 Quality

The sampling and analysis will be conducted in accordance with the RFI Quality Assurance (QA) Plan (Appendix A, Phase II RFI Work Plan; DuPont, 2010).

3.4.4 Quality Assurance/Quality Control Samples

An equipment rinsate blank will be collected during each sampling event to ensure that equipment decontamination measures during the sampling event were effective in eliminating cross-contamination of samples. One equipment rinsate blank per sampling event is within the recommended one in 20 occurrences for such samples because there are ten wells to be sampled during each event.

A duplicate sample will be collected during each sampling event to provide information on the effects of field sampling and laboratory analytical procedures on the accuracy of the results. One duplicate per sampling event is within the recommended one in 20 occurrences for such samples because there are ten wells to be sampled during each event. The duplicate sample will be analyzed for each parameter analyzed on the corresponding primary sample.

3.4.5 Analytical Data Package and Validation Review

All analytical results will be reported by the laboratory and will include a data package with the following deliverables:

- Chain-of-custody forms
- Analytical results
- QA/QC summaries (matrix spike and duplicate, laboratory control sample and duplicate, replicate, and surrogate recoveries)
- Blank sample results

All analytical data generated will be reviewed by an experienced QA/QC chemist to validate the results, qualify data if necessary, and determine data usability. The data will be stored in the in-house Envista environmental database after undergoing quality checks.

3.4.6 Health and Safety

All field activities will be conducted in accordance with the Health and Safety Plan (Appendix C, Phase II RFI Work Plan; DuPont, 2010).

3.4.7 Waste Management

All generated wastes, including purge water, disposable materials, and personal protective equipment, will be containerized and disposed of in accordance with the WMP (Appendix B, Phase II RFI Work Plan; DuPont, 2010).

This page intentionally left blank

4.0 DATA EVALUATION

The analytical results will be evaluated and compared to a screening level to determine if a new release has occurred that may present a potential threat to human health and the environment.

In the 2004 PCCP, UTLs were proposed to develop the screening levels. However, UTLs are no longer the USEPA recommended method to calculate a compliance limit. Rather, the USEPA 2009 Unified Guidance (USEPA, 2009a) document recommends Upper Prediction Limits (UPLs) as the preferred method for the calculation of compliance limits. For this project, UPLs were calculated using all groundwater data collected to date and it was determined that the data set is not large enough to properly perform the UPL calculations. Therefore, it was decided to conduct a site-specific analysis to determine the appropriate screening levels for the constituents of concern (COCs) at this site.

The Edge Moor Plant site is located at river mile (R.M.) 72.7, within Zone 5 of the Delaware River that extends from R.M. 78.8 to R.M. 48.2 (Delaware River Basin Commission [DRBC], 2008). Zone 5 is not used as a drinking water supply, but may be used for fishing and contact recreation.

Due to the quality of the neutralization and stabilization activities and the placement of an engineered cap over the four surface impoundments, direct contact with soils is eliminated and only the groundwater to surface water exposure pathway is potentially complete (ENVIRON, 2002). Two exposure scenarios have been carried forward for evaluating current or potential future exposure of closed surface impoundments area COCs to human and/or ecological receptors as presented below:

- **Human Health**: Discharge of potentially affected groundwater into the Delaware River, accumulation of potential COCs in fish tissue, subsequent human exposure through fish consumption and through potential contact during recreational activities.
- **Aquatic Life**: Direct exposure of COCs to aquatic organisms due to potential groundwater discharge into the Delaware River.

A review of available surface water screening criteria was performed to determine the appropriate screening criteria. In addition, an analysis of site-specific hydrology, including groundwater/surface water interaction, was developed.

The following steps have been completed to develop site-specific screening criteria:

- Reviewed available surface water quality criteria for the protection of human health and aquatic life
- Estimated Delaware River flow adjacent to the site
- Calculated groundwater discharge from the closed surface impoundments area to the Delaware River
- Calculated Surface Water Protection Factors (SWPFs)
- Calculated screening levels by multiplying each selected water quality criteria by the SWPF
- Selected site-specific screening levels from the most conservative calculated human health and aquatic life values

4.1.1 Review of Available Water Quality Criteria

Parsons reviewed the following documents to identify applicable screening criteria for Zone 5 of the Delaware River, adjacent to the site:

- **DNREC SWQS**: Surface Water Quality Standards (SWQSs) for the State of Delaware (Title 7 Delaware Administrative Code Section 7401, as last amended July 11, 2004; DNREC, 2004b)
- **DRBC SWQS**: SWQS for the Delaware River Basin from the DRBC (18 CFR Part 140 Article 3, as last amended July 16, 2008; DRBC, 2008)
- **USEPA NRWQC**: National Recommended Water Quality Criteria (NRWQC) from the USEPA (2009).

Human Health Screening Criteria

The process to select the screening criteria for the protection of Human Health is comprised of the following two steps:

1. Select the most stringent of the criteria listed in DNREC SWQS or DRBC SWQS. If no value is listed, then
2. Select the criteria listed in USEPA NRWQC.

Table 3 presents available DNREC SWQSs and DRBC SWQSs for protection of human health from ingesting fish impacted by carcinogenic compounds and systemic toxicants. For manganese and pentachlorobenzene, no promulgated SWQS values are available; therefore, the USEPA NRWQC is used. No human health criteria are available for octachlorostyrene in any of the three documents referenced.

Aquatic Life Screening Criteria

The process to select the screening criteria for the protection of Aquatic Life is comprised of the following three steps:

1. Select the most stringent of the criteria listed in DNREC SWQSs or DRBC SWQSs. If no value is listed, then
2. Select the criteria listed in USEPA NRWQC. If no value is listed, then
3. Review other available water quality screening benchmarks.

Table 4 presents the available water quality criteria and benchmarks for protection of aquatic life. DNREC SWQSs and DRBC SWQSs for chronic toxic effects to aquatic life are only available for PCBs and arsenic. Water quality screening benchmark criteria were developed for the remaining constituents using the following approach:

- Benchmark values for antimony, hexachlorobenzene, hexachlorobutadiene, and tetra-chlorodibenzo(p)dioxin (TCDD) equivalents were derived from the USEPA Region 3 Biological Technical Assistance Group (BTAG) freshwater screening benchmarks (USEPA 2006).
- The manganese benchmark is based on a recently-developed criterion adopted by British Columbia, Canada (BCME, 2001) that is dependent on the hardness of the receiving water. The available literature recognizes that manganese toxicity varies with hardness. Therefore this is the best method available to determine appropriate values.

- The thallium benchmark is based on a study that produced the lowest toxicity values to relevant fish species that could occur in the river, and represents a chronic exposure scenario for 30 days (LeBlanc, G.A. and J.W. Dean, 1984).
- The pentachlorobenzene benchmark is a Tier II Secondary Chronic value, as cited in the Oak Ridge National Laboratory Report (Suter and Tsao, 1996).

The USEPA NRWQC and screening benchmarks are guidelines developed using approaches and assumptions that are not necessarily consistent with the methodologies used to derive DNREC or DRBC SWQS. These guideline values are used as references and do not carry the same regulatory significance as the formally promulgated water quality standards adopted by DNREC and DRBC.

No aquatic life toxicity reference values or benchmarks are available for octachlorostyrene in any of the documents referenced.

Table 5 summarizes the lowest selected relevant criterion for protection of human health and for protection of aquatic life. Criteria applicable to specific COCs are discussed further in Section 4.1.5.

4.1.2 Delaware River Flow Adjacent to the Site

Parsons used data from the United States Geological Survey (USGS) Gages to determine flow in the Delaware River. The Trenton Gage on the Delaware River is the closest upstream gage. The Schuylkill River (as measured at the Philadelphia Gage) enters the Delaware River between the Trenton Gage and the site. The flow values from both gage locations are summed to provide a conservative estimate of flow adjacent to the site. There are several other tributaries that enter the Delaware River between the Trenton Gage and the site that are not measured so the actual Delaware River flow adjacent to the site will be higher than that estimated by using the two referenced gages.

DNREC SWQSs (Title 7 Delaware Administrative Code Section 7401; DNREC, 2004b) identify critical flows to be used to develop water-quality-based discharge levels. The Table below displays the appropriate flow to be used with each type of risk category per DNREC SWQSs

Risk Category	Flow Rate Used
Human Health Carcinogens	Harmonic Mean Flow
Human Health Systematic Toxicants	The flow of a 30-day duration with a recurrence interval of five years (generally known as the 30Q5 flow)
Chronic Toxicant Effects on Aquatic Wildlife	The flow of a seven-day duration with recurrence interval of 10 years (generally known as the 7Q10 flow)

Parsons followed DNREC SWQSs, and used the most recent 30-year period of record (1/1/1980 through 12/31/2009) to determine a statistical assessment of various critical low flow conditions of the Delaware River in the vicinity of the site as follows [measured in cubic feet per second (cfs)]:

	Trenton Gage (Gage 01463500)	Philadelphia (Gage 01474500)	Total Flow Adjacent to Site
Harmonic Mean Flow	6,902 cfs	1,373 cfs	8,275 cfs
30Q5 Flow	2,807 cfs	410 cfs	3,217 cfs
7Q10 Flow	--	--	2,500 cfs

The 7Q10 flow, used for evaluating aquatic life chronic toxicity, is specified in the DRBC guidance document (DRBC, 2008) for water quality permitting in Zone 5 of the Delaware River (18 CFR Part 410 Section 4.30.7) as 2,500 cfs.

The flow values summarized above are referred to as the Delaware River Flow ($\mathbf{Q_R}$) which is used in the calculations presented in Section 4.1.4.

4.1.3 Groundwater discharge to the Delaware River

Groundwater discharge from the closed surface impoundments area to the Delaware River, $\mathbf{Q_{GW}}$, is calculated based on Darcy's law, as follows:

$\mathbf{Q_{GW} = k * i * A}$

Where,

k = hydraulic conductivity = 3.5 feet per day (ft/d)

This is based on the slug test result from monitoring well MW-02.

i = average hydraulic gradient = 0.019 foot/foot (ft/ft)

This is based on hydraulic heads between the upgradient wells (MW-10 and MW-9) and the Delaware River water level. To be conservative, the maximum reported head in the upgradient wells, and the mean mid-tide levels in the Delaware River are used in this report. This mean mid-tide level is based on the Delaware River average elevation during a period of 139 hours (almost 6 days). The hydraulic gradient varies from 0.014 ft/ft to 0.024 ft/ft.

A = cross-sectional area of flow = 31,000 square feet

This cross-sectional area is calculated using a length of 1,550 feet along the Delaware River with a 20-foot "aquifer" thickness for the first water-bearing soil zone. However, there is no well defined aquifer zone in this region; only interbedded pockets of clayey sand, sandy clay, or sand were observed. A highly conservative thickness of 20 feet is used based on the maximum length of well screen (MW-2 and MW-3); the actual observed thickness of this interbedded zone ranges from <1.0 foot to 8 feet.

Q_{GW} =3.5 ft/d * 0.019 ft/ft * 31,000 ft^2 = 2.017 cubic feet per day (cft/d, or 0.024 cfs)

4.1.4 Surface Water Protection Factor

In January 2002, ENVIRON International Corporation prepared the *Exposure and Risk Evaluation for Process Ponds* (ENVIRON, 2002). This report concludes that

groundwater is mixed with surface waters of the Delaware River prior to direct exposure to aquatic organisms, chemical uptake by fish, or recreational exposure.

This mixing of groundwater with the surface water introduces the concept of a SWPF, defined as the ratio of the flow of the surface water (Delaware River) to the flow of groundwater discharge from the closed surface impoundments area.

SWPF = Q_R/Q_{GW}

Using the values for Q_R and Q_{GW} listed in Sections 4.1.2 and 4.1.3, respectively:

Risk Category	Q_R	Q_{GW}	SWPF (rounded)
Human Health Carcinogens	8,275 cfs	0.024 cfs	339,300 **$SWPF_{HHC}$**
Human Health Systematic Toxicants	3,217 cfs	0.024 cfs	131,900 **$SWPF_{HHST}$**
Protection of Aquatic Life	2,500 cfs	0.024 cfs	102,500 **$SWPF_{PAL}$**

4.1.5 Selection of Screening Levels

Site-specific screening levels are calculated by multiplying the values from Table 5 by the appropriate SWPF. All values are then compared to each other and then the lowest value for each COC is selected as the site-specific screening level.

To select the site-specific screening level:

1. Multiply the **$SWPF_{HHC}$** by each Human Health Carcinogens Screening Factor for each COC.
2. Multiply the **$SWPF_{HHST}$** by each Human Health Systemic Toxicants Screening Factor for each COC.
3. Multiply the **$SWPF_{PAL}$** by each Protection of Aquatic Life Screening Factor for each COC.

The lowest calculated value for each COC is the selected site-specific screening level to be used for the closed surface impoundments assessment. Table 6 presents the final groundwater screening levels for use in the post-closure groundwater monitoring program.

The Table below summarizes the screening level selected for each COC.

COC	Screening Level (mg/L)
Antimony	3075.00
Arsenic	9681.46
Manganese	13190.00
Thallium	817.78
Hexachlorobenzene	0.095
Hexachlorobutadiene	133.25
Octachlorostyrene	N/A (PQL = .01 will be used)
Total PBCs	0.0152
Pentachlorobenzene	48.175
2,3,7,8-tetrachlorodibenzodoxin equivalent concentrations (Dioxin TEQ)	1.05E-06

For octachlorostyrene, the current analytical practical quantitation limit (PQL) using Method SW 8270C will be used as the groundwater screening level because no criteria, benchmarks, or other relevant toxicity data are currently available. Octachlorostyrene has not been detected in groundwater at the closed surface impoundments area. The current PQL, as of March 2010, is 10 μg/L.

Dioxin TEQ is calculated as the weighted sum of the concentrations of 7 dioxin congeners, 10 furan congeners, and 12 PCB congeners after each concentration is multiplied by a weighting toxic equivalency factor (TEF) specific to that congener.

4.1.6 Confirmation of an Exceedance

Following each semi-annual groundwater sampling event, the groundwater results will be compared to the screening levels.

If an individual COC returns a result above the corresponding screening levels, this finding does not necessarily indicate an issue with the post-closure remedy; this exceedance needs to be first confirmed. Confirmation will vary depending on the parameter as presented in Figure 3.

If the parameter is a total metal, then the laboratory will be requested to analyze the filtered sample to determine the dissolved concentration. If the dissolved metal concentration also exceeds the screening level, then re-sampling will be conducted to collect a confirmatory sample that will be analyzed for that particular metal parameter.

In the case of a measured SVOC or Total PCBs, or calculated Dioxin TEQ exceedance, the confirmation will consist of first filtering the replicate held in laboratory custody. The laboratory will then analyze the sample for the project list of parameters to determine whether the COC is bound to particulates, or if it is present in the dissolved form. The filtered sample results will be compared to the screening levels as described above. If the filtered-sample result also exceeds the respective screening levels, a re-sampling will be conducted to provide a second level of confirmation prior to any further action.

Results from re-sampling a specific well for confirmatory sampling (unfiltered and filtered) will be compared to the screening levels again for the particular parameter(s) in question.

- If the re-sampled result does not exceed the screening levels, then the initial result will be considered as a false positive.
- If the re-sampled result returns an exceedance from both the unfiltered and filtered sample analysis, then other physical and hydrogeological conditions will be reviewed.

Concentration changes could result from many factors, including on-site migration from an upgradient source or changing aquifer geochemistry (e.g., pH, ORP, and DO, or tidal influences). Therefore, the response to any confirmed exceedance will be determined on a case-by-case basis.

5.0 POST-CLOSURE MAINTENANCE ACTIVITIES

This section describes the planned activities to maintain the integrity of the ponds' containment system and the function of the monitoring and security systems.

DuPont covered each surface impoundment individually with a final cover capping system consisting of a geomembrane, drainage layer, cover soil layer, and final topsoil/vegetative cover. The geomembrane consisted of high-density polyethylene that was placed directly on the neutralized/stabilized solids. No sharp debris was present on or in the surface impoundment area that could have damaged the integrity of the geomembrane during installation. QC measures included procedures to remove such objects should they be found after grading the material. In addition, polyethylene geomembrane and treated impoundment solid material are chemically compatible.

5.1 Quarterly Inspections

The capping system surface, the drainage conveyance, and other areas of the site will be inspected quarterly. Due to the homogenous nature of the treated solid material and the amount of cement added to each surface impoundment, very little differential settling is anticipated. Subsidence of the underlying silt and clay unit should also be minimal due to the length of time (over ten years) it has had to consolidate under the solid load. Any disturbance to the final cover (or other components of the capping system) will be repaired. The groundwater monitoring wells will be inspected during each routine sampling event (scheduled semiannually) and during the quarterly inspection of the capping system. Access to the closed surface impoundments is limited to authorized personnel, and a security system is in place (electronic surveillance system and security fencing maintained by the plant).

5.2 Maintenance of the Waste Containment System

A properly installed capping system, such as at the Edge Moor closed surface impoundments, will require minimum maintenance. The proper grade on the slopes of the capping system, coupled with an efficient drainage layer, promotes good drainage and minimizes long-term erosion. Maintaining the surficial vegetative cover and surface-water runoff conveyances are the predominant maintenance tasks.

Routine and as-needed maintenance operations will be conducted to ensure the function of the containment system. The vegetative cover can be maintained through common horticultural practices. Plantings of fescue or rye grasses require periodic mowing to flourish. Plantings of warm and cold season grasses (similar to Cells 1, 2, and 3 of the DuPont Hay Road Landfill) are self-propagating without mowing and provide habitat for a variety of bird and mammal species.

Drainage conveyances such as culvert pipes, riprap-lined swales, or grass-lined swales also require periodic maintenance. This maintenance effort is typically more intense in the first two years after initial installation of the capping system, until the vegetation becomes established and sustained. The grading design for the four caps prevents run-on from impacting the final covers. The final cover at each impoundment is protected from significant erosion via run-off by the vegetative/top soil layer. Drainage from each capped impoundment is collected in a retention pond and then exits the DuPont property at a storm-water outfall.

Any damage (e.g., loss) of the vegetation or topsoil will be identified during the quarterly inspection and will be repaired and/or replaced. This includes any reseeding and mulching over eroded areas that may occur. Any damage that may occur due to severe storms or non-regular events will be corrected as needed. The damages and needed repair will be assessed and corrective measures implemented within a reasonable timeframe to prevent further vulnerability of the containment system. The DNREC Solid and Hazardous Waste Management Branch (SHWMB) will be notified should DuPont discover any site damages incurred during storms or other events.

5.3 Maintenance of the Monitoring System

The monitoring system includes groundwater monitoring wells with protective steel covers that require little routine maintenance. The physical condition of the wells inspected during scheduled sampling events. The ability of the wells to provide valid groundwater samples will be determined during purging and water-level measurements. Wells may require redevelopment by surging, pumping, or bailing. These or other techniques to re-open well screens will be used as determined necessary by inspection of the wells. Wells that do not respond to redevelopment or become unusable will be replaced with new monitoring wells.

5.4 Maintenance of the Security System

The operating Edge Moor Plant will be responsible for area security. The entire facility is surrounded by a fence (except on the Delaware River side), and plant guards control access to the facility 24 hours a day, 365 days per year. Employees must show identification to obtain access; visitors must sign in and out and wear a visitor badge at all times. A security system will prevent unauthorized access to the areas around the closed surface impoundments. All maintenance of the site security systems will be conducted by DuPont Edge Moor facility personnel.

6.0 REPORTING

Groundwater samples will be collected from monitoring wells on a semiannual basis, generally in March and September of each year. A semiannual data report will be generated following the first half of the year sampling period using the in-house environmental database. This data report will be provided electronically to the DNREC. An annual report will be prepared and submitted to the DNREC following the second half of the year sampling period and will include both hard-copy and electronic data. This report will include a detailed summary of all post-closure maintenance and monitoring activities conducted during the year, a summary of the data analyses, and any conclusions and recommendations derived from the data analysis.

Groundwater sampling and report submission will be in accordance with the schedule summarized below:

Sampling Event	Sampling Schedule	Report Format	Date Due to DNREC
1st Half of Year	February to April	Electronic Data Deliverable Only	August 1
2nd Half of Year	August to October	Electronic Data Deliverable and Annual Report	March 1 of following year

This page intentionally left blank

7.0 REFERENCES

British Columbia Ministry of Environment. 2001. Ambient Water Quality Guidelines for Manganese. January 2001. Available online at http://www.env.gov.bc.ca/wat/wq/BCguidelines/manganese/manganese.html

DNREC. September 23, 2004a. Letter to DuPont: Approval of DuPont Edge Moor Closure Certification Report for Four Surface Impoundments.

_____. 2004b. *State of Delaware Surface Water Quality Standards.* As amended July 11, 2004. Title 7 Delaware Administrative Code Section 7401

_____. 1995. Procedure for Sampling Ground Water from Monitoring Wells.

DRBC. (As amended) July 16, 2008. *Water Quality Standards for the Delaware River Basin.*18 CFR Part 410 Article 3.

DuPont. 2002. Documentation of Neutralization and Stabilization Construction Activities for Four Surface Impoundments.

_____. 2004a. Closure Certification Report for Four Surface Impoundments.

_____. 2004b. Post Closure Care Plan for Four Surface Impoundments.

_____. 2005. Hydrogeological Evaluation Report.

_____. July 20 2006a. Letter report to DNREC re: "Baseline Groundwater Compliance Limits".

_____. 2006b. Baseline report

_____. 2006c. Phase I Corrective Action RFI Work Plan.

_____. 2009. Phase I RFI Data Summary Report.

_____. March 2010. Phase II RFI Work Plan.

ENVIRON International Corporation. January 2002. Exposure and Risk Evaluation for Process Ponds.

_____. 2007. Report (page 11)

Gibbons, Robert D. 1994. *Statistical Methods for Groundwater Monitoring*.

LeBlanc G.A. and Dean J.W. 1984. *Antimony and thallium toxicity to embryos and larvae of fathead minnows (Pimephales promelas)*. Bull. Environ. Contam. Toxicol. 32: 565-570.

Suter, G.W, II, and C.L. Tsao. 1996. *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision.* Oak Ridge National Laboratory, ES/ER/TM-96/R2, Oak Ridge National Laboratory, Oak Ridge, TN.

USEPA. 1992. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, DRAFT Addendum to Interim Final Guidance.

_____. 1996. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells.

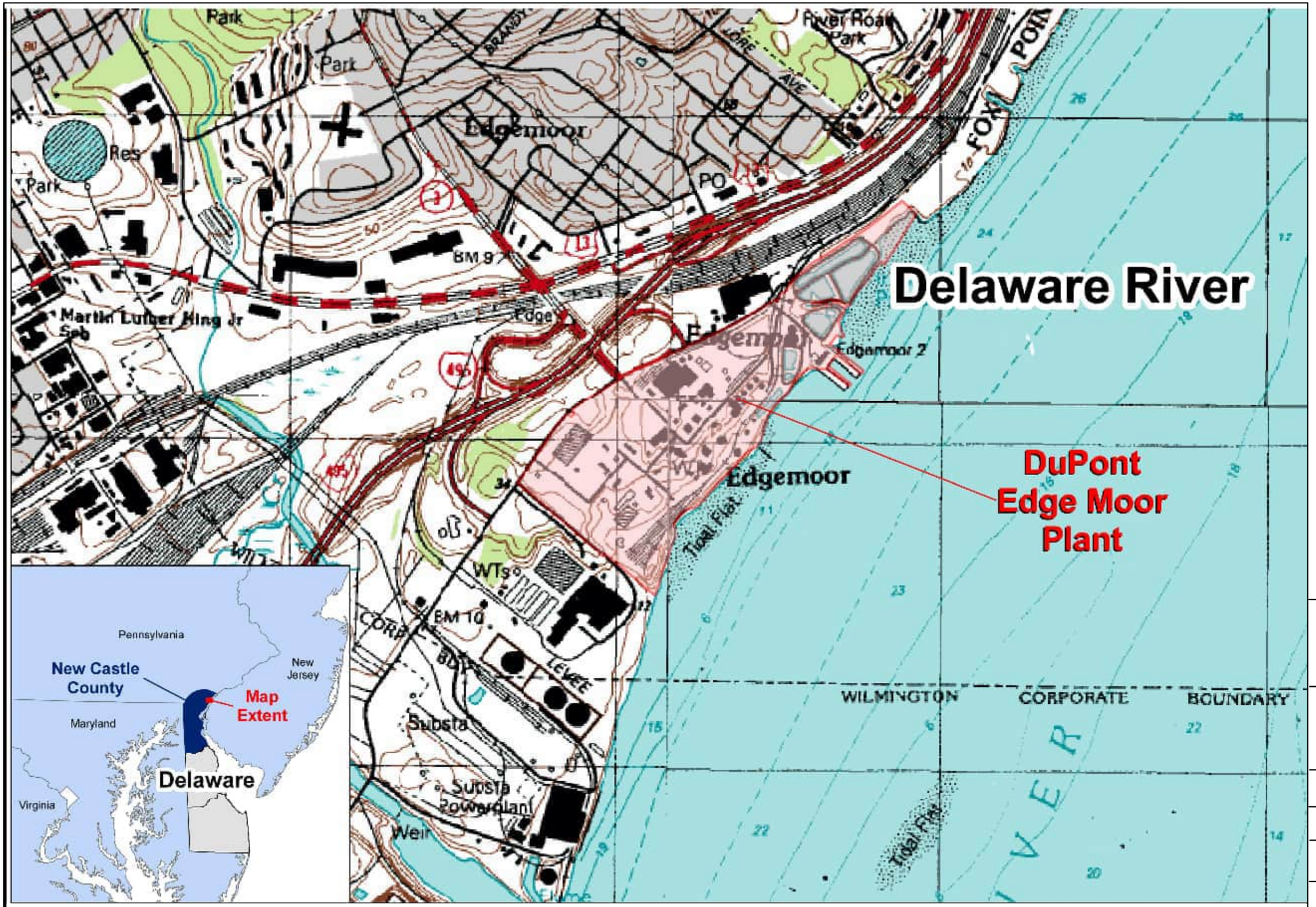
_____. 2006. Region III Biological Technical Advisory Group Freshwater Screening Benchmarks. July 2006. Available online at http://www.epa.gov/reg3hscd/risk/eco/btag/sbv/fw/screenbench.html

USEPA. 2009a. Statistical Analysis of groundwater monitoring data at RCRA facilities. Unified Guidance. EPA 530-R-09-007.

_____. 2009b. National Recommended Water Quality Criteria. Office of Water and Office of Science and Technology. Available online at http://www.epa.gov/ost/criteria/wqctable.html

USGS. National Water Information System. Available online at http://nwis.waterdata.usgs.gov/nwis/sw

FIGURES



Notes:

Image is a compilation of USGS topographic 7.5 minute series, quadrangles (Wilmington South, Wilmington North, Marcus Hook, Penns Grove), dated 1983.

Scale:
1 inch = 1000 feet

N
W
E
S

PARSONS
1601 Market Street
Suite 900
Philadelphia, PA 19103

Site Location

Edge Moor Closed Surface Impoundments
Post-Closure Care Plan
Edgemoor, Delaware

Created:	DuPont Project Number:
D. Vitek	7359
Date: 3/2/10	Parsons Project Number:
Rev. Number:	Figure Number: 1

File Name:
P:\GIS\EdgeMoor\MXD\Fig 01 Location Map.mxd



Legend

- Closed Ponds
- Monitoring Well Locations
- Surface Water Location

Notes:
Base photo source:
2007 Orthophoto (Delaware DataMIL)

N
W E
S

0 125 250 500
Feet

PARSONS
1601 Market Street
Suite 900
Philadelphia, PA 19103

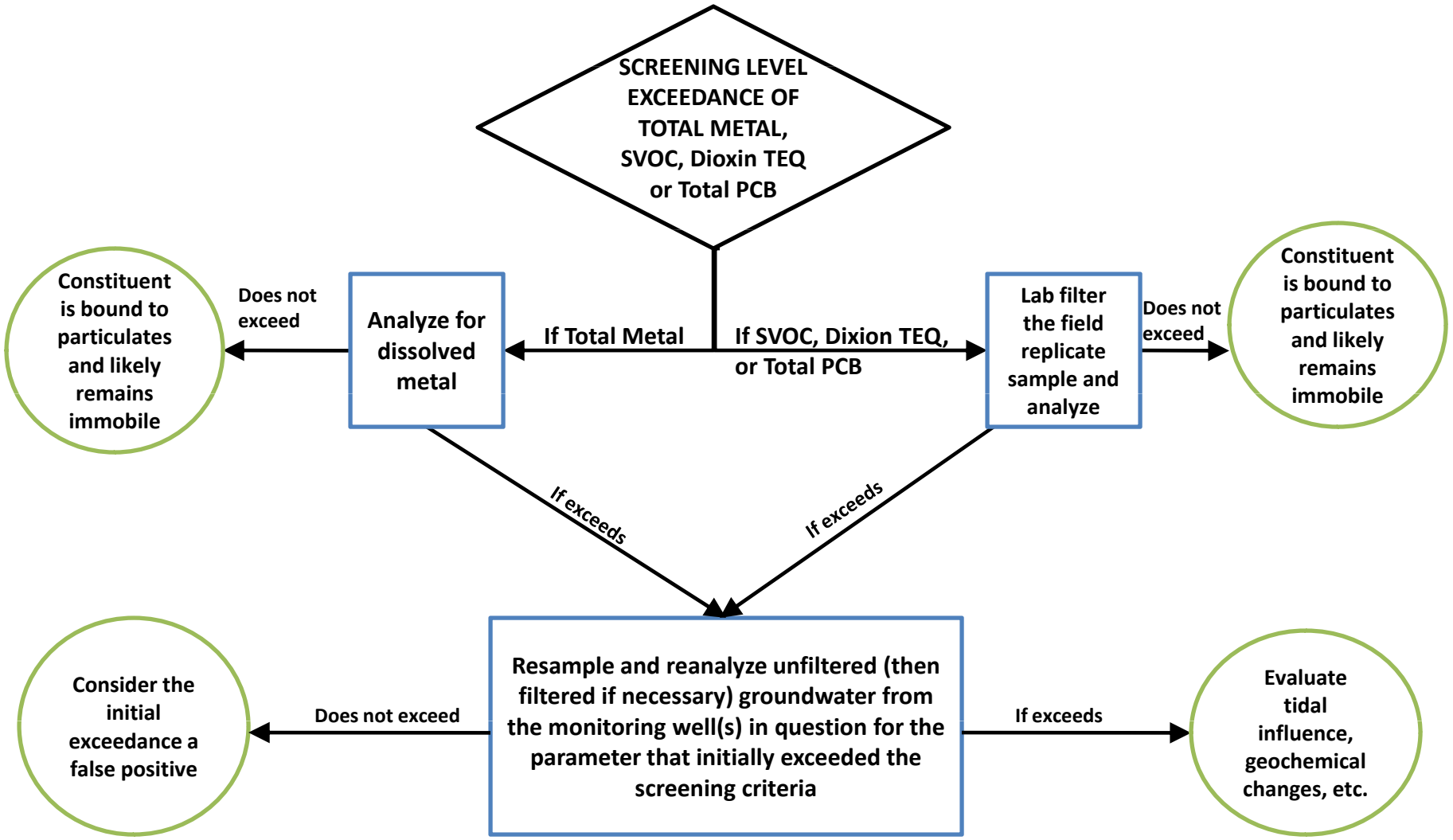
Closed Surface Impoundments Monitoring Area

Edge Moor Closed Surface Impoundments
Post-Closure Care Plan
Edgemoor, Delaware

Created: D. Vitek	DuPont Project Number: 7359
Date: 3/2/10	Parsons Project Number:
Rev. Number:	Figure Number: 2

File Name:
P:\GIS\EdgeMoor\MXD\Fig 02 Closed Surface Imps.mxd

Figure 3
Screening Level Exceedance Action Matrix
Post-Closure Care Plan – Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware



TABLES

Table 1
Revised Sampling and Analysis Program
Post-Closure Care Plan – Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Well	DNREC Permit Number	Depth (ft bgs)	Screen Interval (ft bgs)	Pump/Tubing Inlet Depth (ft bgs)	Semiannual Sampling and Analysis	Annual Sampling and Analysis
MW-1	204848	41.5	31.5 - 41.5	36.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-2	205018	63.5	43.5 - 63.5	53.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-3	205019	63.5	43.5 - 63.5	53.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-4	205020	72	57 - 72	64.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-5	205021	74	59 - 74	66.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-6	202022	79	64 - 79	71.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-7	205023	85	75 - 85	80	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-8	--	85	70 - 85	77.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-9	205025	62	52 - 62	57	metals[1], sem-ivolatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]
MW-10	205026	51	36 - 51	43.5	metals[1], semi-volatile organic compounds (SVOCs)[2]	PCBs[3], dioxins, and furans[4]

[1] total and dissolved antimony, arsenic, manganese, thallium (EPA method 6020)
[2] hexachlorobenzene, hexachlorobutadiene, octochlorostyrene, pentachlorobenzene (EPA method 8270C)
[3] polychlorinated biphenyls (EPA method 1668)
[4] polychlorinated dibenzo(p) dioxins and furans (EPA method 1613)
bgs = below ground surface
-- = permit # not available

Table 2
Sample Container, Preservation, and Holding Time Requirements
Post-Closure Care Plan – Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Parameters	Media	Container and Volume	Preservative	Maximum Holding Time
8270C	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	7 days from collection for extraction, 40 days for analysis
1613	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	1 year from collection for extraction, analyze within 1 year of extraction
1668	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	1 year from collection for extraction, analyze within 1 year of extraction
6020	Water	1 L polyethylene (minimum 500 ml)	Cool to 4°C ± 2°C, pH<2 with HNO3	6 months from collection

Note: Samples collected for multiple parameters may be collected into a larger size sample container provided container type and preservation requirements are the same.

Table 3
Human Health Protection Screening Level Selection
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

	Delaware Surface Water Quality Standards (DNREC 2004b)		Delaware River Basin Commission (DRBC 2008)		National Recommended Water Quality Criteria (USEPA 2009b)	Lowest Relevant Criterion For Protection of Human Health (1)	
	Fish Ingestion		Freshwater Fish Ingestion				
Contaminant Of Concern (µg/L)	Systemic Toxicants	Human Carcinogens	Systemic Toxicants	Human Carcinogens	Human Health for the Consumption of Organism Only	Systemic Toxicants	Human Carcinogens
Metals (2)							
Antimony	1,600	N/A	4,310	N/A	640	1600	N/A
Arsenic (III)	N/A	N/A	73.4	N/A	0.14	73.4	N/A
Manganese	N/A	N/A	N/A	N/A	100 (3)	100 (3)	N/A
Thallium	18	N/A	6.2	N/A	0.47	6.2	N/A
Organic Compounds							
Hexachlorobenzene	0.36	0.00028	0.991	0.000775	0.00029	0.36	0.00028
Hexachlorobutadiene	2,900	18	7,750	49.7	18	2,900	18
Octachlorostyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total PCBs	N/A	0.000064	0.00849	0.0000448	0.000064	0.00849	0.0000448
Pentachlorobenzene	N/A	N/A	N/A	N/A	1.5	1.5	N/A
Dioxin TEQ	N/A	5.10E-09	N/A	1.4E-08	5.10E-09	N/A	5.1E-09

(1) Lower of State of Delaware (2004b) or DRBC (2008) values, when available; otherwise, USEPA (2009b) criteria are adopted.
(2) State of Delaware and USEPA criteria for metals are based on dissolved concentration; DRBC values apply to total concentration.
(3) Manganese criterion from USEPA 2009b references Quality Criteria for Water from 1986 and 1976 which are based on consumption of marine mollusks.
N/A: Criterion not available

Table 4
Freshwater Aquatic Life Protection Screening Level Selection
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Contaminant of Concern (µg/L)	Delaware Surface Water Quality Standards (DNREC 2004b)	Delaware River Basin Commission (DRBC 2008)	National Recommended Water Quality Criteria (USEPA 2009b)	Other Screening Benchmarks	Lowest Relevant Criterion for Protection of Aquatic Life [1]
Metals [2]					
Antimony	N/A	N/A	N/A	30	30
Arsenic (III)	150	190	150	--	150
Manganese	N/A	N/A	N/A	1150[3]	1,150
Thallium	N/A	N/A	N/A	40[4]	40
Organic Compounds					
Hexachlorobenzene	N/A	N/A	N/A	0.0003[5]	0.0003
Hexachlorobutadiene	N/A	N/A	N/A	1.3[5]	1.3
Octachlorostyrene	N/A	N/A	N/A	N/A	N/A
Total PCBs	0.014	0.014	0.014	--	0.014
Pentachlorobenzene	N/A	N/A	N/A	0.47[6]	0.47
Dioxin TEQ	N/A	N/A	N/A	3.1E-09[5]	3.10E-09

(1) Lower of DNREC (2004b) or DRBC (2008) values, when available; otherwise, USEPA BTAG freshwater screening benchmarks (USEPA, 2006) is adopted with the exception of manganese, pentachlorobenzene and thallium.
(2) DNREC and USEPA criteria for metals are based on dissolved concentration; DRBC values apply to total concentration.
(3) Manganese criterion based on British Columbia chronic guideline at a hardness of 124 mg/L as $CaCO_3$ (BCME, 2001)
(4) 30-day chronic fathead minnow LOEC for thallium (Le Blanc, G. A. and J. W. Dean 1984).
(5) Bioaccumulative reference value
(6) Tier II Secondary chronic value (Suter and Tsao, 1996)
N/A: Criterion not available

Table 5
Selected Criteria and Benchmarks for Protection of Human Health and Aquatic Life
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Contaminant Of Concern (µg/L)	Protection of Human Health		Protection of Aquatic Life
	Systemic Toxicants	Human Carcinogens	
Metals			
Antimony	1600	N/A	30
Arsenic	73.4	N/A	150
Manganese	100	N/A	1150
Thallium	6.2	N/A	40
Organic Compounds			
Hexachlorobenzene	0.36	0.00028	0.0003(1)
Hexachlorobutadiene	2900	18	1.3
Octachlorostyrene	N/A	N/A	N/A
Total PCBs	0.00849	0.0000448	0.014
Pentachlorobenzene	1.5	N/A	0.47
Dioxin TEQ	N/A	5.10E-09	3.10E-09(1)

(1) bioaccumulative reference value

Table 6
Final Selected Groundwater Screening Levels
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

	Protection of Human Health		Protection of Aquatic Life	Selected Screening Level
	Systemic Toxicants	Human Carcinogens		
Relevant Flow	**8,275 cfs (harmonic mean)**	**3,217 cfs (30Q5 flow)**	**2,500 cfs (7Q10 flow)**	
Surface Water Protection Factor	**131900**	**339300**	**102500**	
Contaminant of Concern (mg/L)				
Metals				
Antimony	211040.00	N/A	3075.00	**3075.00**
Arsenic	9681.46	N/A	15375.00	**9681.46**
Manganese	13190.00	N/A	117875.00	**13190.00**
Thallium	817.78	N/A	4100.00	**817.78**
Organic Compounds				
Hexachlorobenzene	47.484	0.095	0.1018	**0.095**
Hexachlorobutadiene	382510.00	6107.40	133.25	**133.25**
Octachlorostyrene	N/A	N/A	N/A	**0.01**[(1)]
Total PCBs	1.12	0.0152	1.435	**0.0152**
Pentachlorobenzene	197.85	N/A	48.175	**48.175**
Dioxin TEQ	N/A	1.73E-06	1.05E-06	**1.05E-06**

(1) This is the most typical current PQL for Octachlorostyrene per USEPA Method SW 8270
N/A: Not Available

APPENDIX A

GROUNDWATER CONCENTRATIONS FROM BASELINE GROUNDWATER COMPLIANCE LIMITS LETTER JULY 20, 2006

Groundwater Concentrations: MW-1
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	6/05[1]		7/05[1]		08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)														
1,2,3,4,6,7,8-HPCDD	**3.48 J**	---	**2.58 J**	---	**10.4 J**	**36.3**	**4.48 J**	ND (3.97)	**53.6**	**9.30 J**	**10.4 J**	**6.07 J**	**10.1 J**	ND (3.2)
1,2,3,4,7,8-HXCDD	ND (1.68)	---	ND (1.57)	---	ND (1.13)	ND (0.682)	ND (2.1)	ND (1.48)	ND (1.25)	ND (2.35)	ND (1.31)	ND (1.38)	ND (0.311)	ND (1.85)
1,2,3,6,7,8-HXCDD	ND (1.71)	---	ND (1.51)	---	ND (1.16)	ND (1.8)	ND (2.18)	ND (1.42)	2.72 J	ND (2.5)	ND (1.42)	ND (1.46)	**0.411 J**	ND (1.94)
1,2,3,7,8,9-HXCDD	ND (1.7)	---	ND (1.45)	---	ND (1.13)	ND (1.89)	ND (2.02)	ND (1.37)	ND (1.21)	ND (2.35)	ND (1.33)	ND (1.37)	ND (0.53)	ND (1.91)
1,2,3,7,8-PECDD	ND (1.73)	---	ND (0.747)	---	ND (1.11)	ND (0.599)	ND (1.25)	ND (0.858)	ND (1.27)	ND (1.46)	ND (2.86)	ND (0.836)	ND (0.231)	ND (1.7)
2,3,7,8-TCDD	ND (1.14)	---	ND (0.829)	---	ND (0.79)	ND (0.437)	ND (1.01)	ND (0.788)	ND (0.817)	ND (0.728)	ND (1.86)	ND (0.432)	ND (0.264)	ND (1.74)
OCDD	136 B	---	**64.1**	---	**438**	1850 B	**167**	**131**	693 B	375 B	580 B	**334**	529 B	**37.8 J**
TOTAL HPCDD	**7.93**	---	**2.58**	---	**24.2**	**90.8**	**10.9**	ND (8.25)	**106**	**21.2**	**26.4**	**14.2**	**24.7**	ND (3.2)
TOTAL HXCDD	**2.66**	---	**1.84**	---	**8.27**	**37.2**	**3.94**	**3.76**	**17.1**	**5.66**	**9.68**	**4.77**	**12.9**	ND (1.9)
TOTAL PECDD	ND (1.73)	---	ND (0.747)	---	ND (1.11)	3.93	ND (1.25)	ND (0.858)	ND (1.27)	ND (1.46)	ND (1.29)	ND (0.836)	**0.723**	ND (1.7)
Total TCDD	ND (1.14)	---	ND (0.829)	---	ND (0.79)	4.54	ND (1.01)	ND (0.788)	ND (0.817)	ND (0.728)	ND (1.86)	**0.542**	0.54 B	ND (1.74)
Furans (pg/L)														
1,2,3,4,6,7,8-HPCDF	ND (1.08)	---	ND (0.776)	---	ND (0.443)	ND (0.383)	ND (0.957)	ND (0.847)	**9.21 J**	ND (1.1)	ND (1.52)	ND (0.915)	ND (0.185)	ND (1.65)
1,2,3,4,7,8,9-HPCDF	ND (1.03)	---	ND (0.957)	---	ND (0.651)	ND (0.405)	ND (1.1)	ND (1)	ND (1.44)	ND (1.01)	ND (1.46)	ND (0.437)	ND (0.187)	ND (1.67)
1,2,3,4,7,8-HXCDF	ND (0.729)	---	ND (0.411)	---	ND (0.352)	ND (0.382)	ND (0.629)	ND (0.577)	ND (0.447)	ND (0.506)	ND (0.5)	ND (0.359)	ND (0.145)	ND (1.2)
1,2,3,6,7,8-HXCDF	ND (0.708)	---	ND (0.4)	---	ND (0.358)	ND (0.377)	ND (0.571)	ND (0.54)	ND (0.449)	ND (0.53)	ND (0.5)	ND (0.344)	ND (0.135)	ND (1.03)
1,2,3,7,8,9-HXCDF	ND (0.702)	---	ND (0.81)	---	ND (0.563)	ND (0.587)	ND (1.08)	ND (0.901)	ND (0.914)	ND (0.819)	ND (0.849)	ND (0.585)	ND (0.199)	ND (1.62)
1,2,3,7,8-PECDF	ND (3.48)	---	ND (1.24)	---	ND (1.27)	ND (0.521)	ND (1.35)	ND (1.38)	ND (1.19)	ND (1.11)	ND (1.88)	ND (0.52)	ND (0.223)	ND (1.07)
2,3,4,6,7,8-HXCDF	ND (0.483)	---	ND (0.462)	---	ND (0.369)	ND (0.423)	ND (0.637)	ND (0.566)	ND (0.538)	ND (0.547)	ND (0.534)	ND (0.38)	ND (0.142)	ND (1.28)
2,3,4,7,8-PECDF	ND (2.9)	---	ND (1.05)	---	ND (0.971)	ND (0.435)	ND (1.1)	ND (1.12)	ND (1.2)	ND (0.989)	ND (1.58)	ND (0.46)	ND (0.21)	ND (1.01)
2,3,7,8-TCDF	ND (1.4)	---	ND (1.53)	---	ND (0.532)	ND (0.308)	ND (1.01)	ND (0.883)	ND (0.755)	ND (0.673)	ND (1.31)	ND (0.45)	ND (0.279)	ND (2.1)
OCDF	ND (7.32)	---	ND (1.36)	---	ND (3.22)	3.39 B	ND (2.68)	ND (2.98)	**37.6 J**	ND (3.03)	**5.89 J**	ND (2.02)	1.22 B	ND (3.62)
TOTAL HPCDF	ND (1.18)	---	ND (0.855)	---	ND (0.537)	ND (0.392)	ND (1.02)	ND (0.915)	**39.8**	ND (1.06)	ND (1.49)	ND (0.978)	ND (0.186)	ND (1.66)
TOTAL HXCDF	ND (0.835)	---	ND (0.501)	---	ND (0.402)	ND (0.436)	ND (0.699)	ND (0.632)	**11.7**	ND (0.592)	ND (0.586)	ND (0.406)	ND (0.155)	ND (1.28)
TOTAL PECDF	ND (3.17)	---	ND (1.14)	---	ND (1.11)	ND (0.476)	ND (1.22)	ND (1.24)	ND (1.23)	ND (1.05)	ND (1.73)	ND (0.489)	ND (0.216)	ND (1.04)
Total TCDF	**11.1**	---	ND (1.53)	---	ND (0.532)	ND (0.308)	ND (1.01)	ND (0.883)	ND (0.755)	ND (0.673)	ND (1.31)	ND (0.45)	ND (0.279)	ND (2.1)
Metals (ug/L)														
ANTIMONY	ND (6.4)	ND (6.4)	<6.4 J	<6.4 J	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	<9.3 J	<9.3 J	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---	---
MANGANESE	**6300**	**6850**	**15200**	**18200**	**9890**	**8060**	**6770**	**5470**	**9360**	**12500**	**17400**	**11800**	**7390**	**9120**
THALLIUM	ND (10)	ND (10)	**37.6 J**	**29.7 J**	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)														
PCB 77	ND (49)	---	**7.97 J**	---	3.05 B	2.83 B	ND (2.33)	6.59 B	ND (3.18)	ND (2.49)	ND (5.76)	**38.1**	ND (3.09)	ND (9.81)
PCB 81	ND (49)	---	ND (3.01)	---	ND (1.59)	ND (1.18)	ND (1.57)	ND (3.79)	ND (3.2)	ND (2.33)	ND (5.93)	ND (3.56)	ND (3.79)	ND (9.43)
PCB 105	ND (49)	---	**12.5 J**	---	ND (10.5)	ND (8.51)	ND (4.88)	ND (11.1)	ND (12.6)	ND (10.9)	ND (12.6)	**63.2**	ND (6.21)	ND (13.7)
PCB-106/118	**64.5**	---	**17.8 J**	---	ND (14.7)	ND (11.9)	ND (8.05)	15.2 J	ND (16.8)	ND (9.54)	ND (19.6)	124 B	ND (5.81)	ND (11)
PCB 114	ND (49)	---	ND (7.1)	---	ND (12.3)	ND (9.57)	ND (5.43)	ND (12.1)	ND (13.7)	ND (12.9)	ND (14.1)	ND (8.35)	ND (6.25)	ND (15.5)
PCB 123	ND (49)	---	ND (6.68)	---	ND (13.8)	ND (11.3)	ND (7.79)	ND (9.73)	ND (18)	ND (10.2)	ND (18.9)	ND (17.4)	ND (6.46)	ND (11.7)
PCB 126	ND (49)	---	ND (7.73)	---	ND (13)	ND (9.69)	ND (5.69)	ND (15.3)	ND (15.7)	ND (14.1)	ND (14.5)	ND (7.21)	ND (8.78)	ND (16.6)
PCB 156	ND (49)	---	ND (1.41)	---	ND (1.86)	ND (2.68)	ND (2.5)	ND (5.19)	ND (3.19)	ND (3.04)	ND (5.79)	ND (26.5)J	ND (3.71)	ND (9.63)
PCB 157	ND (49)	---	ND (1.41)	---	ND (1.94)	ND (2.88)	ND (2.63)	ND (5.57)	ND (3.25)	ND (3.1)	ND (6.42)	ND (2.83)	ND (3.65)	ND (10.6)
PCB 167	ND (49)	---	ND (1.55)	---	ND (1.89)	ND (2.76)	ND (2.65)	ND (5.36)	ND (3.18)	ND (2.89)	ND (6.03)	ND (26.5)J	ND (3.38)	ND (10.4)
PCB 169	ND (49)	---	4.1 B	---	3.64 B	ND (6.76)	**3.6 J**	ND (7.91)	ND (25.4)J	ND (3.73)	ND (7.1)	ND (7.32)	4.66 BJ	ND (11.6)
PCB 189	ND (49)	---	ND (0.994)	---	ND (1.38)	ND (1.4)	ND (0.986)	ND (3.52)	ND (1.43)	ND (1.86)	ND (2.7)	ND (1.57)	ND (1.63)	ND (3.67)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	ND (49)	---	ND (50.8)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	ND (26.5)	ND (51)	ND (51.6)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (50.8)	---	ND (50.6)	ND (50.3)	ND (50.5)	ND (50.4)	ND (50.8)	ND (49)	ND (48.2)	ND (53)	ND (102)	ND (103)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (50.8)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	ND (26.5)	ND (51)	ND (51.6)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (50.8)B	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	**38.5**	4.66 B	ND (51.6)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (25.4)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	ND (26.5)	ND (51)	ND (51.6)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (50.8)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	**222**	ND (26.5)	ND (51)	ND (51.6)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (49)	---	ND (50.8)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	**66.3**	ND (26.5)	ND (51)	ND (51.6)
TOTAL PCB (CONGENERS)	7320 B	---	1170 B	---	6.69 B	2.83 B	3.60 B	21.8 B	**32.5**	ND (49)	**289**	7630 B	4.66 B	ND (103)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	**588**	---	ND (50.8)	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	1040	ND (51)	ND (51.6)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**4320**	---	**791**	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	ND (25.4)	ND (24.5)	ND (24.1)	4670 B	ND (51)	ND (51.6)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**2410**	---	343 B	---	ND (25.3)	ND (25.2)	ND (25.2)	ND (25.2)	**27.2**	ND (24.5)	ND (24.1)	1880 B	ND (51)	ND (51.6)
SVOCs (ug/L)														
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (2)J	ND (2)	ND (2)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results

(2): PCB 209

B: Blank Contamination

J: Estimated Concentration

ND: Not Detected

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-2
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	**6.88 J**	**4.56 J**	**10.2 J**	**16.0 J**	**7.73 J**	**12.5 J**	**80.5**	**42.3**	**24.9**	**12 J**	**9.62 J**	ND (2.6)
1,2,3,4,7,8-HXCDD	ND (2.33)	ND (1.64)	ND (2.88)	ND (0.931)	ND (3.11)	ND (1.47)	ND (1.2)	ND (2.57)	ND (1.65)	ND (1.71)	ND (0.241)	ND (1.42)
1,2,3,6,7,8-HXCDD	ND (2.34)	ND (1.48)	ND (2.77)	ND (0.882)	ND (3.21)	ND (1.45)	**2.64 J**	ND (2.67)	ND (1.71)	ND (1.74)	ND (0.253)	ND (1.48)
1,2,3,7,8,9-HXCDD	ND (2.34)	ND (1.46)	ND (2.77)	ND (0.854)	ND (2.99)	ND (1.38)	**3.13 J**	ND (2.54)	ND (1.63)	ND (1.67)	**0.502 J**	ND (1.47)
1,2,3,7,8-PECDD	ND (0.82)	ND (0.998)	ND (1.33)	ND (0.65)	ND (1.99)	ND (0.945)	ND (1.07)	ND (1.21)	ND (2.65)	ND (0.564)	ND (0.219)	ND (1.51)
OCDD	141 B	**65**	**188**	289 B	**136**	**268**	1180 B	788 B	519 B	**271**	200 B	ND (4.08)
2,3,7,8-TCDD	ND (0.996)	ND (0.748)	ND (0.841)	ND (0.756)	ND (1.45)	ND (0.649)	ND (0.862)	ND (0.996)	ND (1.89)	ND (0.462)	ND (0.199)	ND (1.63)
Total TCDD	**2.37**	ND (0.748)	ND (1.53)	ND (2.74)	ND (1.45)	**2.20**	**11.2**	**7.61**	**3.61**	**3.53**	2.24 B	ND (1.63)
TOTAL PECDD	**1.29**	ND (0.998)	ND (1.33)	**2.34**	ND (1.99)	**2.02**	**15.6**	**9.54**	ND (3.66)	**1.96**	**2.13**	ND (1.51)
TOTAL HXCDD	**4.54**	**2.59**	**6.65**	**14.8**	**4.86**	**8.57**	**60.1**	**41.1**	**20.5**	**10.5**	**10.9**	ND (1.46)
Furans (pg/L)												
Total TCDF	**5.53**	ND (0.786)	ND (0.628)	ND (0.543)	ND (0.895)	ND (0.701)	ND (0.851)	ND (0.673)	ND (1.4)	ND (0.569)	ND (0.265)	ND (1.89)
OCDF	ND (6.26)	ND (1.95)	ND (2.51)	1.81 B	ND (3.1)	**1.40 J**	**22.2 J**	**9.80 J**	**5.10 J**	ND (2.61)	1.10 B	ND (3.83)
1,2,3,4,6,7,8-HPCDF	ND (1.41)	ND (0.751)	ND (0.355)	**0.961 J**	ND (1.14)	<0.618	**5.30 J**	ND (0.868)	ND (1.38)	ND (1.19)	ND (0.171)	ND (1.28)
1,2,3,4,7,8,9-HPCDF	ND (0.763)	ND (0.955)	ND (0.513)	ND (0.349)	ND (1.3)	ND (0.685)	ND (0.919)	ND (0.851)	ND (1.46)	ND (0.6)	ND (0.175)	ND (1.25)
1,2,3,4,7,8-HXCDF	ND (0.915)	ND (0.392)	ND (0.446)	ND (0.275)	ND (1.47)	ND (0.477)	ND (0.372)	ND (0.334)	ND (0.299)	ND (0.457)	ND (0.153)	ND (1.18)
1,2,3,6,7,8-HXCDF	ND (0.879)	ND (0.378)	ND (0.437)	ND (0.284)	ND (1.33)	ND (0.467)	ND (0.369)	ND (0.321)	ND (0.307)	ND (0.452)	ND (0.147)	ND (1.03)
1,2,3,7,8,9-HXCDF	ND (1.39)	ND (0.756)	ND (0.638)	ND (0.428)	ND (2.69)	ND (0.784)	ND (0.725)	ND (0.509)	ND (0.526)	ND (0.716)	ND (0.211)	ND (1.67)
1,2,3,7,8-PECDF	ND (1.55)	ND (1.18)	ND (0.789)	ND (0.85)	ND (1.54)	ND (1.35)	ND (1.09)	ND (1.62)	ND (1.99)	ND (0.702)	ND (0.174)	ND (1.13)
2,3,4,6,7,8-HXCDF	ND (0.966)	ND (0.444)	ND (0.462)	ND (0.316)	ND (1.54)	ND (0.488)	ND (0.439)	ND (0.365)	ND (0.332)	ND (0.485)	ND (0.159)	ND (1.24)
2,3,4,7,8-PECDF	ND (4.42)	ND (1.07)	ND (0.668)	ND (0.677)	ND (1.32)	ND (1.19)	ND (0.949)	ND (1.57)	ND (1.89)	ND (0.665)	ND (0.155)	ND (1.03)
2,3,7,8-TCDF	ND (1.05)	ND (0.786)	ND (0.628)	ND (0.543)	ND (0.895)	ND (0.701)	ND (0.851)	ND (0.673)	ND (1.4)	ND (0.569)	ND (0.265)	ND (1.89)
TOTAL HPCDD	**16.9**	**11.7**	**24.9**	**38.7**	**21.4**	**33.8**	**183**	**110**	**67.2**	**33.1**	**23.5**	ND (2.6)
TOTAL HPCDF	ND (1.55)	ND (0.839)	ND (0.427)	**0.961**	ND (1.21)	ND (0.647)	**21**	ND (0.86)	ND (1.42)	ND (1.29)	ND (0.173)	ND (1.26)
TOTAL HXCDF	ND (1.02)	ND (0.474)	ND (0.49)	**0.533**	ND (1.67)	ND (0.664)	**7.2**	ND (0.378)	ND (0.36)	ND (0.515)	ND (0.168)	ND (1.28)
TOTAL PECDF	**2.40**	ND (1.12)	ND (0.726)	ND (0.759)	ND (1.43)	ND (1.27)	ND (1.02)	ND (1.59)	ND (1.94)	ND (0.684)	ND (0.164)	ND (1.08)
Metals (ug/L)												
ANTIMONY	ND (64)	**47.2 J**	ND (32)	ND (64)	ND (64)	ND (128)	ND (64)	ND (64)	ND (64)	ND (64)	ND (64)	ND (64)
ARSENIC	ND (93)	**128 J**	ND (233)	ND (186)	ND (93)	ND (186)	ND (93)	**128 J**	ND (93)	**112 J**	**96.1 J**	**163 J**
LEAD	ND (84)	---	---	ND (168)	---	---	---	---	---	---	---	---
MANGANESE	**152000**	**177000**	**179000**	**164000**	**147000**	**169000**	**149000**	**150000**	**154000**	**150000**	**148000**	**146000**
THALLIUM	ND (100)	**306 J**	ND (250)	**228 J**	ND (100)	ND (200)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
PCBs (pg/L)												
PCB 77	ND (49.1)J	**4.27 J**	2.32 B	3.62 B	**3.14 J**	ND (3.32)	ND (6.71)	ND (5.57)	**6.36 J**	**53.3**	ND (5.26)	ND (8.77)
PCB 81	ND (49.1)	ND (1.9)	ND (1.31)	ND (1.56)	ND (1.66)	ND (3.02)	ND (2.69)	ND (5.16)	ND (5.15)	ND (4.3)	ND (3.73)	ND (8.34)
PCB 105	ND (49.1)J	**8.32 J**	ND (12.8)	ND (8.11)	ND (4.04)	**6.51 J**	ND (10.8)	ND (12.1)	ND (18.1)	**77.5**	ND (8.17)	ND (14.2)
PCB-106/118	**80.2**	**9.50 J**	ND (13.9)	ND (15.9)	**7.74 J**	**14.2 J**	ND (13.7)	ND (20)	ND (18.3)	138 B	ND (7.43)	ND (12.9)
PCB 114	ND (49.1)	ND (6.84)	ND (13.1)	ND (9.11)	ND (4.6)	ND (9.29)	ND (11.4)	ND (13.8)	ND (19.1)	ND (6.03)	ND (7.79)	ND (14.4)
PCB 123	ND (49.1)	ND (5.71)	ND (14.6)	ND (15.4)	ND (3.58)	ND (7.42)	ND (14.6)	ND (19.3)	ND (17.1)	ND (8.85)	ND (7.52)	ND (13.7)
PCB 126	ND (49.1)	ND (7.72)	ND (14)	ND (10.1)	ND (4.73)	ND (11.4)	ND (13.6)	ND (15.3)	ND (19.8)	ND (5.45)	ND (8.06)	ND (16)
PCB 156	ND (49.1)	ND (2.15)	ND (1.78)	ND (2.94)	ND (2.29)	ND (4.14)	ND (4.15)	ND (4.81)	ND (5.11)	ND (25.5)J	ND (3.17)	ND (9.25)
PCB 157	ND (49.1)	ND (2.27)	ND (1.86)	ND (3.19)	ND (2.35)	ND (4.42)	ND (4.45)	ND (5.02)	ND (5.17)	ND (7.36)	ND (3.39)	ND (9.23)
PCB 167	ND (49.1)	ND (2.42)	ND (1.66)	ND (2.98)	ND (2.33)	ND (4.26)	ND (4.16)	ND (4.85)	ND (5.21)	ND (6.99)	ND (5.21)	ND (9.46)
PCB 169	ND (49.1)	4.64 B	2.93 B	ND (4.25)	**3.4 J**	ND (6.29)	ND (5.54)	ND (6.22)	ND (6)	ND (7.44)	ND (9.25)	ND (11.8)
PCB 189	ND (49.1)	ND (1.12)	ND (24.5)	ND (1.56)	ND (1.3)	ND (1.27)	ND (1.97)	ND (2.2)	ND (4)	ND (1.32)	ND (1.36)	ND (4.71)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[(1)]	ND (49.1)	ND (51.4)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	ND (25.5)	ND (25.8)	ND (51.6)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (51.4)	ND (49.1)	ND (50.5)	ND (49.9)	ND (49.8)	ND (52.8)	ND (49.7)	ND (49.5)	ND (51)	ND (51.5)	ND (104)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (51.4)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	ND (25.5)	ND (25.8)	ND (51.6)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (51.4)B	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	**36.2**	ND (25.8)	ND (51.6)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (25.7)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	ND (25.5)	ND (25.8)	ND (51.6)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (51.4)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	ND (25.5)	ND (25.8)	ND (51.6)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (49.1)	ND (51.4)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	ND (25.5)	ND (25.8)	ND (51.6)
TOTAL PCB (CONGENERS)	5010 B	121 B	5.24 B	155 B	**539**	20.7 B	ND (52.8)	174 B	**6.36**	3030 B	ND (51.5)	ND (104)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	**546**	ND (51.4)	ND (24.5)	ND (25.2)	ND (25)	ND (24.9)	ND (26.4)	ND (24.8)	ND (24.8)	711 B	ND (25.8)	ND (51.6)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**2920**	ND (51.4)	ND (24.5)	**124**	**424**	ND (24.9)	ND (26.4)	94.1 B	ND (24.8)	1740 B	ND (25.8)	ND (51.6)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**1540**	94 B	ND (24.5)	**30.9**	**103**	ND (24.9)	ND (26.4)	80.2 B	ND (24.8)	539 B	ND (25.8)	ND (51.6)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)	ND (1)J	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)	ND (1)J	ND (1)
PENTACHLOROBENZENE	ND (2)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)	ND (2)J	ND (2)J	ND (2)J	ND (2)	ND (2)J	ND (2)
OCTACHLOROSTYRENE	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)	ND (2)J	ND (2)J	ND (2)J	ND (2)	ND (2)J	ND (2)

(1): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-3
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	9/05[1]		10/05[1]		11/05[2]		12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)															
1,2,3,4,6,7,8-HPCDD	ND (5.88)	ND (1.9)	**2.02 J**	**3.16 J**	**2.64 J**	**1.27 J**	ND (1.68)	**3.28 J**	**2.40 J**	**4.75 J**	ND (2.4)	ND (1.33)	**1.96 J**	**1.31 J**	ND (2.67)
1,2,3,4,7,8-HXCDD	ND (1.51)	ND (1.23)	ND (1.96)	ND (1.05)	ND (0.988)	ND (1.68)	<0.855	ND (1.19)	ND (1.33)	ND (1.26)	ND (1.4)	ND (1.87)	ND (1.32)	ND (0.294)	ND (2.18)
1,2,3,6,7,8-HXCDD	ND (1.4)	ND (1.26)	ND (1.93)	ND (1.1)	ND (0.943)	ND (1.68)	<0.888	ND (1.18)	ND (1.39)	ND (1.25)	ND (1.48)	ND (1.86)	ND (1.35)	ND (0.301)	ND (2.33)
1,2,3,7,8,9-HXCDD	ND (1.45)	ND (1.17)	ND (1.91)	ND (1.02)	ND (0.91)	ND (1.59)	ND (0.824)	ND (1.12)	ND (1.28)	ND (1.23)	ND (1.4)	ND (1.8)	ND (1.29)	ND (0.301)	ND (2.28)
1,2,3,7,8-PECDD	ND (0.861)	ND (0.824)	ND (0.699)	ND (0.619)	ND (0.573)	ND (1.04)	ND (1.7)	ND (0.77)	ND (0.71)	ND (0.852)	ND (0.99)	ND (2.46)	ND (0.567)	ND (0.217)	ND (1.94)
2,3,7,8-TCDD	ND (0.876)	ND (0.6)	ND (0.641)	ND (0.605)	<0.793	ND (1.01)	ND (1.08)	ND (1.13)	ND (0.584)	ND (0.656)	ND (0.893)	ND (1.23)	ND (0.483)	ND (0.211)	ND (2.05)
OCDD	69.9 B	**13.4 J**	**94.1**	154 B	101 B	**37.4 J**	**24.1 J**	**153**	**76.7**	161 B	170 B	50.5 J,B	**121**	56.6 B	ND (2.35)
TOTAL HPCDD	ND (5.88)	ND (1.9)	**2.02**	**5.77**	**5.16**	**1.27**	ND (1.68)	**3.28**	**2.40**	**9.65**	ND (4.97)	ND (1.33)	**1.96**	2.98 B	ND (2.67)
TOTAL HXCDD	ND (1.45)	ND (1.22)	ND (1.93)	**1.29**	**1.02**	ND (1.65)	ND (0.856)	**1.44**	ND (1.33)	**1.40**	ND (1.43)	ND (1.84)	**0.798**	**0.632**	ND (2.26)
TOTAL PECDD	ND (0.861)	ND (0.824)	ND (0.699)	ND (0.619)	ND (0.573)	ND (1.04)	ND (1.7)	ND (0.77)	ND (0.71)	ND (0.852)	ND (0.99)	ND (2.33)	ND (0.567)	ND (0.217)	ND (1.94)
Total TCDD	**10.5**	**1.65**	**10.2**	**10.6**	**12.1**	**3.66**	**2.36**	**12.5**	**7.28**	**11.2**	**8.73**	**2.07**	**7.77**	**4.47**	ND (2.05)
Furans (pg/L)															
1,2,3,4,6,7,8-HPCDF	ND (0.988)	ND (0.665)	ND (0.534)	**1.45 J**	**0.867 J**	ND (0.999)	ND (0.799)	ND (1.15)	ND (0.557)	**1.04 J**	ND (0.615)	ND (0.932)	ND (2.2)	ND (0.402)	ND (1.93)
1,2,3,4,7,8,9-HPCDF	ND (1.29)	ND (0.808)	ND (0.797)	ND (0.47)	ND (0.251)	ND (1.14)	ND (0.868)	ND (1.22)	ND (0.628)	ND (0.679)	ND (0.608)	ND (1.09)	ND (0.666)	ND (0.18)	ND (1.98)
1,2,3,4,7,8-HXCDF	ND (0.849)	ND (0.385)	ND (0.581)	**0.5 J**	ND (0.289)	ND (0.44)	ND (0.532)	ND (0.528)	ND (0.43)	ND (0.28)	ND (0.434)	ND (0.415)	ND (0.572)	ND (0.136)	ND (1.14)
1,2,3,6,7,8-HXCDF	ND (0.792)	ND (0.371)	ND (0.544)	ND (0.279)	ND (0.288)	ND (0.387)	ND (0.513)	ND (0.497)	ND (0.418)	ND (0.283)	ND (0.434)	ND (0.425)	ND (0.564)	ND (0.12)	ND (0.994)
1,2,3,7,8,9-HXCDF	ND (1.31)	ND (0.769)	ND (0.842)	ND (0.467)	ND (0.475)	ND (0.727)	ND (0.9)	ND (0.838)	ND (0.711)	ND (0.49)	ND (0.616)	ND (0.698)	ND (0.892)	ND (0.191)	ND (1.66)
1,2,3,7,8-PECDF	ND (2.28)	ND (1.14)	ND (1.11)	ND (0.69)	ND (1.12)	ND (0.951)	ND (1.64)	ND (1.36)	ND (1.12)	ND (1.07)	ND (0.805)	ND (1.97)	ND (0.768)	ND (0.164)	ND (1.29)
2,3,4,6,7,8-HXCDF	ND (0.924)	ND (0.438)	ND (0.592)	ND (0.294)	ND (0.302)	ND (0.462)	ND (0.557)	ND (0.555)	ND (0.458)	ND (0.315)	ND (0.455)	ND (0.453)	ND (0.633)	ND (0.136)	ND (1.27)
2,3,4,7,8-PECDF	ND (2.01)	ND (0.988)	ND (0.952)	ND (0.534)	ND (0.907)	ND (0.844)	ND (1.49)	ND (1.14)	ND (1)	ND (1.11)	ND (0.757)	ND (1.93)	ND (0.708)	ND (0.158)	ND (1.26)
2,3,7,8-TCDF	ND (1.39)	ND (0.853)	ND (0.75)	ND (0.439)	ND (0.432)	ND (0.673)	ND (0.839)	ND (0.806)	ND (0.705)	ND (0.802)	ND (0.56)	ND (1.46)	ND (0.671)	ND (0.228)	ND (2.38)
OCDF	ND (6.69)	ND (1.85)	ND (4.53)	4.31 B	3.66 B	ND (2.27)	ND (1.95)	**5.30 J**	**2.75 J**	**5.73 J**	**11.0 J**	**4.41 J**	ND (5.21)	4.18 B	ND (4.23)
TOTAL HPCDF	ND (1.12)	ND (0.728)	ND (0.654)	**1.45**	**1.37**	ND (1.06)	ND (0.829)	ND (1.18)	ND (0.588)	**1.04**	ND (0.612)	ND (1)	ND (2.26)	0.402 B	ND (1.96)
TOTAL HXCDF	ND (1.13)	ND (0.472)	ND (0.629)	**1.30**	ND (0.383)	ND (0.485)	ND (0.605)	ND (0.593)	ND (0.494)	**1.20**	ND (0.48)	ND (0.491)	ND (0.572)	ND (0.146)	ND (1.27)
TOTAL PECDF	ND (2.14)	ND (1.06)	ND (1.03)	**1.83**	ND (1.01)	ND (0.895)	ND (1.57)	ND (1.25)	ND (1.06)	ND (1.08)	ND (0.781)	ND (1.95)	ND (0.738)	ND (0.161)	ND (1.28)
Total TCDF	ND (3.03)	ND (0.853)	ND (0.75)	ND (0.439)	ND (0.432)	ND (0.673)	ND (0.839)	ND (0.806)	ND (0.705)	ND (0.802)	ND (0.56)	ND (1.46)	ND (0.671)	ND (0.228)	ND (2.38)
Metals (ug/L)															
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (32)	ND (6.4)	ND (64)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	**17.5 J**	ND (9.3)	ND (9.3)	<46.5	ND (9.3)	ND (93)
LEAD	9.3 J	---	---	ND (9.4)	ND (9.4)	---	---	---	---	---	---	---	---	---	---
MANGANESE	**5050**	**5440**	**5060**	**8500**	**5350**	**6070**	**5560**	**6200**	**6620**	**7590**	**6370**	**6660**	**9690**	**7650**	**8310**
THALLIUM	ND (50)	ND (10)J	**24.4**	**17.4 J**	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	**16.4 J**	ND (10)	ND (10)	ND (50)	ND (50)	ND (100)
PCBs (pg/L)															
PCB 77	ND (49.2)	**4.89 J**	4.21 B	3.57 B	3.91 B	ND (2.82)	ND (5.34)J	9.88 B	ND (3.87)	ND (5.34)	ND (4.14)	ND (5.91)	**43.7**	ND (6.71)	ND (10.7)
PCB 81	ND (49.2)	ND (2.52)	ND (1.97)	ND (1.7)	ND (1.65)	ND (2.8)	ND (1.82)	ND (3.39)	ND (3.59)	ND (5.09)	ND (3.84)	ND (5.65)	ND (8.12)	ND (2.49)	ND (10.9)
PCB 105	ND (49.2)	**7.79 J**	ND (10.3)	ND (7.59)	ND (9.27)	ND (5.35)	ND (11.7)	**12.5 J**	ND (7.45)	ND (13)	ND (12.1)	ND (13.9)	**71.1**	ND (5.62)	ND (11.9)
PCB-106/118	ND (49.2)	**11.8 J**	ND (12.7)	ND (9.01)	ND (10.1)	ND (5.44)	ND (10.1)	**24.1 J**	**13.9 J**	ND (17.9)	ND (10.5)	ND (19.9)	117 B	ND (6.93)	ND (13.5)
PCB 114	ND (49.2)	ND (6.02)	ND (10.9)	ND (8.68)	ND (10.1)	ND (5.61)	ND (12.2)	ND (8.68)	ND (7.76)	ND (13.3)	ND (13.3)	ND (15.8)	ND (10.4)	ND (4.88)	ND (12.4)
PCB 123	ND (49.2)	ND (12.3)	ND (12.3)	ND (9.24)	ND (10.4)	ND (5.56)	ND (10.5)	ND (8.78)	ND (7.06)	ND (19.4)	ND (10.4)	ND (18.6)	ND (16.4)	ND (7.92)	ND (13.6)
PCB 126	ND (49.2)	ND (7.28)	ND (12.3)	ND (9.19)	ND (11.3)	ND (6.15)	ND (12.8)	ND (11.2)	ND (10.3)	ND (17.3)	ND (14.9)	ND (16)	ND (10.4)	ND (8.13)	ND (13.5)
PCB 156	ND (49.2)	ND (1.83)	ND (2.12)	ND (2.69)	ND (1.97)	ND (3.41)	ND (2.08)	ND (5.02)	ND (4.31)	ND (4.7)	ND (3.68)	ND (5.8)	ND (7)	ND (3.97)	ND (9.9)
PCB 157	ND (49.2)	ND (1.9)	ND (2.28)	ND (2.76)	ND (2.1)	ND (3.41)	ND (2.21)	ND (5.32)	ND (4.76)	ND (5.06)	ND (3.88)	ND (6.19)	ND (7.02)	ND (3.96)	ND (10.4)
PCB 167	ND (49.2)	ND (1.81)	ND (2.16)	ND (2.66)	ND (2.14)	ND (3.41)	ND (2.45)	ND (5.19)	ND (4.24)	ND (4.59)	ND (3.96)	ND (5.78)	ND (7.7)	ND (4.67)	ND (10.5)
PCB 169	ND (49.2)	3.44 B	3.85 B	ND (3.29)	5.12 B	**4.46 J**	**3.46 J**	ND (7.71)	ND (6.59)	ND (6.39)	ND (4.79)	ND (7.08)	ND (8.24)	ND (5.08)	ND (12.5)
PCB 189	ND (49.2)	ND (1.11)	ND (1.6)	ND (2.07)	ND (1.49)	ND (1.74)	ND (2.17)	ND (2.7)	ND (1.81)	ND (2.61)	ND (2.05)	ND (2.87)	ND (1.74)	ND (2.07)	ND (3.83)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	**52.4**	ND (51.8)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	ND (26.2)	ND (26.3)	ND (52.5)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	**85.4**	ND (51.8)	ND (49.7)	ND (51.9)	ND (49.3)	ND (51.1)	ND (52)	ND (49.4)	ND (50)	ND (52.7)	ND (50.3)	ND (50.4)	ND (52.1)	ND (52.7)	ND (105)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (51.8)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	ND (26.2)	ND (26.3)	ND (52.5)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (51.8)B	ND (24.9)	ND (25.9)	<24.7 B	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	**32.6**	ND (26.3)	ND (52.5)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (25.9)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	ND (26.2)	ND (26.3)	ND (52.5)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (51.8)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	ND (26.2)	ND (26.3)	ND (52.5)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (51.8)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	ND (26.2)	ND (26.3)	ND (52.5)
TOTAL PCB (CONGENERS)	1690 B	488 B	8.06 B	3.57 B	9.03 B	4.46 B	3.46 B	252 B	13.9 B	ND (52.7)	31.8 B	ND (50.4)	3300 B	ND (52.7)	ND (105)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (49.2)	ND (51.8)	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	**90.4**	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	578 B	ND (26.3)	ND (52.5)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**944**	**347**	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	162 B	ND (25)	ND (26.3)	31.8 B	ND (25.2)	1940 B	ND (26.3)	ND (52.5)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**563**	**118 B**	ND (24.9)	ND (25.9)	ND (24.7)	ND (25.6)	ND (26)	ND (24.7)	ND (25)	ND (26.3)	ND (25.2)	ND (25.2)	749 B	ND (26.3)	ND (52.5)
SVOCs (ug/L)															
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (10)	ND (10)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (10)	ND (10)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (20)	ND (20)	ND (4)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J
PENTACHLOROBENZENE	ND (2)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (20)	ND (20)	ND (4)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J

(1): First column - original results, second column - duplicate sample results
(2): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-4
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	ND (1.95)	ND (1.27)	ND (0.873)	ND (0.689)	ND (3.27)	ND (3.24)	**8.12 J**	**1.96 J**	ND (1.57)	ND (2.03)	**0.821 J**	ND (2.75)
1,2,3,4,7,8-HXCDD	ND (1.66)	ND (1.26)	ND (1.04)	ND (0.61)	ND (1.54)	ND (1.29)	ND (0.914)	ND (1.03)	ND (1.84)	ND (0.868)	ND (0.279)	ND (1.78)
1,2,3,6,7,8-HXCDD	ND (1.77)	ND (1.28)	ND (1.01)	ND (0.652)	ND (1.53)	ND (1.33)	ND (0.969)	ND (1.14)	ND (1.94)	ND (0.914)	ND (0.294)	ND (1.93)
1,2,3,7,8,9-HXCDD	ND (1.72)	ND (1.2)	ND (1.01)	ND (0.597)	ND (1.45)	ND (1.24)	ND (0.921)	ND (1.05)	ND (1.83)	ND (0.861)	ND (0.289)	ND (1.87)
1,2,3,7,8-PECDD	ND (0.837)	ND (0.681)	ND (0.542)	ND (0.484)	ND (0.976)	ND (0.855)	ND (0.735)	ND (0.707)	ND (2.51)	ND (0.542)	ND (0.232)	ND (2.28)
2,3,7,8-TCDD	ND (0.876)	ND (0.757)	ND (0.525)	ND (0.511)	ND (0.946)	ND (0.511)	ND (0.634)	ND (0.842)	ND (1.83)	ND (0.557)	ND (0.207)	ND (1.73)
OCDD	13.8 BJ	ND (3.34)	ND (6.91)	39.9 BJ	**56.7**	**60.7**	88.8 B	131 B	13.5 B	**48.5 J**	47.1 B	**8.55 J**
TOTAL HPCDD	ND (1.95)	ND (1.27)	ND (0.873)	ND (0.689)	ND (3.27)	ND (3.24)	**16.1**	4.84	ND (1.57)	ND (2.03)	1.79 B	ND (2.75)
TOTAL HXCDD	ND (1.72)	ND (1.25)	ND (1.02)	ND (0.62)	ND (1.51)	ND (1.28)	ND (0.936)	ND (1.07)	ND (1.87)	ND (0.882)	ND (0.287)	ND (1.86)
TOTAL PECDD	ND (0.837)	ND (0.681)	ND (0.542)	ND (0.484)	ND (0.976)	ND (0.855)	ND (0.735)	ND (0.707)	ND (1.52)	ND (0.806)	ND (0.232)	ND (2.28)
Total TCDD	ND (0.876)	ND (0.757)	ND (0.525)	ND (0.511)	ND (0.946)	ND (0.511)	ND (0.634)	ND (0.842)	ND (1.83)	ND (0.557)	ND (0.207)	ND (1.73)
Furans (pg/L)												
1,2,3,4,6,7,8-HPCDF	ND (1.88)	ND (0.711)	ND (0.448)	ND (0.219)	ND (0.706)	ND (0.706)	**2.16 J**	ND (0.651)	ND (1.46)	ND (0.53)	ND (0.199)	ND (1.58)
1,2,3,4,7,8,9-HPCDF	ND (1.08)	ND (0.784)	ND (0.702)	ND (0.248)	ND (0.74)	ND (0.796)	ND (0.997)	ND (0.639)	ND (1.69)	ND (0.596)	ND (0.206)	ND (1.61)
1,2,3,4,7,8-HXCDF	ND (0.646)	ND (0.43)	ND (0.285)	ND (0.148)	ND (0.477)	ND (0.356)	ND (0.241)	ND (0.348)	ND (0.67)	ND (0.265)	ND (0.163)	ND (1.07)
1,2,3,6,7,8-HXCDF	ND (0.614)	ND (0.409)	ND (0.254)	ND (0.146)	ND (0.413)	ND (0.34)	ND (0.248)	ND (0.35)	ND (0.686)	ND (0.259)	ND (0.149)	ND (0.953)
1,2,3,7,8,9-HXCDF	ND (0.992)	ND (0.833)	ND (0.397)	ND (0.239)	ND (0.765)	ND (0.539)	ND (0.447)	ND (0.551)	ND (1.17)	ND (0.43)	ND (0.229)	ND (1.51)
1,2,3,7,8-PECDF	ND (1.65)	ND (1.33)	ND (0.612)	ND (0.591)	ND (0.789)	ND (1.28)	ND (1.21)	ND (0.826)	ND (2.64)	ND (0.532)	ND (0.193)	ND (1.1)
2,3,4,6,7,8-HXCDF	ND (0.678)	ND (0.513)	ND (0.269)	ND (0.155)	ND (0.485)	ND (0.375)	ND (0.283)	ND (0.386)	ND (0.721)	ND (0.287)	ND (0.161)	ND (1.1)
2,3,4,7,8-PECDF	ND (1.35)	ND (1.15)	ND (0.568)	ND (0.512)	ND (0.709)	ND (1.08)	ND (1.03)	ND (0.828)	ND (2.48)	ND (0.501)	ND (0.181)	ND (1.1)
2,3,7,8-TCDF	ND (0.946)	ND (0.818)	ND (0.432)	ND (0.333)	ND (0.799)	ND (0.83)	ND (0.626)	ND (0.599)	ND (1.75)	ND (0.452)	ND (0.258)	ND (2.11)
OCDF	ND (3.78)	ND (1.41)	ND (2.75)	ND (1.04)	ND (2.45)	ND (2.95)	**6.97 J**	**10.1 J**	ND (3.21)	ND (4.73)	2.13 B	ND (4.35)
TOTAL HPCDF	ND (2.1)	ND (0.743)	ND (0.563)	ND (0.232)	ND (0.72)	ND (0.745)	**7.59**	ND (0.645)	ND (1.56)	ND (0.561)	ND (0.202)	ND (1.6)
TOTAL HXCDF	ND (0.72)	ND (0.527)	ND (0.296)	ND (0.169)	ND (0.516)	ND (0.395)	ND (1.77)	ND (0.403)	ND (0.803)	ND (0.302)	ND (0.176)	ND (1.16)
TOTAL PECDF	ND (1.49)	ND (1.23)	ND (0.589)	ND (0.55)	ND (0.747)	ND (1.18)	ND (1.12)	ND (0.827)	ND (2.56)	ND (0.516)	ND (0.187)	ND (1.1)
Total TCDF	ND (3.18)	ND (0.818)	ND (0.432)	ND (0.333)	ND (0.799)	ND (0.83)	ND (0.626)	ND (0.599)	ND (1.75)	ND (0.452)	ND (0.258)	ND (2.11)
Metals (ug/L)												
ANTIMONY	ND (6.4)	ND (6.4)J	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)J	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---
MANGANESE	1260	1290	1340	1330	1310	1360	1360	1280	1380	1310	1350	1280
THALLIUM	ND (10)	ND (10)J	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)												
PCB 77	ND (48.7)	6.78 J	ND (1.7)	ND (2.25)	**3.31 J**	ND (4.16)	ND (9.57)	ND (5.18)	**18.2 J**	ND (25.9)J	ND (5.34)	ND (8.18)
PCB 81	ND (48.7)	ND (2.17)	ND (1.57)	ND (2.16)	ND (1.81)	ND (3.83)	ND (8.63)	ND (4.86)	ND (4.01)	ND (2.61)	ND (3.19)	ND (7.74)
PCB 105	ND (48.7)	**10.3 J**	ND (10.7)	ND (10.6)	ND (12)	ND (8.22)	ND (16.6)	ND (16.5)	ND (13)	ND (25.9)J	**3.61 J**	ND (12)
PCB-106/118	ND (48.7)	**12.3 J**	ND (13.5)	ND (16.9)	ND (11.1)	ND (14.5)	ND (13.2)	ND (13.7)	**32.6**	ND (25.9)J	ND (8.68)	ND (15.5)
PCB 114	ND (48.7)	ND (8.27)	ND (12.1)	ND (12.3)	ND (14.1)	ND (8.22)	ND (17.5)	ND (17.3)	ND (13.5)	ND (8.49)	ND (7.15)	ND (13.7)
PCB 123	ND (48.7)	ND (7.45)	ND (12.8)	ND (16.1)	ND (10.7)	ND (14.4)	ND (13.1)	ND (14.2)	ND (18.6)	ND (8.7)	ND (6.73)	ND (14.7)
PCB 126	ND (48.7)	ND (9.7)	ND (12.7)	ND (13.2)	ND (13.5)	ND (10.3)	ND (22.4)	ND (19.9)	ND (14)	ND (7.79)	ND (11.4)	ND (13.4)
PCB 156	ND (48.7)	ND (1.97)	ND (2.17)	ND (2.36)	ND (2.65)	ND (4.02)	ND (6.26)	ND (4.53)	ND (5.53)	ND (2.07)	ND (4.28)	ND (7.66)
PCB 157	ND (48.7)	ND (2.08)	ND (2.18)	ND (2.39)	ND (2.8)	ND (4.28)	ND (6.75)	ND (4.61)	ND (5.75)	ND (2.37)	ND (4.31)	ND (7.87)
PCB 167	ND (48.7)	ND (1.98)	ND (2.09)	ND (2.25)	ND (2.66)	ND (4.07)	ND (6.51)	ND (4.27)	ND (5.8)	ND (2.13)	ND (3.84)	ND (7.89)
PCB 169	ND (48.7)	3.63 B	3.45 B	2.77 B	**4.53 J**	ND (5.67)	ND (10.7)	ND (5.73)	ND (6.46)	ND (25.9)J	ND (1.36)	ND (9.81)
PCB 189	ND (48.7)	ND (1.51)	ND (1.54)	ND (1.41)	ND (2.59)	ND (1.57)	ND (4.09)	ND (1.72)	ND (3.06)	ND (1.45)	ND (1.68)	ND (1.63)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[(1)]	ND (48.7)	ND (51.4)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)	ND (49.9)	ND (49.2)	ND (52.9)	ND (49.6)	ND (55.6)	ND (53)	**394**	ND (51.8)	ND (50.7)	ND (106)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)B	ND (24.9)	ND (24.6)B	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (25.7)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	ND (24.2)	ND (25.9)	ND (25.4)	ND (53.2)
TOTAL PCB (CONGENERS)	1770 B	489 B	3.45 B	3.04 B	7.84 B	ND (49.6)	ND (55.6)	55.5 B	**6540**	365 B	**3.61**	ND (106)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (48.7)	ND (51.4)	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	**305**	30.1 B	**3.61**	ND (53.2)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**1070**	**330**	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	ND (26.5)	**2750**	290 B	ND (25.4)	ND (53.2)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**668**	133 B	ND (24.9)	ND (24.6)	ND (26.5)	ND (24.8)	ND (27.8)	55.5 B	**3100**	41.6 B	ND (25.4)	ND (53.2)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (2)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): PCB 209

B: Blank Contamination

J: Estimated Concentration

ND: Not Detected

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-5
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	ND (2.14)	ND (1.03)	ND (1.1)	**0.999 J**	ND (1.14)	ND (1.27)	**4.61 J**	ND (1.7)	ND (1.65)	ND (1.68)	**14.4 J**	ND (2.25)
1,2,3,4,7,8-HXCDD	ND (1.17)	ND (1.12)	ND (1.03)	ND (0.519)	ND (1.15)	ND (0.849)	ND (1.03)	ND (1.15)	ND (1.98)	ND (0.894)	ND (0.231)	ND (1.51)
1,2,3,6,7,8-HXCDD	ND (1.1)	ND (1.15)	ND (0.973)	ND (0.544)	ND (1.2)	ND (0.849)	ND (0.989)	ND (1.15)	ND (2.06)	ND (0.952)	ND (0.245)	ND (1.55)
1,2,3,7,8,9-HXCDD	ND (1.07)	ND (1.07)	ND (0.983)	ND (0.503)	ND (1.11)	ND (0.802)	ND (0.986)	ND (1.11)	ND (1.96)	ND (0.892)	ND (0.241)	ND (1.55)
1,2,3,7,8-PECDD	ND (0.727)	ND (0.84)	ND (0.667)	ND (0.656)	ND (0.873)	ND (0.727)	ND (0.496)	ND (0.793)	ND (3.19)	ND (0.469)	ND (0.206)	ND (1.89)
2,3,7,8-TCDD	ND (0.837)	ND (0.854)	ND (0.571)	ND (0.55)	ND (0.935)	ND (0.673)	ND (0.594)	ND (0.932)	ND (2.03)	ND (0.528)	ND (0.263)	ND (1.88)
OCDD	15 B	**5.25 J**	**20.3 J**	66.8 B	79 B	**19.9 J**	50.4 B	34.3 B	71.8 B	**16 J**	136 B	ND (3.71)
TOTAL HPCDD	ND (2.14)	ND (1.03)	ND (1.1)	**2.21**	ND (1.14)	ND (1.27)	**8.86**	ND (1.7)	ND (1.65)	ND (1.68)	**23.8**	ND (2.25)
TOTAL HXCDD	ND (1.11)	ND (1.11)	ND (0.993)	ND (0.522)	ND (1.15)	ND (0.833)	ND (1)	ND (1.14)	ND (2)	ND (1.6)	ND (0.239)	ND (1.54)
TOTAL PECDD	ND (0.727)	ND (0.84)	ND (0.667)	ND (0.656)	ND (0.873)	ND (0.727)	ND (0.496)	ND (0.793)	ND (3.19)	ND (2.03)	ND (0.206)	ND (1.89)
Total TCDD	ND (0.837)	ND (0.854)	ND (0.571)	ND (0.55)	ND (0.935)	ND (0.673)	ND (0.594)	ND (0.932)	ND (2.03)	ND (0.528)	ND (0.263)	ND (1.88)
Furans (pg/L)												
1,2,3,4,6,7,8-HPCDF	ND (0.995)	ND (0.75)	ND (0.392)	ND (0.329)	ND (0.706)	ND (0.601)	ND (1.09)	ND (0.686)	ND (1.77)	ND (0.545)	**1.91 J**	ND (1.1)
1,2,3,4,7,8,9-HPCDF	ND (1.16)	ND (0.942)	ND (0.575)	ND (0.367)	ND (0.769)	ND (0.665)	ND (1.21)	ND (0.655)	ND (2.01)	ND (0.63)	ND (0.224)	ND (1.16)
1,2,3,4,7,8-HXCDF	ND (0.683)	ND (0.417)	ND (0.269)	ND (0.13)	ND (0.342)	ND (0.329)	ND (0.319)	ND (0.26)	ND (0.967)	ND (0.245)	ND (0.115)	ND (1.09)
1,2,3,6,7,8-HXCDF	ND (0.637)	ND (0.397)	ND (0.258)	ND (0.13)	ND (0.305)	ND (0.321)	ND (0.332)	ND (0.246)	ND (0.972)	ND (0.223)	ND (0.105)	ND (0.939)
1,2,3,7,8,9-HXCDF	ND (1.11)	ND (0.835)	ND (0.41)	ND (0.209)	ND (0.532)	ND (0.552)	ND (0.627)	ND (0.41)	ND (1.62)	ND (0.379)	ND (0.156)	ND (1.46)
1,2,3,7,8-PECDF	ND (1.19)	ND (1.18)	ND (0.585)	ND (0.467)	ND (0.78)	ND (1.26)	ND (0.836)	ND (0.914)	ND (3.3)	ND (0.588)	ND (0.189)	ND (1.02)
2,3,4,6,7,8-HXCDF	ND (0.728)	ND (0.476)	ND (0.283)	ND (0.139)	ND (0.359)	ND (0.352)	ND (0.368)	ND (0.286)	ND (1.11)	ND (0.259)	ND (0.114)	ND (1.14)
2,3,4,7,8-PECDF	ND (1.05)	ND (1.07)	ND (0.533)	ND (0.392)	ND (0.682)	ND (1.04)	ND (0.678)	ND (0.881)	ND (3.03)	ND (0.576)	ND (0.171)	ND (1.01)
2,3,7,8-TCDF	ND (1.01)	ND (1.07)	ND (0.449)	ND (0.363)	ND (0.713)	ND (0.613)	ND (0.684)	ND (0.818)	ND (1.82)	ND (0.482)	ND (0.236)	ND (1.77)
OCDF	ND (2.08)	ND (2)	ND (1.95)	**1.33 J**	ND (9.15)	**8.02 J**	**4.09 J**	ND (2.55)	**5.34 J**	ND (3.34)	11 BJ	ND (2.77)
TOTAL HPCDF	ND (1.07)	ND (0.834)	ND (0.476)	ND (0.346)	ND (0.733)	ND (0.629)	ND (1.14)	ND (0.671)	ND (1.88)	ND (0.584)	**9.61**	ND (1.13)
TOTAL HXCDF	ND (0.771)	ND (0.511)	ND (0.299)	ND (0.149)	ND (0.373)	ND (0.38)	**0.7**	ND (0.296)	ND (1.15)	ND (0.27)	**1.56**	ND (1.16)
TOTAL PECDF	**4.21**	ND (1.12)	ND (0.558)	ND (0.427)	ND (0.729)	ND (1.14)	ND (0.752)	ND (0.898)	ND (3.16)	ND (0.582)	ND (0.18)	ND (1.02)
Total TCDF	**9.4**	ND (1.07)	ND (0.449)	ND (0.363)	ND (0.713)	ND (0.613)	ND (0.684)	ND (0.818)	ND (1.82)	ND (0.482)	ND (0.236)	ND (1.77)
Metals (ug/L)												
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (64)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	**14.1 J**	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (93)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---
MANGANESE	**9280**	**10300**	**16200**	**15000**	**15700**	**15500**	**15900**	**14400**	**17600**	**12800**	**13500**	**15500**
THALLIUM	ND (10)	**11.4 J**	**21.4**	**17.9 J**	**19.1 J**	ND (10)	**16.1 J**	ND (10)	ND (10)	ND (10)	ND (50)	ND (100)
PCBs (pg/L)												
PCB 77	**16.5 J**	**5.92 J**	3.59 B	ND (2.12)	3.19 B	ND (3.17)	ND (5.28)	ND (3.9)	ND (5.39)	ND (24.8)J	ND (4.31)	ND (15.2)
PCB 81	ND (5.77)	ND (3.4)	ND (1.28)	ND (2.02)	ND (1.61)	ND (3.15)	ND (5.07)	ND (3.5)	ND (5.14)	ND (2.43)	ND (3.11)	ND (15.1)
PCB 105	**36.1 J**	ND (9.64)	ND (9.5)	ND (15.9)	ND (16.4)	ND (10.3)	ND (17.2)	ND (12.3)	ND (16.4)	ND (9.87)	ND (6.52)	ND (15)
PCB-106/118	**62**	ND (16.8)	ND (14.2)	ND (10.7)	**15.1 J**	**21.3 J**	ND (17.4)	ND (17.2)	ND (18)	26 B	ND (5.8)	ND (15.6)
PCB 114	ND (13.6)	ND (9.86)	ND (10.4)	ND (11.7)	ND (19.7)	ND (10.9)	ND (118)	ND (13.5)	ND (18.1)	ND (11.9)	ND (4.6)	ND (17)
PCB 123	ND (18.2)	ND (17.5)	ND (14.5)	ND (15.7)	ND (11)	ND (8.16)	ND (16.2)	ND (16.9)	ND (17.6)	ND (11.2)	ND (8.28)	ND (15.9)
PCB 126	ND (14.4)	ND (12.3)	ND (13)	ND (13.2)	ND (17.9)	ND (13.9)	ND (23.8)	ND (16.3)	ND (18.6)	ND (9.66)	ND (6.65)	ND (18)
PCB 156	ND (3.81)	ND (2.83)	ND (2.07)	ND (2.7)	ND (3.04)	ND (3.01)	ND (6.03)	ND (3.26)	ND (8.93)	ND (2.92)	ND (3.09)	ND (9.67)
PCB 157	ND (3.84)	ND (2.92)	ND (2.14)	ND (2.68)	ND (3.18)	ND (3.06)	ND (6.36)	ND (3.43)	ND (9.4)	ND (3.07)	ND (3.26)	ND (10.2)
PCB 167	ND (4.23)	ND (2.9)	ND (1.91)	ND (2.66)	ND (3.15)	ND (3.07)	ND (5.86)	ND (3.32)	ND (9.69)	ND (2.97)	ND (2.31)	ND (9.89)
PCB 169	ND (4.93)	5.11 B	3.86 B	ND (6.3)	ND (4.03)	ND (4.52)	ND (9.72)	ND (4.29)	ND (10.7)	ND (3.43)	ND (3.88)	ND (13.4)
PCB 189	ND (2.72)	ND (2.27)	ND (1.66)	ND (1.59)	ND (2.95)	ND (1.15)	ND (3.89)	ND (1.85)	ND (3.15)	ND (1.13)	ND (0.782)	ND (3.4)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[(2)]	ND (51.1)	ND (51.8)	ND (24.4)	ND (25.8)	ND (25.7)	ND (24.6)	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (51.1)	ND (51.8)	50.0 B	ND (51.6)	ND (51.4)	ND (49.1)	ND (49.6)	ND (51.3)	ND (51.2)	ND (49.7)	ND (49.8)	ND (103)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (51.1)	ND (51.8)	ND (24.4)	ND (25.8)	ND (25.7)	ND (24.6)	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (51.1)	ND (51.8)B	ND (24.4)B	ND (25.8)	ND (25.7)	55.4 B	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (25.6)	ND (25.9)	ND (24.4)	ND (25.8)	ND (25.7)	ND (24.6)	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (51.1)	ND (51.8)	ND (24.4)	ND (25.8)	29.4	ND (24.6)	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (51.1)	ND (51.8)	ND (24.4)	ND (25.8)	ND (25.7)	ND (24.6)	ND (24.8)	ND (25.7)	ND (25.6)	ND (24.8)	ND (24.9)	ND (51.3)
TOTAL PCB (CONGENERS)	**4470**	314 B	81.9 B	ND (51.6)	103 B	140 B	**57.4**	125 B	68.0 B	805 B	ND (49.8)	ND (103)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	**346**	ND (51.8)	ND (24.4)	ND (25.8)	**70.9**	**84.2**	**27**	ND (25.7)	ND (25.6)	132 B	ND (24.9)	ND (51.3)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**2750**	**203**	28 B	ND (25.8)	ND (25.7)	ND (24.6)	**30.4**	33.7 B	68.0 B	530 B	ND (24.9)	ND (51.3)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**1370**	106 B	ND (24.4)	ND (25.8)	ND (25.7)	ND (24.6)	ND (24.8)	91.7 B	ND (25.6)	143 B	ND (24.9)	ND (51.3)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J	ND (1)J
OCTACHLOROSTYRENE	ND (2)J	ND (5)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J	ND (2)J

(1): First column - original results, second column - duplicate sample results
(2): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-6
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	ND (1.74)	ND (1.2)	ND (1.98)	ND (0.85)	ND (1.23)	ND (1.28)	**7.18 J**	ND (1.55)	ND (1.18)	ND (1.77)	ND (0.999)	ND (2.65)
1,2,3,4,7,8-HXCDD	ND (1.11)	ND (1.13)	ND (1.85)	ND (0.849)	ND (1.83)	ND (1.28)	<0.981	ND (1.09)	ND (1.71)	ND (0.868)	ND (0.187)	ND (1.81)
1,2,3,6,7,8-HXCDD	ND (1.12)	ND (1.09)	ND (1.86)	ND (0.881)	ND (1.68)	ND (1.28)	ND (0.992)	ND (1.14)	ND (1.82)	ND (0.907)	<0.200	ND (1.89)
1,2,3,7,8,9-HXCDD	ND (1.05)	ND (1.04)	ND (1.82)	ND (0.818)	ND (1.65)	ND (1.21)	<0.964	ND (1.08)	ND (1.71)	<0.858	<0.196	ND (1.87)
1,2,3,7,8-PECDD	ND (0.895)	ND (0.588)	ND (0.989)	ND (0.596)	<0.933	ND (0.828)	ND (0.682)	<0.965	ND (3.02)	<0.583	<0.178	ND (2.34)
2,3,7,8-TCDD	ND (0.704)	ND (0.569)	ND (0.551)	ND (0.69)	ND (1.19)	ND (0.997)	ND (1.05)	ND (1.17)	ND (1.14)	<0.538	<0.222	ND (1.96)
OCDD	10.1 B	6.43 B	ND (19.3)	13.6 B	<5.64	**6.94 J**	50.3 B	4.7 B	<4.44	**8.51 J**	10.5 B	ND (2.33)
TOTAL HPCDD	ND (1.74)	ND (1.2)	ND (1.98)	ND (0.85)	ND (1.23)	ND (1.28)	**13.2**	ND (1.55)	ND (1.18)	ND (1.77)	1.94 B	ND (2.65)
TOTAL HXCDD	ND (1.09)	ND (1.08)	ND (1.84)	ND (0.85)	ND (1.72)	ND (1.26)	<0.979	ND (1.1)	ND (1.75)	ND (0.879)	<0.194	ND (1.86)
TOTAL PECDD	ND (0.895)	ND (0.588)	ND (0.989)	ND (0.596)	<0.933	ND (0.828)	ND (0.682)	<0.965	ND (3.02)	ND (1)	<0.178	ND (2.34)
Total TCDD	ND (0.704)	ND (0.569)	ND (0.551)	ND (1.32)	ND (1.19)	ND (0.997)	ND (1.05)	ND (1.17)	ND (1.14)	<0.538	<0.222	ND (1.96)
Furans (pg/L)												
1,2,3,4,6,7,8-HPCDF	ND (0.569)	ND (0.867)	<0.977	ND (0.613)	ND (0.585)	ND (0.686)	**1.56 J**	<0.508	<1.37	ND (0.582)	**0.306 J**	**7.00 J**
1,2,3,4,7,8,9-HPCDF	ND (0.648)	ND (1.04)	ND (1.45)	ND (0.616)	ND (0.709)	ND (0.796)	ND (0.781)	ND (0.489)	ND (1.31)	ND (0.687)	ND (0.144)	ND (2.01)
1,2,3,4,7,8-HXCDF	ND (0.4)	ND (0.351)	ND (0.709)	ND (0.358)	ND (0.397)	ND (0.464)	<0.676	ND (0.235)	ND (0.603)	ND (0.275)	ND (0.113)	ND (1.75)
1,2,3,6,7,8-HXCDF	ND (0.365)	ND (0.329)	ND (0.692)	ND (0.362)	ND (0.362)	ND (0.448)	ND (0.709)	ND (0.23)	ND (0.608)	ND (0.28)	ND (0.102)	ND (1.46)
1,2,3,7,8,9-HXCDF	ND (0.664)	ND (0.686)	ND (1.06)	ND (0.557)	ND (0.623)	ND (0.76)	ND (1.33)	ND (0.342)	ND (1.02)	ND (0.433)	ND (0.149)	ND (2.4)
1,2,3,7,8-PECDF	ND (1.18)	ND (1.1)	ND (1.35)	ND (0.876)	ND (0.99)	ND (1.2)	ND (0.936)	ND (1.25)	ND (2.63)	ND (0.599)	ND (0.173)	ND (2.53)
2,3,4,6,7,8-HXCDF	ND (0.409)	ND (0.393)	ND (0.739)	ND (0.368)	ND (0.409)	ND (0.5)	ND (0.811)	ND (0.236)	ND (0.611)	ND (0.278)	ND (0.111)	ND (1.83)
2,3,4,7,8-PECDF	ND (0.983)	ND (0.948)	ND (1.24)	ND (0.692)	ND (0.807)	ND (0.982)	ND (0.838)	ND (1.1)	ND (2.47)	ND (0.533)	ND (0.168)	ND (2.3)
2,3,7,8-TCDF	ND (1.53)	ND (0.939)	ND (0.891)	ND (0.409)	ND (0.666)	ND (0.599)	ND (0.43)	ND (0.712)	ND (1.64)	ND (0.336)	ND (0.215)	ND (2.13)
OCDF	ND (1.99)	**2.41 J**	ND (5.26)	**4.33 J**	ND (2.23)	ND (1.94)	**8.24 J**	**2 J**	ND (2.8)	ND (3.8)	1.92 B	ND (15.2)
TOTAL HPCDF	ND (0.604)	ND (0.944)	ND (1.2)	ND (0.613)	ND (0.639)	ND (0.735)	5.98	ND (0.499)	ND (1.34)	ND (0.631)	**0.306**	**7**
TOTAL HXCDF	ND (0.448)	ND (0.423)	ND (0.788)	ND (0.405)	ND (0.434)	ND (0.532)	ND (0.863)	ND (0.258)	ND (0.703)	ND (0.31)	ND (0.119)	ND (1.86)
TOTAL PECDF	ND (2.92)	ND (1.02)	ND (1.29)	ND (0.778)	ND (0.895)	ND (1.08)	ND (0.886)	ND (1.17)	ND (2.55)	ND (0.565)	ND (0.17)	ND (2.42)
Total TCDF	**2.44**	ND (0.939)	ND (0.891)	ND (0.409)	ND (0.666)	ND (0.599)	ND (0.43)	ND (0.712)	ND (1.64)	ND (0.336)	ND (0.215)	ND (2.13)
Metals (ug/L)												
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---
MANGANESE	**272**	**212**	**175**	**246**	**138**	**162**	**239**	**135**	**156**	**131**	**133**	**130**
THALLIUM	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	13.7 B	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)												
PCB 77	ND (16.7)	5.56 B	13.8 B	ND (3.29)	2.76 B	ND (4.27)	ND (6.02)	4.39 B	ND (4.83)	ND (24.9)J	ND (4.42)	ND (12.3)
PCB 81	ND (6.2)	ND (1.3)	ND (2.17)	ND (3.08)	ND (1.32)	ND (4.1)	ND (5.65)	ND (2.28)	ND (4.75)	ND (2.78)	ND (2.9)	ND (11.9)
PCB 105	**27.5 J**	11.4 B	**56.2**	ND (8.41)	ND (9.98)	ND (9.65)	ND (9.32)	ND (12.6)	ND (18.3)	ND (9.89)	ND (5.52)	ND (15.4)
PCB-106/118	**44.1 J**	16.7 B	**132**	ND (18.6)	ND (9.04)	ND (13.8)	**19.5 J**	ND (13.6)	ND (19.3)	ND (24.9)J	ND (8.98)	ND (14.1)
PCB 114	ND (14.1)	ND (5.14)	ND (5.14)	ND (9.47)	ND (13)	ND (9.91)	ND (10.3)	ND (14)	ND (20.6)	ND (13.1)	ND (7.18)	ND (18.3)
PCB 123	ND (20)	ND (6.94)	ND (6.01)	ND (17.8)	ND (8.56)	ND (12)	ND (11.9)	ND (13.4)	ND (18.4)	ND (12.5)	ND (8.9)	ND (14.3)
PCB 126	ND (15.6)	ND (5.16)	ND (5.87)	ND (9.84)	ND (11.7)	ND (12.4)	ND (12.3)	ND (15.9)	ND (19.8)	ND (10.5)	ND (9.97)	ND (20)
PCB 156	ND (4.11)	ND (1.6)	**14 J**	ND (2.09)	ND (2.22)	ND (3.33)	ND (5.14)	ND (2.57)	ND (7.93)	ND (24.9)J	ND (3.69)	ND (11.7)
PCB 157	ND (4.25)	ND (1.75)	**5.52 J**	ND (2.18)	ND (2.26)	ND (3.55)	ND (5.88)	ND (2.65)	ND (8.51)	ND (2.24)	ND (4.61)	ND (12)
PCB 167	ND (4.22)	ND (1.65)	**6.83 J**	ND (2.11)	ND (2.11)	ND (3.43)	ND (5.5)	ND (2.66)	ND (8.31)	ND (2.13)	ND (4.59)	ND (11.6)
PCB 169	ND (4.99)	3.35 B	4.88 B	ND (3.61)	4.44 B	4.28 B	ND (7.55)	**3.39 J**	ND (9.36)	ND (24.9)J	ND (10.4)	ND (15.3)
PCB 189	ND (2.22)	ND (1.04)	ND (1.62)	ND (1.86)	ND (2.09)	ND (1.63)	ND (3.54)	ND (1.24)	ND (2.24)	ND (1)	ND (1.05)	ND (4.23)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	ND (50)	ND (48.6)	ND (25.3)	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (48.6)	637 B	ND (51)	ND (51.8)	ND (49.1)	ND (52.7)	ND (49.9)	ND (48.7)	ND (49.8)	ND (50.4)	ND (102)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (48.6)	**188**	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	**51.3**	ND (25.2)	ND (51.1)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (48.6)B	313 B	ND (25.5)	ND (25.9)	ND (24.6)B	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (25)	ND (24.3)	55.3 B	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (48.6)	ND (25.3)	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	**80.8**
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (48.6)	**101**	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
TOTAL PCB (CONGENERS)	**2920**	389 B	3290 B	ND (51)	7.19 B	4.28 B	**101**	7.77 B	ND (48.7)	230 B	ND (50.4)	80.8 B
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	**264**	54.5 B	**602**	ND (25.5)	ND (25.9)	ND (24.6)	ND (26.4)	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**1800**	273 B	762 B	ND (25.5)	ND (25.9)	ND (24.6)	**54.3**	ND (25)B	ND (24.3)	157 B	ND (25.2)	ND (51.1)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**859**	57.9 B	**636**	ND (25.5)	ND (25.9)	ND (24.6)	**27.6**	ND (25)	ND (24.3)	ND (24.9)	ND (25.2)	ND (51.1)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)R	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)R	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (5)R	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)R	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results

(2): PCB 209

B: Blank Contamination

J: Estimated Concentration

R: Rejected Data

ND: Not Detected

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-7
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	ND (1.35)	ND (1.28)	ND (2.04)	ND (0.481)	ND (1.82)	ND (0.676)	ND (1.25)	ND (1.31)	**1.76 J**	ND (1.9)	ND (0.22)	ND (1.88)
1,2,3,4,7,8-HXCDD	ND (1.46)	ND (1.17)	ND (1.44)	ND (0.858)	ND (1.31)	ND (0.867)	ND (1)	ND (1.15)	ND (1.81)	ND (0.666)	ND (0.235)	ND (2)
1,2,3,6,7,8-HXCDD	ND (1.5)	ND (1.19)	ND (1.47)	ND (0.907)	ND (1.44)	ND (0.89)	ND (1.06)	ND (1.28)	ND (2)	ND (0.698)	ND (0.251)	ND (2.06)
1,2,3,7,8,9-HXCDD	ND (1.4)	ND (1.12)	ND (1.43)	ND (0.835)	ND (1.3)	ND (0.83)	ND (1.01)	ND (1.18)	ND (1.85)	ND (0.659)	ND (0.245)	ND (2.05)
1,2,3,7,8-PECDD	ND (0.646)	ND (0.655)	ND (0.648)	ND (0.738)	ND (0.688)	ND (0.973)	ND (0.689)	ND (1.1)	ND (2.97)	ND (0.425)	ND (0.208)	ND (1.45)
2,3,7,8-TCDD	ND (0.648)	ND (0.876)	ND (0.567)	ND (0.712)	ND (0.835)	ND (0.737)	ND (0.662)	ND (1.12)	ND (1.98)	ND (0.574)	ND (0.201)	ND (1.78)
OCDD	9.97 B	ND (2.75)	ND (10.6)	4.45 B	ND (7.44)	ND (3.53)	ND (7.47)	21.9 B	17.1 B	**9.77 J**	7.88 B	**4.12 J**
TOTAL HPCDD	ND (1.35)	ND (1.28)	ND (2.04)	ND (0.481)	ND (1.6)	ND (0.676)	ND (1.25)	ND (1.31)	**1.76**	ND (1.9)	0.546 B	ND (1.88)
TOTAL HXCDD	ND (1.46)	ND (1.16)	ND (1.45)	ND (0.867)	ND (1.35)	ND (0.862)	ND (1.2)	ND (1.02)	ND (1.89)	ND (0.675)	ND (0.244)	ND (2.04)
TOTAL PECDD	ND (0.646)	ND (0.655)	ND (0.648)	ND (0.738)	ND (0.688)	ND (0.973)	ND (0.689)	ND (1.1)	ND (2.97)	ND (0.851)	ND (0.208)	ND (1.45)
Total TCDD	ND (0.648)	ND (0.876)	ND (0.567)	ND (0.712)	ND (0.835)	ND (0.737)	ND (0.662)	ND (1.12)	ND (1.98)	ND (0.574)	ND (0.201)	ND (1.78)
Furans (pg/L)												
1,2,3,4,6,7,8-HPCDF	ND (0.661)	ND (0.671)	ND (1.04)	ND (0.564)	ND (0.852)	ND (0.452)	ND (0.522)	ND (0.677)	ND (1.33)	ND (0.779)	ND (0.259)	ND (1.37)
1,2,3,4,7,8,9-HPCDF	ND (0.737)	ND (0.797)	ND (1.53)	ND (0.575)	ND (0.983)	ND (0.482)	ND (0.604)	ND (0.683)	ND (1.53)	ND (0.437)	ND (0.121)	ND (1.38)
1,2,3,4,7,8-HXCDF	ND (0.405)	ND (0.433)	ND (0.502)	ND (0.28)	ND (0.322)	ND (0.33)	ND (0.309)	ND (0.344)	ND (0.551)	ND (0.227)	ND (0.112)	ND (0.955)
1,2,3,6,7,8-HXCDF	ND (0.402)	ND (0.413)	ND (0.478)	ND (0.292)	ND (0.296)	ND (0.338)	ND (0.313)	ND (0.375)	ND (0.605)	ND (0.211)	ND (0.109)	ND (0.849)
1,2,3,7,8,9-HXCDF	ND (0.724)	ND (0.852)	ND (0.756)	ND (0.44)	ND (0.519)	ND (0.554)	ND (0.583)	ND (0.541)	ND (1.05)	ND (0.345)	ND (0.143)	ND (1.47)
1,2,3,7,8-PECDF	ND (1.12)	ND (1.2)	ND (0.795)	ND (0.699)	ND (1.02)	ND (1.24)	ND (1.23)	ND (1.15)	ND (1.66)	ND (0.711)	ND (0.164)	ND (1.15)
2,3,4,6,7,8-HXCDF	ND (0.442)	ND (0.485)	ND (0.523)	ND (0.299)	ND (0.344)	ND (0.355)	ND (0.346)	ND (0.397)	ND (0.624)	ND (0.235)	ND (0.12)	ND (1.06)
2,3,4,7,8-PECDF	**1.21 J**	ND (1.05)	ND (0.665)	ND (0.594)	ND (0.842)	ND (1.04)	ND (1.12)	ND (1.06)	ND (1.53)	ND (0.661)	ND (0.159)	ND (1.08)
2,3,7,8-TCDF	ND (0.938)	ND (0.931)	ND (0.829)	ND (0.4)	ND (0.68)	ND (1.18)	ND (1.15)	ND (0.848)	ND (1.49)	ND (0.426)	ND (0.19)	ND (1.62)
OCDF	ND (2)	ND (1.45)	ND (4.25)	ND (1.76)	ND (3.11)	ND (4.51)	**4.19 J**	**15.1 J**	ND (4.86)	ND (2.99)	1.58 B	ND (3.32)
TOTAL HPCDF	ND (0.694)	ND (0.726)	ND (1.26)	ND (0.568)	ND (0.909)	ND (0.465)	ND (0.559)	ND (0.68)	ND (1.42)	ND (0.811)	**0.259**	ND (1.38)
TOTAL HXCDF	ND (0.48)	ND (0.525)	ND (0.554)	ND (0.323)	ND (0.358)	ND (0.387)	ND (0.379)	ND (0.41)	ND (0.697)	ND (0.249)	ND (0.121)	ND (1.08)
TOTAL PECDF	**6.93**	ND (1.12)	ND (0.727)	ND (0.644)	ND (0.927)	ND (1.14)	ND (1.18)	ND (1.1)	ND (0.742)	ND (0.685)	ND (0.162)	ND (1.12)
Total TCDF	**13.0**	ND (0.931)	ND (0.829)	ND (0.4)	ND (0.68)	1.45 B	ND (1.15)	ND (0.848)	ND (1.49)	ND (0.426)	**0.311**	ND (1.62)
Metals (ug/L)												
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---
MANGANESE	**115**	**109**	**107**	**123**	**109**	**111**	**120**	**130**	**110**	**93**	**98.5**	**92.3**
THALLIUM	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	14.3 B	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)												
PCB 77	ND (22.2)	8.9 B	ND (2.38)	3.17 B	ND (3.22)	10.6 B	ND (6.48)	12.5 B	ND (6.37)	ND (24.2)J	8.60 BJ	ND (11.4)
PCB 81	ND (10)	ND (1.8)	ND (1.14)	ND (1.57)	ND (1.41)	ND (3.97)	ND (5.96)	ND (8.21)	ND (6.38)	ND (2.24)	ND (6.37)	ND (11.1)
PCB 105	**56.8**	15 B	ND (8.54)	ND (7.29)	ND (11.2)	41.6 B	ND (11.4)	**16 J**	ND (17.3)	ND (9.04)	**8.60 J**	ND (12.7)
PCB-106/118	**90**	23.8 B	ND (10)	ND (7.47)	ND (14.9)	65 B	ND (12.8)	**31**	ND (21.1)	ND (13.5)	**12.7 J**	ND (13.9)
PCB 114	ND (12.2)	ND (7)	ND (8.72)	ND (7.88)	ND (14.3)	ND (8.26)	ND (12.2)	ND (13.6)	ND (18.7)	ND (10.6)	ND (7.95)	ND (14)
PCB 123	ND (22.6)	ND (7.44)	ND (10.8)	ND (7.61)	ND (14)	ND (9.14)	ND (14.3)	ND (11)	ND (20.3)	ND (15.4)	ND (11.4)	ND (14.7)
PCB 126	ND (12.6)	ND (7.35)	ND (10.2)	ND (9.02)	ND (12.7)	ND (10.8)	ND (14.7)	ND (15.3)	ND (19.4)	ND (9.27)	**6.78 J**	ND (16.3)
PCB 156	ND (6.45)	ND (1.97)	ND (2.25)	ND (1.64)	ND (2.38)	ND (5.05)	ND (5.26)	ND (12.9)	ND (6.67)	ND (2.31)	**5.83 J**	ND (13.9)
PCB 157	ND (6.25)	ND (2.14)	ND (2.21)	ND (1.65)	ND (2.47)	ND (5.23)	ND (5.46)	ND (7.61)	ND (7.08)	ND (2.56)	**4.11 J**	ND (14.7)
PCB 167	ND (6.17)	ND (2.13)	ND (2.21)	ND (1.61)	ND (2.48)	ND (5.18)	ND (5.12)	**6.86 J**	ND (6.78)	ND (2.52)	**3.46 J**	ND (14.3)
PCB 169	ND (7.16)	4.16 B	3 B	ND (1.97)	ND (5.37)	ND (7.85)	ND (7.08)	ND (9.44)	ND (7.99)	ND (6.32)	ND (9.48)	ND (17.4)
PCB 189	ND (2.46)	ND (0.763)	ND (1.04)	ND (1.21)	ND (2.8)	ND (3.29)	ND (1.26)	ND (2.85)	ND (3.21)	ND (1.26)	**5.17 J**	ND (2.56)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[(2)]	ND (49.5)	ND (47.9)	ND (24.7)	ND (25.7)	ND (26.8)	ND (25.8)	ND (26.3)	ND (25.7)	ND (24.9)	ND (25.2)	ND (26.2)	ND (52.6)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (49.5)	ND (47.9)	51.1 B	ND (51.3)	ND (53.5)	ND (51.6)	ND (52.6)	ND (51.5)	ND (49.7)	ND (50.5)	ND (52.3)	ND (105)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	ND (47.9)	ND (24.7)	ND (25.7)	ND (26.8)	ND (25.8)	ND (26.3)	ND (25.7)	ND (24.9)	ND (25.2)	**5.17**	ND (52.6)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	ND (47.9)B	ND (24.7)B	ND (25.7)	ND (26.8)	ND (25.8)	ND (26.3)	**138**	ND (24.9)	ND (25.2)	13.4 B	ND (52.6)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (24.8)	ND (23.9)	ND (24.7)	ND (25.7)	ND (26.8)	ND (25.8)	ND (26.3)	ND (25.7)	ND (24.9)	ND (25.2)	ND (26.2)	ND (52.6)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	ND (47.9)	ND (24.7)	ND (25.7)	**33.4**	ND (25.8)	ND (26.3)	ND (25.7)	ND (24.9)	ND (25.2)	ND (26.2)	ND (52.6)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	ND (47.9)	ND (24.7)	ND (25.7)	ND (26.8)	ND (25.8)	ND (26.3)	ND (25.7)	ND (24.9)	ND (25.2)	ND (26.2)	ND (52.6)
TOTAL PCB (CONGENERS)	**6630**	1370 B	54.1 B	3.17 B	33.4 B	1910 B	ND (52.6)	469 B	54.3 B	288 B	347 B	ND (105)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	**730**	155 B	ND (24.7)	ND (25.7)	ND (26.8)	545 B	ND (26.3)	**47**	ND (24.9)	ND (25.2)	**28.1**	ND (52.6)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**4030**	878 B	ND (24.7)	ND (25.7)B	ND (26.8)	1080 B	ND (26.3)	201 B	54.3 B	254 B	126 B	ND (52.6)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**1860**	329 B	ND (24.7)	ND (25.7)	ND (26.8)	286 B	ND (26.3)	82.4 B	ND (24.9)	34.2 B	**175**	ND (52.6)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (5)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results

(2): PCB 209

B: Blank Contamination

J: Estimated Concentration

ND: Not Detected

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-8
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05	01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)												
1,2,3,4,6,7,8-HPCDD	ND (2.28)	ND (1.2)	ND (1.87)	ND (1.11)	ND (1.62)	ND (0.79)	**2.76 J**	ND (1.29)	**3.95 J**	ND (1.97)	0.406 B	ND (2.5)
1,2,3,4,7,8-HXCDD	ND (1.14)	ND (1.3)	ND (1.62)	ND (0.753)	ND (1.33)	ND (0.948)	ND (0.82)	ND (1.21)	ND (2)	ND (0.913)	ND (0.278)	ND (1.73)
1,2,3,6,7,8-HXCDD	ND (1.07)	ND (1.41)	ND (1.63)	ND (0.743)	ND (1.42)	ND (0.961)	ND (0.8)	ND (1.27)	ND (1.99)	ND (0.934)	ND (0.292)	ND (1.8)
1,2,3,7,8,9-HXCDD	ND (1.04)	ND (1.28)	ND (1.6)	ND (0.706)	ND (1.3)	ND (0.902)	ND (0.789)	ND (1.2)	ND (1.92)	ND (0.893)	ND (0.288)	ND (1.78)
1,2,3,7,8-PECDD	ND (0.714)	ND (0.623)	ND (0.871)	ND (0.662)	ND (0.868)	ND (0.569)	ND (0.831)	ND (1.09)	ND (2.84)	ND (0.494)	ND (0.229)	ND (1.82)
2,3,7,8-TCDD	ND (0.666)	ND (0.554)	ND (0.622)	ND (0.522)	ND (0.959)	ND (0.766)	ND (0.789)	ND (0.809)	ND (1.55)	ND (0.449)	ND (0.195)	ND (1.45)
OCDD	6.57 B	ND (2.35)	ND (6.19)	5.83 B	ND (5.55)	ND (2.07)	20.2 B	7.23 B	48.3 BJ	**6.36 J**	**4.45 B**	**6.61 J**
TOTAL HPCDD	ND (2.28)	ND (1.2)	ND (1.87)	ND (1.11)	ND (1.62)	ND (0.79)	**5.36**	ND (1.29)	**8.12**	ND (1.97)	0.835 B	ND (2.5)
TOTAL HXCDD	ND (1.08)	ND (1.33)	ND (1.62)	ND (0.733)	ND (1.35)	ND (0.937)	ND (0.802)	ND (1.22)	ND (1.96)	ND (0.915)	ND (0.286)	ND (1.77)
TOTAL PECDD	ND (0.714)	ND (0.623)	ND (0.871)	ND (0.662)	ND (0.868)	ND (0.569)	ND (0.831)	ND (1.09)	ND (2.3)	ND (0.782)	ND (0.229)	ND (1.82)
Total TCDD	**2.24**	ND (1.9)	**3.25**	**15**	**3.14**	ND (1.6)	**5.88**	**2.01**	**72.4**	**5.2**	**0.512**	ND (1.45)
Furans (pg/L)												
1,2,3,4,6,7,8-HPCDF	ND (0.654)	ND (0.752)	ND (0.612)	ND (0.445)	ND (0.89)	ND (0.701)	ND (0.996)	ND (0.86)	**4.74 J**	ND (0.562)	**0.439 J**	ND (1.47)
1,2,3,4,7,8,9-HPCDF	ND (0.815)	ND (0.879)	ND (0.85)	ND (0.502)	ND (0.939)	ND (0.778)	ND (0.574)	ND (0.824)	ND (1.22)	ND (0.671)	ND (0.182)	ND (1.33)
1,2,3,4,7,8-HXCDF	ND (0.291)	ND (0.379)	ND (0.331)	ND (0.297)	ND (0.335)	ND (0.353)	ND (0.569)	ND (0.3)	ND (1.34)	ND (0.285)	ND (0.121)	ND (1.08)
1,2,3,6,7,8-HXCDF	ND (0.267)	ND (0.369)	ND (0.308)	ND (0.308)	ND (0.316)	ND (0.331)	ND (0.598)	ND (0.315)	ND (1.26)	ND (0.267)	ND (0.108)	ND (0.939)
1,2,3,7,8,9-HXCDF	ND (0.53)	ND (0.701)	ND (0.492)	ND (0.539)	ND (0.578)	ND (0.538)	ND (1.12)	ND (0.493)	ND (2.11)	ND (0.442)	ND (0.176)	ND (1.5)
1,2,3,7,8-PECDF	ND (1.06)	ND (0.963)	ND (0.607)	ND (0.783)	ND (1.03)	ND (2.05)	ND (1.2)	ND (1.01)	ND (3.38)	ND (0.592)	ND (0.163)	ND (1.17)
2,3,4,6,7,8-HXCDF	ND (0.331)	ND (0.435)	ND (0.35)	ND (0.325)	ND (0.342)	ND (0.344)	ND (0.676)	ND (0.335)	ND (1.46)	ND (0.29)	ND (0.125)	ND (1.13)
2,3,4,7,8-PECDF	ND (0.912)	ND (0.812)	ND (0.526)	ND (0.642)	ND (0.84)	ND (1.63)	ND (1.08)	ND (0.893)	ND (3.29)	ND (0.526)	ND (0.153)	ND (1.12)
2,3,7,8-TCDF	ND (1.19)	ND (0.768)	ND (0.732)	ND (0.356)	ND (0.928)	ND (1.63)	ND (0.711)	ND (0.767)	ND (1.77)	ND (0.402)	ND (0.248)	ND (2.07)
OCDF	ND (2.37)	ND (1.56)	ND (4.48)	**1.89 J**	ND (2.49)	ND (2.93)	**12.8 J**	**9.46 J**	**102**	**4.29 J**	5.36 B	ND (5.18)
TOTAL HPCDF	ND (0.725)	ND (0.807)	ND (0.721)	ND (0.47)	ND (0.91)	ND (0.734)	ND (3.04)	ND (0.842)	**4.74**	ND (0.612)	**0.439**	ND (1.4)
TOTAL HXCDF	ND (0.343)	ND (0.456)	ND (0.364)	ND (0.358)	ND (0.379)	ND (0.383)	ND (0.724)	ND (0.355)	ND (1.53)	ND (0.313)	ND (0.132)	ND (1.16)
TOTAL PECDF	ND (0.981)	ND (0.884)	ND (0.565)	ND (0.709)	ND (0.93)	ND (1.83)	ND (1.14)	ND (0.949)	ND (3.33)	ND (0.559)	ND (0.158)	ND (1.14)
Total TCDF	ND (1.19)	ND (0.768)	ND (0.732)	ND (0.356)	ND (0.928)	ND (1.63)	ND (0.711)	ND (0.767)	ND (1.77)	ND (0.402)	ND (0.248)	ND (2.07)
Metals (ug/L)												
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---
MANGANESE	**201**	**162**	**162**	**183**	**162**	**149**	**156**	**163**	**236**	**148**	**146**	**141**
THALLIUM	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)												
PCB 77	ND (6.87)	4.79 B	2.3 B	2.93 B	ND (3.06)	6.65 B	ND (6)	6.32 B	**9.65 J**	ND (5.73)	5.41 BJ	ND (11.5)
PCB 81	ND (6.6)	ND (1.32)	ND (1.11)	ND (1.37)	ND (3.11)	ND (2.41)	ND (5.86)	ND (3.58)	ND (3)	ND (3.8)	ND (3.08)	ND (11.8)
PCB 105	ND (12.1)	6.83 B	ND (9.37)	ND (12.4)	ND (11.8)	26.3 B	ND (12.6)	ND (10.1)	ND (15.3)	ND (8.47)	ND (5.75)	ND (14.5)
PCB-106/118	ND (40.9)	10.7 B	ND (9.99)	ND (11.8)	ND (14.4)	38.5 B	ND (11.4)	ND (12.8)	**44.5**	ND (10.5)	**9.39 J**	ND (21.5)
PCB 114	ND (13.3)	ND (4.29)	ND (9.53)	ND (13.8)	ND (13.5)	ND (6.86)	ND (14)	ND (11.2)	ND (17)	ND (9.78)	ND (5.99)	ND (16.6)
PCB 123	ND (42.5)	ND (6.95)	ND (9.96)	ND (12.4)	ND (15.4)	ND (8.06)	ND (11.8)	ND (12.8)	ND (21.8)	ND (11.4)	ND (4.09)	ND (21)
PCB 126	ND (14.1)	ND (4.52)	ND (11.3)	ND (15.5)	ND (12.4)	ND (9.05)	ND (16.8)	ND (13.3)	ND (17.5)	ND (8.84)	ND (5.97)	ND (16.6)
PCB 156	ND (6.01)	ND (1.95)	ND (2.73)	ND (2.74)	ND (2.99)	ND (4.17)	ND (5.56)	ND (5.32)	ND (6.8)	ND (2.28)	ND (3.26)	ND (12.3)
PCB 157	ND (5.92)	ND (2.1)	ND (2.91)	ND (2.8)	ND (3.19)	ND (4.35)	ND (5.86)	ND (5.53)	ND (7.21)	ND (2.49)	ND (4.63)	ND (12.4)
PCB 167	ND (5.92)	ND (2.03)	ND (2.6)	ND (2.5)	ND (3.45)	ND (4.29)	ND (5.72)	ND (5.22)	ND (7.1)	ND (2.51)	ND (3.51)	ND (12.7)
PCB 169	ND (7.62)	4.18 B	ND (2.59)	ND (3.29)	ND (3.56)	ND (6.26)	ND (8.62)	ND (7.33)	ND (7.91)	ND (2.66)	5.77 BJ	ND (16.8)
PCB 189	ND (2.1)	ND (0.906)	ND (1.56)	ND (1.93)	ND (2.07)	ND (3.02)	ND (1.58)	ND (2.41)	ND (2.9)	ND (1.24)	ND (2.08)	ND (4)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	**56.9**	**230**	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	**42.5**	ND (25.5)	ND (25.6)	ND (53.4)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)	ND (49.2)	ND (51.2)	ND (50.3)	ND (50)	ND (53)	ND (49.1)	ND (48.3)	ND (51)	ND (51.1)	ND (107)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	ND (24.2)	ND (25.5)	ND (25.6)	ND (53.4)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)B	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	**28.3**	ND (25.5)	5.77 B	ND (53.4)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (25.6)	ND (24.1)	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	ND (24.2)	ND (25.5)	ND (25.6)	ND (53.4)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	ND (24.2)	ND (25.5)	ND (25.6)	ND (53.4)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)	ND (24.6)	ND (25.6)	ND (25.1)	ND (25)	ND (26.5)	ND (24.5)	ND (24.2)	ND (25.5)	ND (25.6)	ND (53.4)
TOTAL PCB (CONGENERS)	**583**	539 B	2.30 B	2.93 B	ND (50.3)	949 B	**53**	6.32 B	**947**	306 B	20.6 B	ND (107)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (51.2)	ND (48.2)	ND (24.6)	ND (25.6)	ND (25.1)	294 B	ND (26.5)	ND (24.5)	**245**	ND (25.5)	**9.39**	ND (53.4)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**282**	231 B	ND (24.6)B	ND (25.6)	ND (25.1)	536 B	ND (26.5)	<24.5 B	**489**	273 B	5.41 B	ND (53.4)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**244**	55.6 B	ND (24.6)	ND (25.6)	ND (25.1)	119 B	ND (26.5)	ND (24.5)	142 B	33.2 B	ND (25.6)	ND (53.4)
SVOCs (ug/L)												
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (5)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results
(2): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-9
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	08/05	09/05	10/05	11/05	12/05[1]		01/06	02/06	03/06	04/06	05/06
Dioxins (pg/L)													
1,2,3,4,6,7,8-HPCDD	ND (1.19)	ND (1.38)	ND (1.5)	**0.646 J**	ND (2.58)	ND (0.818)	ND (2.57)	ND (2.56)	ND (1.17)	ND (0.965)	ND (0.757)	ND (0.204)	ND (2.03)
1,2,3,4,7,8-HXCDD	ND (1.17)	ND (1.04)	ND (1.2)	ND (0.647)	ND (1.56)	ND (0.904)	ND (1.52)	ND (1.28)	ND (1.28)	ND (1.25)	ND (1.01)	ND (0.237)	ND (1.38)
1,2,3,6,7,8-HXCDD	ND (1.14)	ND (1.09)	ND (1.24)	ND (0.694)	ND (1.54)	ND (0.885)	ND (1.5)	ND (1.27)	ND (1.39)	ND (1.34)	ND (1.06)	ND (0.254)	ND (1.43)
1,2,3,7,8,9-HXCDD	ND (1.09)	ND (1.01)	ND (1.2)	ND (0.635)	ND (1.47)	ND (0.844)	ND (1.48)	ND (1.24)	ND (1.29)	ND (1.26)	ND (0.998)	ND (0.248)	ND (1.42)
1,2,3,7,8-PECDD	ND (0.606)	ND (0.817)	ND (0.746)	ND (0.484)	ND (1)	ND (0.654)	ND (0.847)	ND (1.27)	ND (1.06)	ND (1.76)	ND (0.374)	ND (0.21)	ND (1.55)
2,3,7,8-TCDD	ND (0.715)	ND (0.689)	ND (0.621)	ND (0.628)	ND (1.03)	ND (0.909)	ND (1.07)	ND (1.72)	ND (1.15)	ND (1.37)	ND (0.537)	ND (0.252)	ND (1.64)
OCDD	5.85 B	5.93 B	ND (10.4)	4.82 B	ND (13.5)	**3.70 J**	ND (10.3)	6.80 B	7.53 B	4.02 B	**10.6 J**	5.61 B	**4.98 J**
TOTAL HPCDD	ND (1.19)	ND (1.38)	ND (1.5)	**0.646**	ND (2.58)	ND (0.818)	ND (2.57)	ND (2.56)	ND (1.17)	ND (0.965)	ND (0.757)	ND (0.204)	ND (2.03)
TOTAL HXCDD	ND (1.14)	ND (1.04)	ND (1.22)	ND (0.659)	ND (1.52)	ND (0.877)	ND (1.5)	ND (1.26)	ND (1.32)	ND (1.28)	ND (1.02)	ND (0.246)	ND (1.41)
TOTAL PECDD	ND (0.606)	ND (0.817)	ND (0.746)	ND (0.484)	ND (1)	ND (0.654)	ND (0.847)	ND (1.27)	ND (1.06)	ND (1.33)	ND (0.893)	ND (0.21)	ND (1.55)
Total TCDD	**1.98**	ND (0.689)	ND (0.621)	**2.25**	ND (1.03)	ND (0.909)	**4.09**	ND (1.72)	ND (1.15)	**10.6**	ND (0.537)	ND (0.252)	ND (1.64)
Furans (pg/L)													
1,2,3,4,6,7,8-HPCDF	ND (0.778)	ND (0.846)	ND (0.635)	ND (0.308)	ND (0.85)	ND (0.555)	ND (0.786)	ND (1.19)	ND (0.581)	ND (0.847)	ND (1.05)	ND (0.22)	ND (1.02)
1,2,3,4,7,8,9-HPCDF	ND (0.959)	ND (0.982)	ND (0.865)	ND (0.309)	ND (0.965)	ND (0.573)	ND (0.871)	ND (1.4)	ND (0.562)	ND (0.907)	ND (0.581)	ND (0.219)	ND (1.01)
1,2,3,4,7,8-HXCDF	ND (0.34)	ND (0.391)	ND (0.357)	ND (0.156)	ND (0.559)	ND (0.587)	ND (0.47)	ND (0.628)	ND (0.287)	ND (0.43)	ND (0.233)	ND (0.161)	ND (0.789)
1,2,3,6,7,8-HXCDF	ND (0.314)	ND (0.367)	ND (0.329)	ND (0.158)	ND (0.481)	ND (0.543)	ND (0.498)	ND (0.664)	ND (0.285)	ND (0.433)	ND (0.195)	ND (0.148)	ND (0.756)
1,2,3,7,8,9-HXCDF	ND (0.599)	ND (0.755)	ND (0.526)	ND (0.225)	ND (0.891)	ND (0.876)	ND (0.952)	ND (1.74)	ND (0.417)	ND (0.729)	ND (0.357)	ND (0.233)	ND (1.22)
1,2,3,7,8-PECDF	ND (1.11)	ND (0.981)	ND (0.707)	ND (0.693)	ND (1.17)	ND (2.49)	ND (1.34)	ND (2.04)	ND (1.06)	ND (2.5)	ND (0.448)	ND (0.149)	ND (0.86)
2,3,4,6,7,8-HXCDF	ND (0.357)	ND (0.439)	ND (0.361)	ND (0.161)	ND (0.547)	ND (0.577)	ND (0.526)	ND (0.826)	ND (0.302)	ND (0.456)	ND (0.238)	ND (0.165)	ND (0.889)
2,3,4,7,8-PECDF	ND (0.936)	ND (0.854)	ND (0.639)	ND (0.568)	ND (0.973)	ND (1.98)	ND (1.28)	ND (1.93)	ND (0.97)	ND (2.16)	ND (0.419)	ND (0.139)	ND (0.837)
2,3,7,8-TCDF	ND (1.1)	ND (0.975)	ND (0.557)	ND (0.389)	ND (0.7)	ND (1.06)	ND (1.01)	ND (1.53)	ND (0.682)	ND (1.52)	ND (0.379)	ND (0.258)	ND (1.8)
OCDF	ND (2.53)	ND (1.3)	ND (4.14)	ND (1.33)	ND (3.15)	ND (5.26)	**4.59 J**	ND (4.11)	ND (2.06)	ND (2.64)	**2.94 J**	1.55 B	ND (3.34)
TOTAL HPCDF	ND (0.858)	ND (0.905)	ND (0.743)	ND (0.308)	ND (0.9)	ND (0.562)	ND (0.825)	ND (1.29)	ND (0.572)	ND (0.876)	ND (1.14)	ND (0.22)	ND (1.02)
TOTAL HXCDF	ND (0.39)	ND (0.47)	ND (0.386)	ND (0.174)	ND (0.596)	ND (0.634)	ND (0.588)	ND (0.881)	ND (0.319)	ND (0.506)	ND (0.248)	ND (0.177)	ND (0.914)
TOTAL PECDF	ND (1.02)	ND (0.915)	ND (0.671)	ND (0.627)	ND (1.07)	ND (2.22)	ND (1.31)	ND (1.98)	ND (1.01)	ND (2.32)	ND (0.434)	ND (0.144)	ND (0.848)
Total TCDF	ND (1.1)	ND (0.975)	ND (0.557)	ND (0.389)	ND (0.7)	4.19 B	ND (1.01)	ND (1.53)	ND (0.682)	ND (1.52)	ND (0.379)	ND (0.258)	ND (1.8)
Metals (ug/L)													
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	ND (8.4)	---	---	---	---	---	---	---	---	---
MANGANESE	**515**	**487**	**491**	**478**	**501**	**481**	**466**	**480**	**519**	**493**	**455**	**460**	**439**
THALLIUM	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	10.2 B	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)													
PCB 77	ND (6.43)	5.19 B	3.15 B	4.32 B	ND (4.01)	10.7 B	ND (4.17)	ND (5.06)	6.65 B	ND (6)	ND (3.71)	ND (4.24)	ND (10.3)
PCB 81	ND (5.86)	ND (1.66)	ND (1.26)	ND (2.18)	ND (1.5)	ND (3.3)	ND (3.92)	ND (4.77)	ND (2.93)	ND (5.89)	ND (2.12)	ND (2.02)	ND (10)
PCB 105	ND (16)	7.3 B	ND (11.9)	ND (9.75)	ND (11.7)	36.1 B	ND (12.6)	ND (12)	ND (9.24)	ND (18.1)	ND (10.6)	ND (7.46)	ND (18.5)
PCB-106/118	ND (20.9)	ND (17.2)	ND (12.3)	ND (12.6)	ND (9.64)	51.4 B	ND (15.9)	ND (13.9)	ND (12.2)	ND (19.8)	ND (16)	ND (7.35)	ND (17.2)
PCB 114	ND (17.2)	ND (7.68)	ND (11.5)	ND (10.2)	ND (12.5)	ND (9.57)	ND (14.5)	ND (13.1)	ND (10.1)	ND (22.1)	ND (12.3)	ND (8.89)	ND (20.5)
PCB 123	ND (22.6)	ND (8.7)	ND (12.5)	ND (12.5)	ND (9.61)	ND (10)	ND (16)	ND (14.7)	ND (12.7)	ND (21.3)	ND (16.7)	ND (6.87)	ND (17.3)
PCB 126	ND (17.7)	ND (8.2)	ND (13.3)	ND (10.9)	ND (13.9)	ND (12.8)	ND (17.2)	ND (15.9)	ND (11.1)	ND (22.3)	ND (10.8)	ND (8.29)	ND (21.9)
PCB 156	ND (4.7)	ND (1.85)	ND (1.6)	ND (2.66)	ND (2.1)	ND (3.54)	ND (5.85)	ND (4.99)	ND (4.57)	ND (5.45)	ND (2.39)	ND (3.62)	ND (11.9)
PCB 157	ND (4.22)	ND (1.9)	ND (1.71)	ND (2.83)	ND (2.26)	ND (3.67)	ND (6.17)	ND (5.19)	ND (4.59)	ND (5.62)	ND (2.58)	ND (3.71)	ND (13)
PCB 167	ND (5.3)	ND (1.83)	ND (1.64)	ND (2.85)	ND (2.29)	ND (3.47)	ND (5.73)	ND (4.95)	ND (4.81)	ND (5.38)	ND (2.54)	ND (4.4)	ND (12.4)
PCB 169	ND (3.52)	3.78 B	ND (3.14)	3.98 B	4.03 B	4.33 B	ND (8.25)	ND (7.06)	ND (5.81)	ND (6.74)	ND (24.3)J	3.93 BJ	ND (16.6)
PCB 189	ND (1.68)	ND (1.06)	ND (1.31)	ND (1.6)	ND (1.5)	ND (2.07)	ND (4.97)	ND (1.66)	ND (2.55)	ND (2.66)	ND (1.32)	ND (3.34)	ND (4.65)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	ND (50)	ND (49.3)	ND (24.7)	ND (25.5)	ND (25.6)	ND (24.9)	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	**66.9**	**66.5**	88.3 B	ND (51)	ND (51.1)	ND (49.8)	ND (50.6)	ND (51.6)	ND (48.9)	ND (48.1)	ND (48.6)	ND (52)	ND (105)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (49.3)	ND (24.7)	ND (25.5)	ND (25.6)	ND (24.9)	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (50)	<49.3 B	ND (24.7)	<25.5 B	ND (25.6)	<24.9 B	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	3.93 B	ND (52.7)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (25)	ND (24.6)	ND (24.7)	ND (25.5)	ND (25.6)	ND (24.9)	ND (25.3)	ND (25.8)	46.3 B	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (49.3)	ND (24.7)	ND (25.5)	ND (25.6)	ND (24.9)	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (49.3)	ND (24.7)	ND (25.5)	ND (25.6)	ND (24.9)	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL PCB (CONGENERS)	**864**	626 B	91.5 B	8.30 B	4.03 B	2120 B	ND (50.6)	ND (51.6)	403 B	25.2 B	453 B	3.93 B	ND (105)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (50)	ND (49.3)	ND (24.7)	ND (25.5)	ND (25.6)	512 B	ND (25.3)	ND (25.8)	ND (24.5)	ND (24)	ND (24.3)	ND (26)	ND (52.7)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**524**	393 B	ND (24.7)B	ND (25.5)	<31.6	1240 B	ND (25.3)	ND (25.8)	112 B	25.2 B	350 B	ND (26)	ND (52.7)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**274**	155 B	ND (24.7)	ND (25.5)	ND (25.6)	360 B	ND (25.3)	ND (25.8)	244 B	ND (24)	99.5 B	ND (26)	ND (52.7)
SVOCs (ug/L)													
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)J	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)J	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (5)	ND (2)J	ND (2)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results
(2): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-10
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	06/05	07/05	8/05[1]		09/05	10/05	11/05	12/05	1/06[1]		2/05[1]		3/06[1]		4/06[1]		5/06[1]	
Dioxins (pg/L)																		
1,2,3,4,6,7,8-HPCDD	ND (2.68)	**1.97 J**	ND (2.57)	ND (2.37)	**1.37 J**	ND (1.31)	**9.99 J**	**6.29 J**	**3.92 J**	**2.4 J**	**4.55 J**	**7.14 J**	ND (2.29)	ND (2.32)	2.07 B	2.37 B	ND (1.66)	ND (1.53)
1,2,3,4,7,8-HXCDD	ND (1.54)	ND (1.15)	ND (1.06)	ND (1.74)	ND (0.653)	ND (1.92)	ND (1.11)	ND (1.06)	ND (1.38)	ND (1.17)	ND (2.59)	ND (2.27)	ND (0.807)	ND (1.01)	ND (0.35)	ND (0.299)	ND (1.28)	ND (1.36)
1,2,3,6,7,8-HXCDD	ND (1.61)	ND (1.2)	ND (1.06)	ND (1.7)	ND (0.646)	ND (1.95)	ND (1.08)	ND (1)	ND (1.44)	ND (0.22)	ND (2.55)	ND (2.4)	ND (0.801)	ND (1.11)	ND (0.365)	ND (0.317)	ND (1.37)	ND (1.45)
1,2,3,7,8,9-HXCDD	ND (1.49)	ND (1.12)	ND (1.04)	ND (1.69)	ND (0.613)	ND (1.83)	ND (1.03)	ND (1)	ND (1.36)	ND (1.16)	ND (2.48)	ND (2.26)	ND (0.776)	ND (1.03)	ND (0.361)	ND (0.311)	ND (1.34)	ND (1.42)
1,2,3,7,8-PECDD	ND (0.874)	ND (0.948)	ND (0.708)	ND (1.11)	ND (0.722)	ND (1.58)	ND (0.612)	ND (1.09)	ND (1.04)	ND (1.11)	ND (2.39)	ND (2.16)	ND (0.481)	ND (0.48)	ND (0.386)	ND (0.244)	ND (1.25)	ND (1.19)
2,3,7,8-TCDD	ND (0.8)	ND (0.815)	ND (0.72)	ND (0.837)	ND (0.66)	ND (0.984)	ND (0.595)	ND (1.13)	ND (0.834)	ND (0.637)	ND (1.52)	ND (1.49)	ND (0.674)	ND (0.554)	ND (0.333)	ND (0.254)	ND (1.34)	ND (1.17)
OCDD	**17.2 J**	**34.3 J**	ND (20.3)	ND (10)	15.6 B	14.9 B	**14.7 J**	28.3 B	50.3 B	38.1 B	62.4 B	97 B	**24 J**	**23.5 J**	17.9 B	13.5 B	**7.55 J**	**5.05 J**
TOTAL HPCDD	ND (2.68)	**4.08**	ND (2.57)	ND (2.37)	**1.37**	**1.31**	**11.7**	**6.29**	**7.26**	**5.14**	**8**	**12.9**	ND (2.29)	**1.22**	3.5 B	3.22 B	ND (1.66)	ND (1.53)
TOTAL HXCDD	ND (1.55)	ND (1.16)	ND (1.05)	ND (1.71)	ND (0.637)	ND (1.9)	**8.89**	**2.01**	ND (1.39)	ND (1.18)	ND (2.53)	ND (1.4)	**1.19**	ND (2.39)	ND (0.359)	**1.15**	ND (1.33)	ND (1.41)
TOTAL PECDD	ND (0.874)	ND (0.948)	ND (0.708)	ND (1.11)	ND (0.722)	ND (1.58)	**1.03**	ND (1.09)	ND (1.04)	ND (1.11)	ND (2.39)	ND (1.64)	ND (0.995)	ND (0.48)	ND (0.386)	ND (0.244)	ND (1.25)	ND (1.19)
Total TCDD	ND (0.8)	ND (0.815)	ND (0.72)	ND (0.837)	ND (0.66)	ND (0.984)	ND (0.595)	ND (1.13)	ND (0.834)	ND (0.637)	ND (1.52)	ND (1.49)	ND (0.674)	ND (0.554)	ND (0.333)	ND (0.254)	ND (1.34)	ND (1.17)
Furans (pg/L)																		
1,2,3,4,6,7,8-HPCDF	ND (1.75)	ND (0.833)	ND (0.661)	ND (0.626)	ND (0.377)	ND (0.591)	ND (0.551)	ND (1.12)	ND (0.918)	ND (0.85)	ND (1.06)	ND (1.41)	ND (0.583)	ND (0.97)	ND (0.952)	ND (0.224)	ND (1.32)	ND (1.33)
1,2,3,4,7,8,9-HPCDF	ND (1.97)	ND (1.03)	ND (1)	ND (0.92)	ND (0.381)	ND (0.6)	ND (0.629)	ND (0.913)	ND (0.863)	ND (0.859)	ND (1.19)	ND (1.44)	ND (0.658)	ND (0.508)	**0.737 J**	ND (0.213)	ND (1.33)	ND (1.32)
1,2,3,4,7,8-HXCDF	ND (0.904)	ND (0.474)	ND (0.346)	ND (0.402)	ND (0.228)	ND (0.459)	ND (0.349)	ND (0.634)	ND (0.443)	ND (0.638)	ND (0.526)	ND (0.493)	ND (0.258)	ND (0.257)	ND (0.214)	ND (0.112)	ND (0.832)	ND (0.764)
1,2,3,6,7,8-HXCDF	ND (0.877)	ND (0.438)	ND (0.322)	ND (0.406)	ND (0.226)	ND (0.431)	ND (0.342)	ND (0.638)	ND (0.443)	ND (0.642)	ND (0.538)	ND (0.498)	ND (0.241)	ND (0.24)	ND (0.213)	ND (0.11)	ND (0.704)	ND (0.737)
1,2,3,7,8,9-HXCDF	ND (1.55)	ND (0.928)	ND (0.532)	ND (0.627)	ND (0.418)	ND (0.762)	ND (0.551)	ND (1.17)	ND (0.703)	ND (0.951)	ND (0.942)	ND (0.826)	ND (0.394)	ND (0.382)	ND (0.337)	ND (0.171)	ND (1.22)	ND (1.15)
1,2,3,7,8-PECDF	ND (1.57)	ND (1.1)	ND (0.789)	ND (0.733)	ND (0.638)	ND (0.977)	ND (1.42)	ND (1.47)	ND (1.2)	ND (1.02)	ND (2.45)	ND (2.17)	ND (0.504)	ND (0.362)	ND (0.232)	ND (0.186)	ND (0.822)	ND (0.933)
2,3,4,6,7,8-HXCDF	ND (0.953)	ND (0.549)	ND (0.371)	ND (0.441)	ND (0.254)	ND (0.483)	ND (0.36)	ND (0.735)	ND (0.492)	ND (0.682)	ND (0.57)	ND (0.523)	ND (0.272)	ND (0.263)	ND (0.235)	ND (0.121)	ND (0.904)	ND (0.876)
2,3,4,7,8-PECDF	ND (1.41)	ND (1.04)	ND (0.702)	ND (0.671)	ND (0.579)	ND (0.848)	ND (1.22)	ND (1.28)	ND (1.09)	ND (0.909)	ND (2.19)	ND (2.21)	ND (0.496)	ND (0.353)	ND (0.218)	ND (0.177)	ND (0.757)	ND (0.931)
2,3,7,8-TCDF	ND (1.37)	ND (1.02)	ND (0.49)	ND (0.694)	ND (0.409)	ND (0.987)	ND (1.01)	ND (0.96)	ND (0.71)	ND (1.28)	ND (1.7)	ND (1.41)	ND (0.349)	ND (0.319)	ND (0.361)	ND (0.224)	ND (1.6)	ND (1.34)
OCDF	ND (4.25)	**3.49 J**	ND (3.15)	ND (3.94)	ND (1.12)	ND (3.76)	ND (1.43)	**4.18 J**	**3.71 J**	**2.52 J**	**3.85 J**	**6.27 J**	**13.9 J**	**2.19 J**	3.21 B	2.63 B	ND (2.5)	**6.63 J**
TOTAL HPCDF	ND (1.85)	ND (0.917)	ND (0.818)	ND (0.76)	ND (0.378)	ND (0.595)	ND (0.586)	ND (2.7)	ND (0.892)	ND (0.854)	ND (1.12)	ND (1.42)	ND (0.618)	ND (1.03)	**1.69**	ND (0.218)	ND (1.32)	ND (1.32)
TOTAL HXCDF	ND (1.04)	ND (0.574)	ND (0.385)	ND (0.461)	ND (0.275)	ND (0.516)	ND (0.393)	ND (0.779)	ND (0.514)	ND (0.721)	ND (0.632)	ND (0.579)	ND (0.54)	ND (0.279)	ND (0.25)	ND (0.128)	ND (0.915)	ND (0.882)
TOTAL PECDF	ND (1.49)	ND (1.07)	ND (0.744)	ND (0.701)	ND (0.607)	ND (0.909)	ND (1.32)	ND (1.37)	ND (1.14)	ND (0.962)	ND (2.32)	ND (2.19)	ND (0.5)	ND (0.357)	ND (0.225)	ND (0.182)	ND (0.79)	ND (0.932)
Total TCDF	ND (1.37)	ND (1.02)	ND (0.49)	ND (0.694)	ND (0.409)	ND (0.987)	ND (1.01)	ND (0.96)	ND (0.71)	ND (1.28)	ND (1.7)	ND (1.41)	ND (0.443)	ND (0.319)	ND (0.361)	ND (0.224)	ND (1.6)	ND (1.34)
Metals (ug/L)																		
ANTIMONY	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	---	---	---	ND (8.4)	---	---	---	---	---	---	---	---	---	---	---	---	---
MANGANESE	**1370**	**1290**	**1290**	**1310**	**1370**	**1370**	**1030**	**870**	**317**	**315**	**651**	**654**	**721**	**693**	**766**	**771**	**776**	**745**
THALLIUM	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	60	62.5	ND (10)	ND (10)
PCBs (pg/L)																		
PCB 77	ND (17.6)	4.05 B	11.7 B	ND (1.29)	8.98 B	2.98 B	ND (3.73)	ND (4.4)	ND (3.24)	ND (3.76)	ND (6.96)	ND (5.27)	ND (5.53)	ND (4.67)	ND (5.09)	ND (3.11)	ND (8.48)	ND (8.2)
PCB 81	ND (5.25)	ND (1.18)	ND (1.94)	ND (1.26)	ND (2.67)	ND (1.17)	ND (3.68)	ND (4.2)	ND (3.22)	ND (3.74)	ND (6.89)	ND (5.25)	ND (5.28)	ND (4.59)	ND (4.85)	ND (3.02)	ND (8.25)	ND (7.98)
PCB 105	ND (17.1)	5.85 B	**66.3**	**6.95 J**	ND (15)	ND (10.1)	ND (9.02)	ND (15.1)	ND (11.1)	ND (11.6)	ND (15.2)	ND (14.8)	ND (10.1)	ND (16.1)	ND (5.83)	ND (4.63)	ND (11.3)	ND (14.3)
PCB-106/118	ND (24)	9.57 B	**210**	ND (24.9)	ND (12.5)	ND (12)	15.5 B	ND (14.6)	ND (13.1)	ND (12.5)	ND (18.2)	ND (20.1)	ND (12.7)	ND (13.1)	ND (6.49)	**10.1 J**	ND (12.5)	ND (16.1)
PCB 114	ND (16)	ND (3.37)	ND (5.76)	ND (3.28)	ND (13.3)	ND (11)	ND (10.5)	ND (16.5)	ND (11.7)	ND (14.3)	ND (18.2)	ND (17.4)	ND (11.7)	ND (18.6)	ND (6.64)	ND (5.41)	ND (12.2)	ND (15.5)
PCB 123	ND (22)	ND (7.2)	ND (12.9)	ND (3.73)	ND (14.8)	ND (11.7)	ND (6.86)	ND (15)	ND (13.6)	ND (13.6)	ND (18.5)	ND (21.9)	ND (13.4)	ND (13.4)	ND (6.39)	ND (12.6)	ND (12.7)	ND (17.5)
PCB 126	ND (17.1)	ND (3.69)	ND (6.46)	ND (3.72)	ND (13.9)	ND (10.5)	ND (13.3)	ND (17.7)	ND (14.7)	ND (15.5)	ND (18.5)	ND (17.6)	ND (10.7)	ND (16.1)	ND (7.71)	ND (6.14)	ND (14.2)	ND (17.2)
PCB 156	ND (7.66)	ND (1.33)	**38.9**	ND (1.31)	ND (3.49)	ND (2.25)	ND (3.39)	ND (4.07)	ND (3.39)	ND (2.46)	ND (5.14)	ND (6.41)	ND (3.5)	ND (2.85)	ND (4.54)	ND (3.84)	ND (6.7)	ND (9.51)
PCB 157	ND (8.14)	ND (1.26)	**7.71 J**	ND (1.42)	ND (3.76)	ND (2.3)	ND (3.55)	ND (4.28)	ND (3.34)	ND (2.6)	ND (5.52)	ND (6.98)	ND (3.69)	ND (2.73)	ND (6.17)	ND (2.47)	ND (6.82)	ND (9.96)
PCB 167	ND (8.14)	ND (1.2)	**14.1 J**	ND (1.36)	ND (3.48)	ND (2.36)	ND (3.36)	ND (4.05)	ND (3.42)	ND (2.44)	ND (5.09)	ND (6.42)	ND (3.91)	ND (3.06)	ND (2.31)	ND (2.94)	ND (6.66)	ND (9.49)
PCB 169	ND (9.76)	4.27 B	ND (4.35)	3.27 B	ND (7.12)	4.07 B	ND (7.66)	ND (5.34)	ND (4.44)	**3.45 J**	ND (6.29)	ND (8.09)	ND (3.88)	ND (5.24)	ND (6.55)	5.18 BJ	ND (9.13)	ND (11.7)
PCB 189	ND (2.56)	ND (1.43)	**12.6 J**	ND (0.8)	ND (2.7)	ND (2.92)	ND (1.93)	ND (1.77)	ND (2.48)	ND (1.79)	ND (2.28)	ND (3.69)	ND (1.06)	ND (1.3)	ND (1.03)	ND (1.02)	ND (2.63)	ND (2.93)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)[2]	ND (50.2)	ND (52.8)	ND (24.7)	ND (24.6)	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	ND (24.5)	ND (25.1)	ND (25.1)	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	**87.9**	ND (52.8)	833 B	890 B	ND (50.3)	ND (50.1)	ND (49.7)	ND (50.4)	ND (49.4)	ND (49.5)	ND (49.2)	ND (49)	ND (50.2)	ND (50.1)	ND (50.6)	ND (51.9)	ND (107)	ND (104)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (50.2)	ND (52.8)	**5930**	ND (24.6)	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	**51.2**	ND (24.6)	ND (24.5)	ND (25.1)	ND (25.1)	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (50.2)	ND (52.8)B	4550 B	ND (24.6)B	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	**67**	ND (24.6)	**24.9**	ND (25.1)	ND (25.1)	ND (25.3)	5.18 B	ND (52.7)	ND (52.1)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (25.1)	ND (26.4)	148 B	68.9 B	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	ND (24.5)	ND (25.1)	ND (25.1)	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (50.2)	ND (52.8)	**124**	ND (24.6)	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	ND (24.5)	ND (25.1)	ND (25.1)	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (50.2)	ND (52.8)	**1960**	ND (24.6)	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	ND (24.5)	ND (25.1)	ND (25.1)	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL PCB (CONGENERS)	**291**	122 B	16400 B	1390 B	8.98 B	7.04 B	258 B	ND (50.4)	ND (49.4)	**118**	27.1 B	107 B	ND (50.2)	**232**	ND (50.6)	15.2 B	ND (107)	ND (104)
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (50.2)	ND (52.8)	**1460**	ND (24.6)	ND (25.2)	ND (25)	140 B	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	**28.8**	ND (25.1)	ND (25.1)	ND (25.3)	**10.1**	ND (52.7)	ND (52.1)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	**104**	103 B	784 B	53.1 B	ND (25.2)	ND (25)	118 B	ND (25.2)	ND (24.7)	ND (24.7)	27.1 B	53.8 B	ND (25.1)	**203**	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	**99.5**	ND (26.4)	**565**	363	ND (25.2)	ND (25)	ND (24.9)	ND (25.2)	ND (24.7)	ND (24.7)	ND (24.6)	ND (24.5)	ND (25.1)	**28.5**	ND (25.3)	ND (26)	ND (52.7)	ND (52.1)
SVOCs (ug/L)																		
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (5)	ND (2)J	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

(1): First column - original results, second column - duplicate sample results
(2): PCB 209
B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: QA/QC Blanks
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Month	6/05		7/05			8/05			9/05		10/05		11/05		12/05				1/06		2/06		3/06			4/06		5/06	
Sample Date	6/13/05	6/14/05	7/19/05	7/21/05	7/22/05	8/23/05	8/24/05	8/25/05	9/21/05	9/22/05	10/11/05	10/12/05	11/14/05	11/15/05	12/19/05	12/19/05	12/21/05	12/21/05	1/19/06	1/20/06	2/15/06	2/16/06	3/21/06	3/21/06	3/22/06	4/11/06	4/12/06	5/16/06	5/17/06
Sample ID	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-3	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2	EQ-1	EQBLK-1	EQ-2	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-2	EQBLK-1	EQBLK-2	EQBLK-1	EQBLK-2
Dioxins (pg/L)																													
1,2,3,4,6,7,8-HPCDD	ND (1.91)	---	ND (1.16)	ND (2.57)	ND (1.16)	ND (1.31)	ND (2.06)	ND (1.14)	ND (0.782)	ND (0.663)	ND (1.92)	ND (2.16)	ND (1.6)	ND (1.02)	**3.68 J**	---	**12.9 J**	---	---	ND (1.29)	ND (1.65)	ND (1.7)	ND (1.81)	---	ND (1.78)	**0.825 J**	ND (0.508)	ND (2.13)	ND (2.58)
1,2,3,4,7,8-HXCDD	ND (1.8)	---	ND (1.01)	ND (1.76)	ND (1.17)	ND (1.3)	ND (1.81)	ND (1.73)	ND (0.719)	ND (0.644)	ND (2.25)	ND (2.29)	ND (1.34)	ND (1.43)	ND (1.62)	---	ND (0.96)	---	---	ND (1.69)	ND (1.56)	ND (1.99)	ND (0.463)	---	ND (0.885)	ND (0.254)	ND (0.183)	ND (1.79)	ND (1.79)
1,2,3,6,7,8-HXCDD	ND (1.88)	---	ND (1.13)	ND (1.69)	ND (1.15)	ND (1.36)	ND (1.86)	ND (1.71)	ND (0.725)	ND (0.686)	ND (2.34)	ND (2.35)	ND (1.28)	ND (1.46)	ND (1.49)	---	ND (0.976)	---	---	ND (1.66)	ND (1.6)	ND (2.11)	ND (0.476)	---	ND (0.91)	ND (0.272)	ND (0.197)	ND (1.85)	ND (1.81)
1,2,3,7,8,9-HXCDD	ND (1.85)	---	ND (1.03)	ND (1.73)	ND (1.1)	ND (1.31)	ND (1.81)	ND (1.69)	ND (0.682)	ND (0.629)	ND (2.17)	ND (2.2)	ND (1.24)	ND (1.37)	ND (1.51)	---	ND (0.945)	---	---	ND (1.62)	ND (1.53)	ND (1.98)	ND (0.454)	---	ND (0.868)	ND (0.266)	ND (0.192)	ND (1.84)	ND (1.82)
1,2,3,7,8-PECDD	ND (1.26)	---	ND (0.984)	ND (1.25)	ND (0.858)	ND (0.909)	ND (0.897)	ND (0.979)	ND (0.521)	ND (0.584)	ND (1.14)	ND (1.17)	ND (0.894)	ND (0.707)	ND (1.32)	---	ND (0.661)	---	---	ND (0.894)	ND (3.44)	ND (1.51)	ND (0.349)	---	ND (0.908)	ND (0.211)	ND (0.22)	ND (1.88)	ND (2.1)
2,3,7,8-TCDD	ND (0.776)	---	ND (0.906)	ND (1.35)	ND (0.918)	ND (0.751)	ND (0.692)	ND (0.603)	ND (0.794)	ND (0.508)	ND (1.11)	ND (1.17)	ND (0.76)	ND (0.757)	ND (1.35)	---	ND (0.829)	---	---	ND (0.591)	ND (1.07)	ND (1.2)	ND (0.56)	---	ND (0.675)	ND (0.211)	ND (0.209)	ND (1.45)	ND (1.95)
OCDD	ND (7.17)	---	13.8 BJ	ND (5.51)	**3.71 J**	ND (6.42)	ND (7.6)	ND (5.55)	7.86 BJ	8.45 BJ	**17.6 J**	ND (4.83)	ND (5.51)	ND (3.41)	33.2 B	---	96.5 B	---	---	7.66 BJ	ND (4.88)	7.22 BJ	ND (2.81)	---	ND (6.61)	8.98 BJ	13.1 BJ	ND (2.91)	ND (2.89)
TOTAL HPCDD	ND (1.91)	---	ND (1.16)	ND (2.57)	ND (1.16)	ND (1.31)	ND (2.06)	ND (1.14)	ND (0.782)	ND (0.663)	ND (1.92)	ND (2.16)	ND (1.6)	ND (1.02)	**3.68**	---	**25.1**	---	---	ND (1.29)	ND (1.65)	ND (1.7)	ND (1.81)	---	ND (1.78)	**1.88**	**1.23**	ND (2.13)	ND (2.58)
TOTAL HXCDD	ND (1.84)	---	ND (1.06)	ND (1.73)	ND (1.14)	ND (1.32)	ND (1.83)	ND (1.71)	ND (0.708)	ND (0.653)	ND (2.26)	ND (2.28)	ND (1.28)	ND (1.42)	ND (1.53)	---	ND (0.96)	---	---	ND (1.66)	ND (1.56)	ND (2.03)	ND (0.396)	---	ND (0.889)	ND (0.264)	ND (0.191)	ND (1.83)	ND (1.81)
TOTAL PECDD	ND (1.26)	---	ND (0.984)	ND (1.25)	ND (0.858)	ND (0.909)	ND (0.897)	ND (0.979)	ND (0.521)	ND (0.584)	ND (1.14)	ND (1.17)	ND (0.894)	ND (0.707)	ND (1.32)	---	ND (0.661)	---	---	ND (0.894)	ND (3.44)	ND (1.51)	ND (0.965)	---	ND (1.6)	ND (0.211)	ND (0.22)	ND (1.88)	ND (2.1)
Total TCDD	ND (0.776)	---	ND (0.906)	ND (1.35)	ND (0.918)	ND (0.751)	ND (0.692)	ND (0.603)	ND (0.794)	ND (0.508)	ND (1.11)	ND (1.17)	ND (0.76)	ND (0.757)	ND (1.35)	---	ND (0.829)	---	---	ND (0.591)	ND (1.07)	ND (1.2)	ND (0.56)	---	ND (0.675)	ND (0.211)	**0.576**	ND (1.45)	ND (1.95)
Furans (pg/L)																													
1,2,3,4,6,7,8-HPCDF	ND (1.81)	---	ND (0.849)	ND (1.03)	ND (0.882)	ND (0.481)	ND (0.661)	ND (0.443)	ND (0.356)	ND (0.288)	ND (1.01)	ND (1.04)	ND (0.734)	ND (0.732)	ND (1.29)	---	**2.7 J**	---	---	ND (0.804)	ND (0.974)	ND (1.85)	ND (1.29)	---	ND (0.874)	ND (0.191)	**0.315 J**	ND (2.27)	ND (1.72)
1,2,3,4,7,8,9-HPCDF	ND (1.14)	---	ND (0.835)	ND (1.2)	ND (1.03)	ND (0.67)	ND (1.03)	ND (0.701)	ND (0.365)	ND (0.308)	ND (1.15)	ND (1.1)	ND (0.839)	ND (0.851)	ND (1.37)	---	ND (0.685)	---	---	ND (0.812)	ND (1.06)	ND (1.93)	ND (0.416)	---	ND (0.94)	ND (0.185)	ND (0.164)	ND (2.07)	ND (1.67)
1,2,3,4,7,8-HXCDF	ND (1.05)	---	ND (0.315)	ND (0.541)	ND (0.516)	ND (0.49)	ND (0.511)	ND (0.345)	ND (0.247)	ND (0.178)	ND (0.771)	ND (1.39)	ND (0.733)	ND (0.48)	ND (0.463)	---	ND (0.295)	---	---	ND (0.397)	ND (0.481)	ND (0.54)	ND (0.234)	---	ND (0.404)	ND (0.117)	ND (0.126)	ND (1.05)	ND (1.04)
1,2,3,6,7,8-HXCDF	ND (1)	---	ND (0.326)	ND (0.53)	ND (0.497)	ND (0.48)	ND (0.494)	ND (0.328)	ND (0.246)	ND (0.184)	ND (0.732)	ND (1.2)	ND (0.687)	ND (0.461)	ND (0.471)	---	ND (0.307)	---	---	ND (0.402)	ND (0.485)	ND (0.531)	ND (0.219)	---	ND (0.365)	ND (0.112)	ND (0.111)	ND (0.731)	ND (0.893)
1,2,3,7,8,9-HXCDF	ND (0.824)	---	ND (0.493)	ND (0.817)	ND (0.987)	ND (0.734)	ND (0.767)	ND (0.479)	ND (0.365)	ND (0.3)	ND (1.34)	ND (2.26)	ND (1.28)	ND (0.791)	ND (0.869)	---	ND (0.546)	---	---	ND (0.618)	ND (0.842)	ND (1.02)	ND (0.377)	---	ND (0.619)	ND (0.172)	ND (0.182)	ND (1.68)	ND (1.45)
1,2,3,7,8-PECDF	ND (2.18)	---	ND (0.92)	ND (1.59)	ND (0.997)	ND (0.859)	ND (1.04)	ND (0.592)	ND (0.704)	ND (0.54)	ND (1.51)	ND (1.69)	ND (1.55)	ND (1.38)	ND (1.68)	---	ND (0.927)	---	---	ND (0.99)	ND (3)	ND (2.27)	ND (0.54)	---	ND (0.762)	ND (0.14)	ND (0.177)	ND (1.56)	ND (0.985)
2,3,4,6,7,8-HXCDF	ND (0.561)	---	ND (0.334)	ND (0.561)	ND (0.614)	ND (0.528)	ND (0.545)	ND (0.344)	ND (0.266)	ND (0.187)	ND (0.838)	ND (1.52)	ND (0.752)	ND (0.491)	ND (0.544)	---	ND (0.34)	---	---	ND (0.438)	ND (0.476)	ND (0.563)	ND (0.253)	---	ND (0.404)	ND (0.123)	ND (0.126)	ND (1.14)	ND (1.08)
2,3,4,7,8-PECDF	ND (1.83)	---	ND (0.845)	ND (1.36)	**1.16 J**	ND (0.73)	ND (0.838)	ND (0.486)	ND (0.619)	ND (0.445)	ND (1.3)	ND (1.43)	ND (1.25)	ND (1.15)	ND (1.51)	---	ND (0.756)	---	---	ND (0.952)	ND (2.83)	ND (2.1)	ND (0.515)	---	ND (0.738)	ND (0.134)	ND (0.166)	ND (1.47)	ND (0.979)
2,3,7,8-TCDF	ND (1.12)	---	ND (0.677)	ND (0.884)	ND (1.1)	ND (0.646)	ND (0.672)	ND (0.547)	ND (0.346)	ND (0.351)	ND (1.28)	ND (1.23)	ND (1)	ND (0.935)	ND (1.19)	---	ND (0.86)	---	---	ND (0.61)	ND (1.36)	ND (1.69)	ND (0.329)	---	ND (0.436)	ND (0.237)	ND (0.205)	ND (1.64)	ND (1.81)
OCDF	ND (9.51)	---	ND (1.69)	ND (4.02)	ND (2.05)	ND (3.13)	ND (3.05)	ND (2.81)	ND (0.996)	**4.27 J**	ND (3.19)	ND (3.67)	ND (2.75)	ND (2.49)	**7.08 J**	---	**10.6 J**	---	---	ND (1.61)	ND (3.91)	ND (4.21)	ND (2.22)	---	ND (4.3)	1.37 BJ	18.6 BJ	ND (3.2)	ND (3.72)
TOTAL HPCDF	ND (2.09)	---	ND (0.843)	ND (1.11)	ND (0.946)	ND (0.567)	ND (0.828)	ND (0.559)	ND (0.359)	ND (0.297)	ND (1.07)	ND (1.07)	ND (0.78)	ND (0.784)	ND (1.33)	---	**8.66**	---	---	ND (0.808)	ND (1.01)	ND (1.89)	ND (1.35)	---	ND (0.905)	ND (0.188)	**0.315**	ND (2.17)	ND (1.7)
TOTAL HXCDF	ND (1.19)	---	ND (0.363)	ND (0.604)	ND (0.631)	ND (0.55)	ND (0.569)	ND (0.369)	ND (0.278)	ND (0.208)	ND (0.883)	ND (1.54)	ND (0.835)	ND (0.543)	ND (0.577)	---	**2.38**	---	---	ND (0.458)	ND (0.564)	ND (0.642)	ND (0.264)	---	ND (0.437)	ND (0.131)	ND (0.136)	ND (1.15)	ND (1.12)
TOTAL PECDF	ND (2)	---	ND (0.882)	ND (1.47)	**1.16**	ND (0.792)	ND (0.935)	ND (0.537)	ND (0.66)	ND (0.49)	ND (1.4)	ND (1.55)	ND (4.12)	ND (1.26)	ND (1.59)	---	ND (0.837)	---	---	ND (0.971)	ND (2.91)	ND (2.19)	ND (0.527)	---	ND (0.75)	ND (0.137)	ND (0.172)	ND (1.52)	ND (0.982)
Total TCDF	ND (1.12)	---	ND (0.677)	ND (0.884)	ND (1.1)	ND (0.646)	ND (0.672)	ND (0.547)	ND (0.346)	ND (0.351)	ND (1.28)	ND (1.23)	**18.4**	ND (0.935)	ND (1.19)	---	ND (0.86)	---	---	ND (0.61)	ND (1.36)	ND (1.69)	ND (0.329)	---	ND (0.436)	ND (0.237)	ND (0.205)	ND (1.64)	ND (1.81)
Metals (ug/L)																													
ANTIMONY	ND (6.4)	ND (6.4)	---	ND (6.4)J	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	---	ND (6.4)	---	ND (6.4)	**8.1 J**	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)	---	ND (6.4)	ND (6.4)	ND (6.4)	ND (6.4)
ARSENIC	ND (9.3)	ND (9.3)	---	ND (9.3)J	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	---	ND (9.3)	---	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)	---	ND (9.3)	ND (9.3)	ND (9.3)	ND (9.3)
LEAD	ND (8.4)	ND (8.4)	---	---	---	---	---	---	ND (8.4)	ND (8.4)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MANGANESE	ND (0.96)	ND (0.96)	---	**9.3**	ND (0.96)	**1.9 J**	**6.4**	**1.3 J**	**1.2 J**	**3 J**	**3.5 J**	**1.4 J**	**4.4 J**	**8.1**	---	**1.2 J**	---	**6.4**	**11.9**	**1.1 J**	ND (0.96)	ND (0.96)	ND (0.96)	ND (0.96)	---	**19.6**	ND (0.96)	ND (0.96)	ND (0.96)
THALLIUM	ND (10)	ND (10)	---	ND (10)J	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	---	ND (10)	---	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	---	ND (10)	ND (10)	ND (10)	ND (10)
PCBs (pg/L)																													
PCB 77	ND (49.5)	---	4.26 BJ	---	23.6 BJ	**4.7 J**	ND (4.25)	**3.17 J**	**6.36 J**	**3.23 J**	**4.88 J**	ND (4.96)	**46**	**5.48 J**	ND (3.78)	---	ND (3.8)	---	---	ND (4.03)	ND (7.39)	ND (5.32)	ND (28.7)J	---	ND (30.2)J	4.22 BJ	5.19 BJ	ND (14.8)	ND (14.5)
PCB 81	ND (49.5)	---	ND (2.52)	---	ND (2.79)	ND (1.49)	ND (4.16)	ND (1.52)	ND (4.05)	ND (1.93)	ND (1.88)	ND (2.03)	ND (5.86)	ND (3.73)	ND (3.76)	---	ND (4.2)	---	---	ND (3.7)	ND (7.29)	ND (5.37)	ND (3.87)	---	ND (3.29)	ND (5.44)	ND (1.19)	ND (14.4)	ND (13.5)
PCB 105	ND (49.5)	---	ND (11.9)	---	**71.4 J**	ND (10.5)	ND (15.1)	ND (12.1)	ND (18.4)	ND (10.3)	ND (10.4)	ND (1)	**90.5**	ND (12.5)	ND (15.4)	---	ND (18.1)	---	---	ND (14.6)	ND (16.3)	ND (16.2)	ND (11.2)	---	ND (30.2)J	ND (11.1)	ND (4.37)	ND (8.98)	ND (17.1)
PCB-106/118	ND (49.5)	---	ND (9.15)	---	**116**	ND (12.9)	ND (20.6)	ND (13.7)	ND (15.5)	ND (13.8)	ND (13.4)	ND (14.9)	**137**	ND (17.3)	ND (13.9)	---	ND (19.6)	---	---	ND (16.3)	ND (20.7)	ND (22)	ND (14.5)	---	**35.4**	**18.1 J**	ND (6.13)	ND (16.7)	ND (12.8)
PCB 114	ND (49.5)	---	ND (12.7)	---	ND (7.66)	ND (10.7)	ND (18.5)	ND (13.1)	ND (17.8)	ND (11.2)	ND (11.4)	ND (14.3)	ND (9.94)	ND (14.2)	ND (16.4)	---	ND (19)	---	---	ND (17)	ND (18.4)	ND (18.4)	ND (13)	---	ND (11.5)	ND (8.05)	ND (8.29)	ND (10)	ND (18.5)
PCB 123	ND (49.5)	---	ND (9.99)	---	**6.38 J**	ND (13.4)	ND (20.2)	ND (13.7)	ND (17.4)	ND (13.6)	ND (13)	ND (14.3)	ND (12.4)	ND (16)	ND (14.8)	---	ND (16.8)	---	---	ND (16.8)	ND (20)	ND (21.1)	ND (16)	---	ND (13.8)	ND (6.42)	ND (7.74)	ND (15.6)	ND (13.4)
PCB 126	ND (49.5)	---	ND (14)	---	ND (7.66)	ND (12.2)	ND (18.8)	ND (14.5)	ND (18.6)	ND (12.3)	ND (10.6)	ND (12.7)	ND (10.7)	ND (15.2)	ND (19.1)	---	ND (21.7)	---	---	ND (16.8)	ND (18.4)	ND (16.9)	ND (12)	---	ND (10.3)	ND (6.77)	ND (9.96)	ND (11.1)	ND (20.9)
PCB 156	ND (49.5)	---	ND (2.87)	---	**5.18 J**	ND (2.15)	ND (3.14)	ND (1.73)	ND (4.78)	ND (3.26)	ND (3.52)	ND (3.79)	**4.97 J**	ND (4.58)	ND (5.29)	---	ND (4.9)	---	---	ND (4.11)	ND (6.4)	ND (5.38)	ND (2.62)	---	ND (3.17)	ND (6.23)	ND (4.24)	ND (10.5)	ND (12.2)
PCB 157	ND (49.5)	---	ND (3.06)	---	**2.23 J**	ND (2.25)	ND (3.31)	ND (1.8)	ND (4.88)	ND (3.31)	ND (3.68)	ND (4.03)	ND (3.42)	ND (4.85)	ND (5.43)	---	ND (4.99)	---	---	ND (4.2)	ND (6.57)	ND (5.79)	ND (2.87)	---	ND (3.6)	ND (6.49)	ND (4.25)	ND (11.1)	ND (12.7)
PCB 167	ND (49.5)	---	ND (2.75)	---	ND (1.93)	ND (1.98)	ND (3.14)	ND (1.67)	ND (4.56)	ND (3.02)	ND (3.62)	ND (3.76)	ND (3.37)	ND (4.75)	ND (5.13)	---	ND (4.25)	---	---	ND (4.76)	ND (6.55)	ND (5.6)	ND (2.76)	---	ND (3.48)	ND (5.55)	ND (4.11)	ND (10.7)	ND (12.3)
PCB 169	ND (49.5)	---	ND (3.59)	---	4.72 BJ	**3.76 J**	**5.47 J**	ND (4.3)	8.18 BJ	4.95 BJ	**5.67 J**	ND (4.1)	ND (4.16)	ND (11.2)	ND (7.12)	---	ND (6.29)	---	---	**4.9 J**	ND (7.74)	ND (6.62)	ND (28.7)J	---	ND (30.2)J	ND (14.5)	ND (4.79)	ND (106)J	ND (15.5)
PCB 189	ND (49.5)	---	ND (1.78)	---	ND (1.13)	ND (1.87)	ND (1.95)	ND (1.91)	ND (3.32)	ND (1.97)	ND (2.64)	ND (2.57)	ND (2.06)	ND (2.38)	ND (2.07)	---	ND (1.98)	---	---	ND (2.36)	ND (3.22)	ND (2.68)	ND (1.35)	---	ND (1.54)	ND (2.19)	ND (1.7)	ND (9.07)	ND (6.21)
TOTAL DECACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	ND (47.9)	ND (24.8)	ND (24.7)	ND (24.8)	ND (29.2)	ND (25.9)	ND (28)	ND (26.5)	ND (24.9)	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	ND (30.2)	ND (26.9)	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL DICHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (49.2)	---	ND (47.9)	67.3 B	ND (49.3)	ND (49.6)	ND (58.3)	ND (51.8)	ND (56.1)	ND (53.1)	ND (49.8)	ND (51)	ND (50.4)	---	ND (53.2)	---	---	ND (53)	ND (53.2)	ND (48.3)	ND (57.4)	---	ND (60.3)	ND (53.8)	ND (48.1)	ND (106)	ND (108)
TOTAL HEPTACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	ND (47.9)	ND (24.8)	ND (24.7)	ND (24.8)	ND (29.2)	ND (25.9)	ND (28)	ND (26.5)	ND (24.9)	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	ND (30.2)	**43.2**	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL HEXACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	ND (47.9)B	ND (24.8)	ND (24.7)	ND (24.8)	ND (29.2)B	ND (25.9)B	ND (28)	ND (26.5)	83.1 B	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	ND (30.2)	64.9 B	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL MONOCHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	82.3 B	---	ND (23.9)	ND (24.8)	ND (24.7)	27.8 B	34.4 B	32 B	**36.8**	**38.4**	36 B	ND (25.5)	**25.2**	---	ND (26.6)	---	---	ND (26.5)	**38**	ND (24.2)	35.1 B	---	ND (30.2)	ND (26.9)	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL NONACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	ND (47.9)	ND (24.8)	ND (24.7)	ND (24.8)	ND (29.2)	ND (25.9)	ND (28)	ND (26.5)	ND (24.9)	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	ND (30.2)	ND (26.9)	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL OCTACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	ND (47.9)	ND (24.8)	ND (24.7)	ND (24.8)	ND (29.2)	ND (25.9)	ND (28)	ND (26.5)	ND (24.9)	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	ND (30.2)	ND (26.9)	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL PCB (CONGENERS)	**ND (49.5)**	**---**	**441 B**	**---**	**5040 B**	**495 B**	**31.3 B**	**31 B**	**111 B**	**40.2 B**	**47.3**	**38.4**	**8850 B**	**171 B**	**57.1**	**---**	**340**	**---**	**---**	**59.9 B**	**130**	**ND (48.3)**	**210 B**	**---**	**2430**	**367 B**	**32.8 B**	**10.9**	**<NS**
TOTAL PENTACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	ND (24.6)	---	**1050**	ND (24.8)	ND (24.7)	ND (24.8)	ND (32.6)	ND (25.9)	ND (28)	ND (26.5)	**1490**	ND (25.5)	ND (25.2)	---	ND (26.6)	---	---	ND (26.5)	ND (26.6)	ND (24.2)	ND (28.7)	---	**192**	**18.1**	ND (24.1)	ND (53.1)	ND (54.2)
TOTAL TETRACHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	136 B	---	2950 B	**213**	ND (24.7)	ND (24.8)	**35.7**	ND (25.9)	ND (28)	ND (26.5)	**5900**	**106**	ND (25.2)	---	**239**	---	---	26.9 B	**61.1**	ND (24.2)	**138**	---	**1570**	103 B	5.19 B	ND (53.1)	ND (54.2)
TOTAL TRICHLOROBIPHENYLS (CONGENERS)	ND (49.5)	---	223 B	---	**1000**	211 B	**25.9**	ND (24.8)	**32.3**	ND (25.9)	ND (28)	ND (26.5)	**1340**	**65**	**31.9**	---	**101**	---	---	28.1 B	**31**	ND (24.2)	**32**	---	**659**	**138**	**27.6**	ND (53.1)	ND (54.2)
SVOCs (ug/L)																													
HEXACHLOROBENZENE	ND (1)	ND (1)	---	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	---	ND (1)	---	ND (1)	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	---	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	---	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	---	ND (1)	---	ND (1)	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	---	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	ND (2)J	ND (2)J	---	ND (2)	ND (5)	ND (2)J	ND (2)J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	---	ND (2)	---	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	---	ND (2)	ND (2)	ND (2)	ND (2)
PENTACHLOROBENZENE	ND (2)	ND (2)	---	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	---	ND (2)	---	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	---	ND (2)	ND (2)	ND (2)	ND (2)

B: Blank Contamination
J: Estimated Concentration
ND: Not Detected
BOLD: Analyte detected above MDL and not 'B' flagged

APPENDIX B

GROUNDWATER ANALYTICAL RESULTS: PCBs, DIOXIN TEQs, SEMI-VOLATILE ORGANIC COMPOUNDS AND METALS (MAY 2007 – OCTOBER 2009)

Groundwater Concentrations: MW-1
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/14/2007	8/20/2007	11/10/2008	5/27/2009	10/20/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.146**	**0.00217**	ND	**0.019**	NA
TEQ (2005 WHO TEFs)	**0.229**	**0.00573**	ND	**0.0453**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.228)	ND (1.03)	ND (0.918)	ND (0.788)	NA
1,2,3,7,8-PECDD	ND (0.548)	ND (1.39)	ND (0.902)	ND (0.826)	NA
1,2,3,4,7,8-HXCDD	ND (0.522)	ND (1.1)	ND (1.43)	ND (1.08)	NA
1,2,3,6,7,8-HXCDD	ND (0.519)	ND (1.18)	ND (1.49)	ND (1.22)	NA
1,2,3,7,8,9-HXCDD	ND (0.561)	ND (1.14)	ND (1.66)	ND (1.29)	NA
1,2,3,4,6,7,8-HPCDD	**10.3 B**	ND (2.09)	ND (3.32)	**0.582**	NA
OCDD	**418 B**	**18.8 J**	ND (4.27)	**15.7**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.224)	ND (0.537)	ND (0.35)	ND (0.403)	NA
1,2,3,7,8-PECDF	ND (0.534)	ND (1.26)	ND (0.665)	ND (0.634)	NA
2,3,4,7,8-PECDF	ND (0.508)	ND (1.09)	ND (0.578)	ND (0.541)	NA
1,2,3,4,7,8-HXCDF	ND (0.147)	ND (0.283)	ND (0.512)	ND (0.432)	NA
1,2,3,6,7,8-HXCDF	ND (0.13)	ND (0.318)	ND (0.502)	ND (0.408)	NA
1,2,3,7,8,9-HXCDF	ND (0.211)	ND (0.525)	ND (0.707)	ND (0.602)	NA
2,3,4,6,7,8-HXCDF	ND (0.162)	ND (0.397)	ND (0.495)	ND (0.428)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.826)	ND (0.565)	ND (1.39)	ND (1.37)	NA
1,2,3,4,7,8,9-HPCDF	ND (1.26)	ND (0.997)	ND (2.11)	ND (1.76)	NA
OCDF	ND (2.83)	ND (2.72)	ND (5.99)	ND (4.07)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	**0.74 J**	**0.85 J**	**11.3**	**7.1**	**11.2 B**
MANGANESE	**5310**	**6220**	**5990**	**6590**	**5570**
THALLIUM	**0.13 J**	**0.17 J**	ND (0.15)	**0.18 J**	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (2.01)	ND (1.12)	ND (3.21)	ND (0.986)	NA
PCB 81	ND (2.13)	ND (1.08)	ND (3.13)	ND (0.948)	NA
PCB 105	**5.15**	ND (0.891)	ND (1.99)	**1.38**	NA
PCB-106	ND (1.86)	ND (0.81)	ND (2.05)	ND (0.658)	NA
PCB-118	**9.63**	**2.91 B**	ND (1.79)	**1.89**	NA
PCB 114	ND (1.97)	ND (0.888)	ND (1.86)	ND (0.632)	NA
PCB 123	ND (1.91)	ND (0.857)	ND (1.92)	ND (0.644)	NA
PCB 126	ND (2.27)	ND (0.825)	ND (2.18)	ND (0.581)	NA
PCB 156/157	ND (2.54)	ND (1.19)	ND (2.8)	ND (0.839)	NA
PCB 167	**3.65**	ND (0.89)	ND (2.17)	ND (0.622)	NA
PCB 169	ND (2.46)	ND (1.1)	ND (2.89)	**1.16**	NA
PCB 189	ND (2.25)	ND (1.02)	ND (2.14)	ND (0.653)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (1.9)	ND (0.946)	ND (2.2)	ND (0.495)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	53.1 B	10 B	11 B	13.1 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	23.5 B	6.09 B	27.8 B	9.21 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	32.7 B	18.7 B	63.2 B	5.85 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	44.3 B	23.4 B	13.2 B	7.71 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	60.1 B	7 B	ND (2.32)	6 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.99)	ND (0.938)	ND (1.82)	2.51 B	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.66)	ND (0.806)	ND (2.17)	1.58 B	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (3.05)	ND (2.7)	ND (5.77)	ND (1.48)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	ND (2)	ND (1.01)	ND (3.97)	1.47 B	NA
TOTAL PCB (CONGENER SUM) (ND=0)	264 B	65 B	115 B	47 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	409 B	147 B	298 B	97 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-2
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/15/2007	8/20/2007	11/11/2008	5/27/2009	10/20/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.035**	**0.00043**	ND	**0.0096**	NA
TEQ (2005 WHO TEFs)	**0.043**	**0.00013**	ND	**0.0116**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	**2.97**	ND (1.13)	ND (2.36)	**0.87**	NA
1,2,3,7,8-PECDD	ND (1.08)	ND (0.608)	ND (0.621)	ND (1.32)	NA
1,2,3,4,7,8-HXCDD	ND (1.12)	ND (0.667)	ND (0.668)	ND (1.45)	NA
1,2,3,6,7,8-HXCDD	ND (1.2)	ND (0.652)	ND (0.7)	ND (1.55)	NA
1,2,3,7,8,9-HXCDD	ND (0.943)	ND (1.01)	ND (1.33)	ND (0.789)	NA
1,2,3,4,6,7,8-HPCDD	ND (0.201)	ND (0.203)	ND (0.483)	ND (0.617)	NA
OCDD	**44.4**	ND (5)	ND (4.46)	**9.51**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.971)	ND (0.591)	ND (1.01)	ND (0.482)	NA
1,2,3,7,8-PECDF	ND (1.54)	ND (0.978)	ND (1.4)	ND (0.729)	NA
2,3,4,7,8-PECDF	ND (0.171)	ND (0.221)	ND (0.572)	ND (0.33)	NA
1,2,3,4,7,8-HXCDF	ND (0.155)	ND (0.237)	ND (0.572)	ND (0.316)	NA
1,2,3,6,7,8-HXCDF	ND (0.25)	ND (0.375)	ND (0.839)	ND (0.455)	NA
1,2,3,7,8,9-HXCDF	ND (0.566)	ND (1.43)	ND (0.504)	ND (0.787)	NA
2,3,4,6,7,8-HXCDF	ND (0.192)	ND (0.288)	ND (0.573)	ND (0.333)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.524)	ND (1.14)	ND (0.417)	ND (0.735)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.244)	ND (0.301)	ND (0.403)	ND (0.705)	NA
OCDF	ND (1.79)	ND (2.64)	ND (4.75)	ND (1.69)	NA
Metals (ug/L)					
ANTIMONY	ND (96.6)	ND (97)	ND (97)	ND (48.5)	ND (48.5)
ARSENIC	ND (99.9)	**17.2**	**343**	**162**	**287**
MANGANESE	**164000**	**137000**	**139000**	**135000**	**123000**
THALLIUM	**0.78 J**	**0.95**	**0.84**	**0.87**	ND (70)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (2.9)	ND (1.22)	ND (1.93)	ND (1.21)	NA
PCB 81	ND (2.78)	ND (1.12)	ND (1.88)	ND (1.13)	NA
PCB 105	ND (2.35)	1.55 B	ND (1.05)	ND (0.705)	NA
PCB-106	ND (2.29)	ND (0.92)	ND (1.16)	ND (0.7)	NA
PCB-118	**9.52**	2.72 B	ND (0.983)	**1.11**	NA
PCB 114	ND (2.48)	ND (0.971)	ND (1.04)	ND (0.671)	NA
PCB 123	ND (2.35)	ND (0.972)	ND (1.08)	ND (0.686)	NA
PCB 126	ND (2.69)	ND (0.999)	ND (1.12)	ND (0.822)	NA
PCB 156/157	ND (3.35)	ND (0.977)	ND (1.42)	ND (1.16)	NA
PCB 167	ND (2.47)	ND (0.721)	ND (1.12)	ND (0.859)	NA
PCB 169	ND (2.96)	ND (0.971)	ND (1.69)	ND (0.993)	NA
PCB 189	ND (2.49)	ND (0.967)	ND (1.4)	ND (0.925)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (2.9)	ND (0.924)	ND (2.04)	ND (1.01)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	47.5 B	29.6 B	25.7 B	15.2 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	ND (2.47)	ND (0.983)	**2.14**	ND (0.942)	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	67.5 B	8.84 B	6.37 B	4.3 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	**5.53**	**20.6 J**	22.1 B	**19.5**	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	ND (4.46)	ND (2.93)	ND (4.07)	ND (1.88)	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (2.46)	ND (0.862)	ND (1.35)	ND (0.927)	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	29.4 B	19.3 B	ND (1.05)	5.99 B	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	27.3 B	16.8 B	9 B	14 B	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	19.9 B	7.33 B	12.5 B	10.8 B	NA
TOTAL PCB (CONGENER SUM) (ND=0)	245.6 B	102 B	78 B	70 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	453.1 B	185 B	192 B	132 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1) R	ND (1) R	ND (0.9) R	ND (0.9) R
HEXACHLOROBUTADIENE	ND (1)	ND (1) R	ND (1) R	ND (0.9) R	ND (0.9) R
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2) R
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2) R

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-3
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/15/2007	8/20/2007	11/11/2008	5/27/2009	10/20/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.006**	**0.00080**	ND	**0.0128**	NA
TEQ (2005 WHO TEFs)	**0.013**	**0.00024**	ND	**0.0149**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.318)	ND (0.869)	ND (1.16)	ND (0.977)	NA
1,2,3,7,8-PECDD	ND (0.546)	ND (0.798)	ND (1.82)	ND (0.312)	NA
1,2,3,4,7,8-HXCDD	ND (0.922)	ND (0.77)	ND (1.56)	ND (1.05)	NA
1,2,3,6,7,8-HXCDD	ND (0.933)	ND (0.844)	ND (1.77)	ND (1.11)	NA
1,2,3,7,8,9-HXCDD	ND (0.965)	ND (0.822)	ND (1.83)	ND (1.27)	NA
1,2,3,4,6,7,8-HPCDD	ND (2.19)	ND (1.06)	ND (2.39)	**1.17**	NA
OCDD	**41.7**	ND (3.53)	ND (6.34)	**10.7**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.419)	ND (0.296)	ND (0.423)	ND (0.479)	NA
1,2,3,7,8-PECDF	ND (0.585)	ND (1.26)	ND (0.487)	ND (0.705)	NA
2,3,4,7,8-PECDF	ND (0.549)	ND (1.11)	ND (0.431)	ND (0.599)	NA
1,2,3,4,7,8-HXCDF	ND (0.174)	ND (0.203)	ND (0.438)	ND (0.366)	NA
1,2,3,6,7,8-HXCDF	ND (0.168)	ND (0.215)	ND (0.42)	ND (0.337)	NA
1,2,3,7,8,9-HXCDF	ND (0.253)	ND (0.359)	ND (0.587)	ND (0.504)	NA
2,3,4,6,7,8-HXCDF	ND (0.187)	ND (0.279)	ND (0.423)	ND (0.341)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.451)	ND (0.539)	ND (0.182)	ND (0.504)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.678)	ND (0.871)	ND (0.302)	ND (0.665)	NA
OCDF	ND (4.03)	ND (2.91)	ND (11)	ND (2.31)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (48.5)	50.1 J
ARSENIC	ND (0.67)	ND (0.7)	**3.3**	**4.4**	ND (9.5)
MANGANESE	**11300**	**12100**	**16200**	**15700**	**18600**
THALLIUM	**0.13 J**	ND (0.037)	**0.21 J**	**0.49 J**	ND (70)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (3.52)	ND (1.27)	ND (1.98)	ND (1.22)	NA
PCB 81	ND (3.48)	ND (1.25)	ND (1.98)	ND (1.15)	NA
PCB 105	**4.39**	2.64 B	ND (1.39)	ND (0.853)	NA
PCB-106	ND (2.78)	ND (0.914)	ND (1.52)	ND (0.903)	NA
PCB-118	**9.67**	5.33 B	ND (1.27)	**2.33**	NA
PCB 114	ND (2.93)	ND (0.998)	ND (1.28)	ND (0.868)	NA
PCB 123	ND (2.86)	ND (0.971)	ND (1.42)	ND (0.886)	NA
PCB 126	ND (2.84)	ND (1.33)	ND (1.45)	ND (1)	NA
PCB 156/157	ND (3.7)	ND (1.2)	ND (1.89)	ND (1.3)	NA
PCB 167	ND (2.65)	ND (0.881)	ND (1.41)	ND (0.954)	NA
PCB 169	ND (3.55)	ND (1.13)	ND (2.12)	ND (1.14)	NA
PCB 189	ND (3)	ND (0.99)	ND (1.65)	ND (1.09)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (2.72)	ND (1.04)	ND (1.93)	ND (0.738)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	52.7 B	11.6 B	9.77 B	14.9 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	ND (9.16)	4.87 B	7.4 B	8.91 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	36 B	20.3 B	6.79 B	13.2 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	50.8 B	35.9 B	ND (1.33)	7.26 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	58.1 B	14.5 B	ND (1.68)	6.02 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (3.04)	ND (1.05)	ND (1.83)	ND (1.21)	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (2.36)	ND (0.941)	ND (1.63)	ND (1.19)	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (3.88)	ND (2.98)	ND (5.46)	ND (2.49)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	ND (3.21)	ND (0.999)	ND (2.75)	ND (1.36)	NA
TOTAL PCB (CONGENER SUM) (ND=0)	233 B	87 B	24 B	50 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	503 B	178 B	179 B	128 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1) R	ND (1) UJ	ND (1)	ND (1) R
HEXACHLOROBUTADIENE	ND (1)	ND (1) R	ND (1)	ND (1)	ND (1) R
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2) R
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2) R

Results are total concentrations in water, except those from November 2008, which are dissolved
(1): PCB congener 209
EMPC: Estimated Maximum Potential Concentration
B: Not detected substantially above the level measured in lab or field blanks
J: Analyte present. Reported concentration may not be accurate or precise
ND: Not Detected
NA: Not Analyzed
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-4
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/15/2007	8/20/2007	11/12/2008	5/28/2009	10/21/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.005**	**0.00145**	ND	**0.0004**	NA
TEQ (2005 WHO TEFs)	**0.011**	**0.00214**	ND	**0.0013**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.181)	ND (0.646)	ND (0.779)	ND (0.941)	NA
1,2,3,7,8-PECDD	ND (0.527)	ND (1.05)	ND (0.355)	ND (1.54)	NA
1,2,3,4,7,8-HXCDD	ND (0.794)	ND (1.01)	ND (2.51)	ND (1.61)	NA
1,2,3,6,7,8-HXCDD	ND (0.803)	ND (1.06)	ND (2.81)	ND (1.89)	NA
1,2,3,7,8,9-HXCDD	ND (0.825)	ND (0.986)	ND (3.17)	ND (1.98)	NA
1,2,3,4,6,7,8-HPCDD	ND (0.866)	ND (0.99)	ND (3.05)	ND (2.21)	NA
OCDD	**34.2**	**6.3**	ND (7.66)	**4.42**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.548)	ND (0.455)	ND (0.36)	ND (0.966)	NA
1,2,3,7,8-PECDF	ND (0.709)	ND (1.58)	ND (0.75)	ND (0.851)	NA
2,3,4,7,8-PECDF	ND (0.672)	ND (1.3)	ND (0.657)	ND (0.825)	NA
1,2,3,4,7,8-HXCDF	ND (0.165)	ND (0.49)	ND (0.383)	ND (0.661)	NA
1,2,3,6,7,8-HXCDF	ND (0.158)	ND (0.509)	ND (0.388)	ND (0.565)	NA
1,2,3,7,8,9-HXCDF	ND (0.254)	ND (0.789)	ND (0.556)	ND (0.9)	NA
2,3,4,6,7,8-HXCDF	ND (0.187)	ND (0.646)	ND (0.397)	ND (0.575)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.634)	ND (0.481)	ND (2.62)	ND (0.84)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.993)	ND (0.87)	ND (3.67)	ND (1.14)	NA
OCDF	ND (3.41)	ND (1.67)	ND (7.25)	ND (2.22)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.67)	ND (0.7)	ND (0.95)	ND (0.95)	ND (1.9)
MANGANESE	**1330**	**1340**	**1410 J**	**1520**	**1620**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (2.68)	ND (1.29)	ND (2.91)	ND (1.21)	NA
PCB 81	ND (2.67)	ND (1.28)	ND (2.73)	ND (1.18)	NA
PCB 105	**6.13**	3.03 B	ND (1.69)	**1.69**	NA
PCB-106	ND (2.1)	ND (1.15)	ND (1.96)	ND (0.824)	NA
PCB-118	**12**	5.21 B	ND (1.63)	**2.22**	NA
PCB 114	ND (2.24)	ND (1.2)	ND (1.57)	ND (0.76)	NA
PCB 123	ND (2.15)	ND (1.22)	ND (1.82)	ND (0.806)	NA
PCB 126	ND (2.66)	ND (1.04)	ND (2.03)	ND (0.958)	NA
PCB 156/157	ND (2.43)	ND (1.35)	ND (2.28)	ND (1.32)	NA
PCB 167	ND (1.84)	ND (1)	ND (1.85)	ND (1.02)	NA
PCB 169	ND (2.5)	ND (1.23)	ND (2.69)	ND (1.13)	NA
PCB 189	ND (2.8)	ND (0.99)	ND (2)	ND (1.03)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (2)	ND (1.13)	ND (2.31)	ND (0.619)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	40 B	10.5 B	14.3 B	20.1 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	22.5 B	2.52 B	12.3 B	6.81 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	32.5 B	23.9 B	4.52 B	13.2 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	77.7 B	38.4 B	2.51 B	9.81 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	96.6 B	17.6 B	ND (2.06)	7.53 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (2.36)	3.85 B	ND (2.15)	3.22 B	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.85)	**2.47 J**	ND (2.06)	ND (1.13)	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (3.51)	ND (3.04)	ND (6.05)	ND (2.5)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	ND (2.11)	ND (1.11)	ND (3.17)	ND (1.29)	NA
TOTAL PCB (CONGENER SUM) (ND=0)	299 B	99 B	34 B	61 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	481 B	197 B	210 B	134 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1) UJ	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-5
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/15/2007	8/21/2007	11/12/2008	5/28/2009	10/21/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.002**	**0.00311**	ND	**0.0143**	NA
TEQ (2005 WHO TEFs)	**0.003**	**0.00326**	ND	**0.0248**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.224)	ND (0.317)	ND (0.832)	ND (0.994)	NA
1,2,3,7,8-PECDD	ND (0.477)	ND (0.522)	ND (1.62)	ND (0.85)	NA
1,2,3,4,7,8-HXCDD	ND (0.631)	ND (0.606)	ND (2.24)	ND (1.32)	NA
1,2,3,6,7,8-HXCDD	ND (0.647)	ND (0.616)	ND (2.27)	ND (1.36)	NA
1,2,3,7,8,9-HXCDD	ND (0.698)	ND (0.57)	ND (2.7)	ND (1.61)	NA
1,2,3,4,6,7,8-HPCDD	ND (1.11)	ND (0.823)	ND (4.81)	**0.897**	NA
OCDD	**9.26**	**9.6**	ND (6.99)	**52.9**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.22)	ND (0.299)	ND (0.769)	ND (0.647)	NA
1,2,3,7,8-PECDF	ND (0.567)	ND (0.468)	ND (1.81)	ND (0.433)	NA
2,3,4,7,8-PECDF	ND (0.551)	ND (0.421)	ND (1.62)	ND (0.375)	NA
1,2,3,4,7,8-HXCDF	ND (0.16)	ND (0.598)	ND (1.73)	ND (0.639)	NA
1,2,3,6,7,8-HXCDF	ND (0.149)	ND (0.595)	ND (1.66)	ND (0.552)	NA
1,2,3,7,8,9-HXCDF	ND (0.244)	ND (0.947)	ND (2.6)	ND (0.886)	NA
2,3,4,6,7,8-HXCDF	ND (0.174)	ND (0.737)	ND (1.83)	ND (0.606)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.625)	ND (0.475)	ND (1.39)	ND (0.446)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.926)	ND (0.816)	ND (2.03)	ND (0.606)	NA
OCDF	ND (1.94)	ND (1.1)	ND (7.39)	ND (4.51)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	**22.7**	ND (48.5)
ARSENIC	ND (0.67)	ND (0.7)	ND (0.95)	ND (0.95)	ND (9.5)
MANGANESE	**16900**	**13400**	**20300**	**18200**	**21700**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (70)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (1.43)	ND (1.16)	ND (1.84)	ND (1.52)	NA
PCB 81	ND (1.49)	ND (1.18)	ND (1.78)	ND (1.47)	NA
PCB 105	**4.75**	3.74 B	ND (1.09)	**11**	NA
PCB-106	ND (1.61)	ND (0.967)	ND (1.21)	ND (0.957)	NA
PCB-118	**10.3**	6.78 B	ND (1.03)	**19**	NA
PCB 114	ND (1.58)	ND (1.09)	ND (1.03)	ND (0.853)	NA
PCB 123	ND (1.65)	ND (1.04)	ND (1.12)	ND (0.939)	NA
PCB 126	ND (1.9)	ND (1.23)	ND (1.24)	ND (0.898)	NA
PCB 156/157	ND (2.28)	2.2 B	ND (1.6)	**3.4**	NA
PCB 167	**2.85**	ND (1.06)	ND (1.23)	ND (0.963)	NA
PCB 169	ND (2.25)	ND (1.27)	ND (2.03)	ND (1.1)	NA
PCB 189	ND (1.86)	ND (1.07)	ND (1.28)	ND (1.05)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	**3.64**	ND (1.14)	3.31 B	ND (0.624)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	43.8 B	4.77 B	18.4 B	13.6 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	17.6 B	2.95 B	14 B	6.85 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	44.5 B	26.6 B	13.4 B	32.4 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	41.9 B	55.7 B	9.98 B	115 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	85.5 B	16.7 B	ND (1.44)	71.2 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.72)	2.14 B	ND (1.41)	14.3 B	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.51)	ND (1.14)	ND (1.33)	4.85 B	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (2.92)	ND (3.43)	ND (4.38)	ND (2.74)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	ND (1.58)	ND (1.24)	ND (2.24)	**5.48**	NA
TOTAL PCB (CONGENER SUM) (ND=0)	308.5 B	109 B	59 B	264 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	435.9 B	206 B	169 B	329 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1) R	ND (1) R	ND (1) R	ND (1) R
HEXACHLOROBUTADIENE	ND (1)	ND (1) R	ND (1) R	ND (1) R	ND (1) R
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2) R
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2) R

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-6
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/16/2007	8/21/2007	11/13/2008	5/28/2009	10/21/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.002**	**0.00035**	ND	**0.00046**	NA
TEQ (2005 WHO TEFs)	**0.004**	**0.00010**	ND	**0.0014**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.288)	ND (0.554)	ND (0.616)	ND (0.69)	NA
1,2,3,7,8-PECDD	ND (0.672)	ND (1.74)	ND (0.431)	ND (1.48)	NA
1,2,3,4,7,8-HXCDD	ND (1.1)	ND (1.98)	ND (1.65)	ND (1.25)	NA
1,2,3,6,7,8-HXCDD	ND (1.08)	ND (2.21)	ND (1.89)	ND (1.42)	NA
1,2,3,7,8,9-HXCDD	ND (1.24)	ND (1.93)	ND (1.96)	ND (1.42)	NA
1,2,3,4,6,7,8-HPCDD	ND (1.28)	ND (1.04)	ND (4.01)	ND (1.72)	NA
OCDD	**11**	ND (3.55)	ND (2.92)	**4.51**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.292)	ND (0.465)	ND (0.417)	ND (0.726)	NA
1,2,3,7,8-PECDF	ND (0.929)	ND (1.07)	ND (1.15)	ND (0.495)	NA
2,3,4,7,8-PECDF	ND (0.863)	ND (0.962)	ND (1.03)	ND (0.485)	NA
1,2,3,4,7,8-HXCDF	ND (0.94)	ND (0.239)	ND (0.729)	ND (0.445)	NA
1,2,3,6,7,8-HXCDF	ND (0.898)	ND (0.281)	ND (0.76)	ND (0.41)	NA
1,2,3,7,8,9-HXCDF	ND (1.5)	ND (0.437)	ND (1.11)	ND (0.661)	NA
2,3,4,6,7,8-HXCDF	ND (1.04)	ND (0.342)	ND (0.809)	ND (0.424)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.654)	ND (0.282)	ND (0.432)	ND (0.545)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.938)	ND (0.484)	ND (0.668)	ND (0.734)	NA
OCDF	ND (2.31)	ND (1.06)	ND (4.3)	ND (2.5)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.7)	ND (0.7)	ND (0.95)	ND (0.95)	2.4 B
MANGANESE	**181**	**133**	**148**	**141**	**158**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (1.67)	ND (1.17)	ND (2.84)	ND (0.941)	NA
PCB 81	ND (1.76)	ND (1.19)	ND (2.73)	ND (0.89)	NA
PCB 105	4.39	ND (1.22)	ND (1.79)	ND (0.765)	NA
PCB-106	ND (1.36)	ND (1.12)	ND (2)	ND (0.778)	NA
PCB-118	**8.24**	3.46 B	ND (1.7)	**1.76**	NA
PCB 114	ND (1.39)	ND (1.22)	ND (1.74)	ND (0.733)	NA
PCB 123	ND (1.4)	ND (1.2)	ND (1.86)	ND (0.761)	NA
PCB 126	ND (1.57)	ND (1.33)	ND (2.13)	ND (0.776)	NA
PCB 156/157	ND (1.92)	ND (1.54)	ND (2.01)	ND (1.03)	NA
PCB 167	**3.68**	ND (1.16)	ND (1.48)	ND (0.797)	NA
PCB 169	ND (1.76)	ND (1.32)	ND (2.36)	ND (0.915)	NA
PCB 189	ND (1.52)	ND (0.903)	ND (1.83)	ND (0.772)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	5.63 B	ND (1.14)	ND (2.06)	ND (0.652)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	40.7 B	6.99 B	15.1 B	6.99 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	22.7 B	1.99 B	17.1 B	3.31 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	30.1 B	15.2 B	43.7 B	ND (0.9)	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	54.3 B	20.9 B	13.2 B	4.88 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	76.9 B	5.84 B	ND (1.81)	4.21 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.7)	ND (1.14)	ND (1.83)	ND (0.892)	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.43)	ND (1.07)	ND (1.82)	ND (0.871)	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (2.32)	ND (3.06)	ND (5.63)	ND (2.14)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	**2.19**	ND (1.09)	ND (3.3)	ND (1.09)	NA
TOTAL PCB (CONGENER SUM) (ND=0)	272.8 B	51 B	89 B	19 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	409.5 B	156 B	247 B	88 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (0.9)	ND (1)	ND (1) UJ	ND (0.9)
HEXACHLOROBUTADIENE	ND (1)	ND (0.9)	ND (1)	ND (1)	ND (0.9)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-7
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/16/2007	8/20/2007	11/13/2008	5/28/2009	10/21/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.002**	**0.00029**	ND	**0.0083**	NA
TEQ (2005 WHO TEFs)	**0.003**	**0.00009**	ND	**0.0098**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (1.34)	ND (1.72)	ND (0.59)	**0.75**	NA
1,2,3,7,8-PECDD	ND (0.658)	ND (0.643)	ND (0.356)	ND (1.02)	NA
1,2,3,4,7,8-HXCDD	ND (0.639)	ND (0.694)	ND (0.382)	ND (1.13)	NA
1,2,3,6,7,8-HXCDD	ND (0.701)	ND (0.677)	ND (0.379)	ND (1.18)	NA
1,2,3,7,8,9-HXCDD	ND (0.705)	ND (0.751)	ND (0.654)	ND (0.653)	NA
1,2,3,4,6,7,8-HPCDD	ND (0.377)	ND (0.625)	ND (0.498)	ND (0.682)	NA
OCDD	**7.21**	ND (5)	ND (1.75)	**6.65**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.518)	ND (0.294)	ND (0.456)	ND (0.182)	NA
1,2,3,7,8-PECDF	ND (0.83)	ND (0.519)	ND (0.695)	ND (0.249)	NA
2,3,4,7,8-PECDF	ND (0.255)	ND (0.204)	ND (0.369)	ND (0.256)	NA
1,2,3,4,7,8-HXCDF	ND (0.244)	ND (0.211)	ND (0.373)	ND (0.22)	NA
1,2,3,6,7,8-HXCDF	ND (0.4)	ND (0.358)	ND (0.459)	ND (0.341)	NA
1,2,3,7,8,9-HXCDF	ND (0.621)	ND (0.467)	ND (0.331)	ND (0.361)	NA
2,3,4,6,7,8-HXCDF	ND (0.296)	ND (0.269)	ND (0.401)	ND (0.259)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.606)	ND (0.401)	ND (0.318)	ND (0.338)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.264)	ND (0.373)	ND (0.215)	ND (0.376)	NA
OCDF	ND (2.46)	ND (2.73)	ND (0.95)	**0.953**	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.7)	ND (0.7)	ND (0.95)	ND (0.95)	2.6 B
MANGANESE	**96.2**	**83.8**	**85.3**	**88.7**	**106**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (1.6)	ND (1.16)	ND (2.35)	ND (1.22)	NA
PCB 81	ND (1.73)	ND (1.16)	ND (2.24)	ND (1.22)	NA
PCB 105	**3.57**	ND (1.09)	ND (1.36)	**0.86**	NA
PCB-106	ND (1.41)	ND (0.996)	ND (1.47)	ND (0.833)	NA
PCB-118	**7.74**	2.9 B	**2.84**	**1.28**	NA
PCB 114	ND (1.52)	ND (1.01)	ND (1.32)	ND (0.779)	NA
PCB 123	ND (1.46)	ND (1.07)	ND (1.39)	ND (0.814)	NA
PCB 126	ND (1.87)	ND (1.07)	ND (1.52)	ND (0.691)	NA
PCB 156/157	ND (2.08)	ND (1.58)	ND (1.91)	ND (0.911)	NA
PCB 167	**2.52**	ND (1.18)	ND (1.42)	ND (0.704)	NA
PCB 169	ND (1.89)	ND (1.34)	ND (1.7)	ND (0.802)	NA
PCB 189	ND (1.46)	ND (1.28)	ND (1.39)	ND (0.852)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (1.23)	ND (1.35)	ND (2.49)	ND (1.06)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	66.6 B	12.7 B	19.6 B	43.5 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	ND (1.54)	ND (1.19)	ND (1.45)	1.74 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	41.4 B	8.58 B	ND (1.54)	3.78 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	20.4 B	ND (1.1)	ND (1.33)	ND (0.544)	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	ND (2.49)	ND (3)	ND (4.85)	ND (2.15)	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.22)	ND (1.11)	ND (1.45)	ND (0.95)	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	47 B	28 B	21.3 B	7.01 B	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	38 B	20 B	63.2 B	5.02 B	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	21.4 B	8.46 B	35.9 B	9.13 B	NA
TOTAL PCB (CONGENER SUM) (ND=0)	320.6 B	78 B	140 B	70 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	439.5 B	171 B	269 B	137 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1) UJ	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-8
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/16/2007	8/21/2007	11/13/2008	5/29/2009	10/21/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.077**	**0.00171**	ND	**0.0003**	NA
TEQ (2005 WHO TEFs)	**0.102**	**0.00277**	ND	**0.0009**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.344)	ND (0.444)	ND (0.465)	ND (1.41)	NA
1,2,3,7,8-PECDD	ND (1.02)	ND (1.31)	ND (1.57)	ND (1.26)	NA
1,2,3,4,7,8-HXCDD	ND (1.36)	ND (1.18)	ND (1.22)	ND (1.49)	NA
1,2,3,6,7,8-HXCDD	ND (1.42)	ND (1.23)	ND (1.48)	ND (1.6)	NA
1,2,3,7,8,9-HXCDD	ND (1.44)	ND (1.23)	ND (1.45)	ND (1.76)	NA
1,2,3,4,6,7,8-HPCDD	**2.52**	ND (0.9)	ND (2.33)	ND (1.25)	NA
OCDD	**65.1**	ND (5)	ND (4.57)	ND (3.79)	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.619)	ND (0.467)	ND (0.287)	ND (0.615)	NA
1,2,3,7,8-PECDF	ND (1.23)	ND (1.12)	ND (0.61)	ND (0.869)	NA
2,3,4,7,8-PECDF	ND (1.12)	ND (0.917)	ND (0.518)	ND (0.816)	NA
1,2,3,4,7,8-HXCDF	ND (0.666)	ND (0.273)	ND (0.386)	ND (0.442)	NA
1,2,3,6,7,8-HXCDF	ND (0.617)	ND (0.299)	ND (0.38)	ND (0.404)	NA
1,2,3,7,8,9-HXCDF	ND (1.05)	ND (0.504)	ND (0.587)	ND (0.59)	NA
2,3,4,6,7,8-HXCDF	ND (0.79)	ND (0.38)	ND (0.4)	ND (0.427)	NA
1,2,3,4,6,7,8-HPCDF	**3.5**	ND (2.5)	ND (0.835)	ND (1.78)	NA
1,2,3,4,7,8,9-HPCDF	ND (0.666)	ND (1.08)	ND (1.29)	ND (2.35)	NA
OCDF	**71.9**	**8.35**	ND (4.46)	**3.09**	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.7)	ND (0.7)	ND (0.95)	ND (0.95)	3.4 B
MANGANESE	**163**	**153**	**173**	**173**	**199**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (1.53)	ND (1.44)	ND (2.29)	ND (1.67)	NA
PCB 81	ND (1.59)	ND (1.44)	ND (2.33)	ND (1.62)	NA
PCB 105	**6.56**	3.35 B	ND (1.45)	**1.93**	NA
PCB-106	ND (1.43)	ND (0.907)	ND (1.59)	ND (1.04)	NA
PCB-118	**12.6**	5.37 B	ND (1.29)	**2.96**	NA
PCB 114	ND (1.55)	ND (1)	ND (1.38)	ND (0.959)	NA
PCB 123	ND (1.48)	ND (0.977)	ND (1.47)	ND (1.01)	NA
PCB 126	ND (1.49)	ND (1.31)	ND (1.79)	ND (1.09)	NA
PCB 156/157	**3.11**	ND (1.49)	ND (2.16)	ND (1.52)	NA
PCB 167	**3.82**	ND (1.13)	ND (1.52)	ND (1.21)	NA
PCB 169	ND (1.74)	ND (1.27)	ND (1.81)	ND (1.28)	NA
PCB 189	ND (1.48)	ND (1.13)	ND (2.01)	ND (0.944)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	19.1 B	ND (1.02)	ND (1.32)	ND (0.582)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	60.2 B	**61.1 J**	16 B	11.3 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	42.4 B	7.41 B	5.68 B	4.49 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	58.1 B	27.1 B	12 B	5.11 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	80.8 B	35.2 B	ND (1.39)	12.7 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	88.6 B	18.1 B	ND (1.66)	9.87 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	5.68 B	6.68 B	ND (2.16)	1.85 B	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	2.22 B	**2.01 J**	ND (1.83)	ND (1.26)	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (2.24)	ND (3.13)	ND (5.21)	ND (2.82)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	**51.1**	**8.7**	ND (2.92)	ND (1.45)	NA
TOTAL PCB (CONGENER SUM) (ND=0)	442.2 B	166 B	34 B	45 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	536.3 B	258 B	187 B	133 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved

(1): PCB congener 209

EMPC: Estimated Maximum Potential Concentration

B: Not detected substantially above the level measured in lab or field blanks

J: Analyte present. Reported concentration may not be accurate or precise

ND: Not Detected

NA: Not Analyzed

BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-9
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/16/2007	8/22/2007	11/13/2008	5/29/2009	10/22/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.002**	**0.00032**	ND	**0.00015**	NA
TEQ (2005 WHO TEFs)	**0.003**	**0.00010**	ND	**0.00005**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.399)	ND (0.583)	ND (0.597)	ND (1.01)	NA
1,2,3,7,8-PECDD	ND (1.39)	ND (0.802)	ND (1.41)	ND (0.751)	NA
1,2,3,4,7,8-HXCDD	ND (0.926)	ND (0.539)	ND (1.5)	ND (1.18)	NA
1,2,3,6,7,8-HXCDD	ND (0.91)	ND (0.592)	ND (1.58)	ND (1.22)	NA
1,2,3,7,8,9-HXCDD	ND (1.02)	ND (0.564)	ND (1.69)	ND (1.42)	NA
1,2,3,4,6,7,8-HPCDD	ND (2.25)	ND (2.06)	ND (5.4)	ND (1.16)	NA
OCDD	ND (2.8)	ND (1.68)	ND (7.79)	ND (3.95)	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.691)	ND (0.392)	ND (0.406)	ND (0.762)	NA
1,2,3,7,8-PECDF	ND (0.864)	ND (0.649)	ND (0.62)	ND (0.227)	NA
2,3,4,7,8-PECDF	ND (0.839)	ND (0.564)	ND (0.549)	ND (0.206)	NA
1,2,3,4,7,8-HXCDF	ND (0.303)	ND (0.4)	ND (0.595)	ND (0.303)	NA
1,2,3,6,7,8-HXCDF	ND (0.286)	ND (0.47)	ND (0.58)	ND (0.268)	NA
1,2,3,7,8,9-HXCDF	ND (0.5)	ND (0.811)	ND (0.902)	ND (0.435)	NA
2,3,4,6,7,8-HXCDF	ND (0.381)	ND (0.595)	ND (0.606)	ND (0.31)	NA
1,2,3,4,6,7,8-HPCDF	ND (1.12)	ND (0.422)	ND (0.7)	ND (0.516)	NA
1,2,3,4,7,8,9-HPCDF	ND (1.72)	ND (0.712)	ND (0.969)	ND (0.677)	NA
OCDF	**10.5**	ND (1.44)	ND (6.25)	ND (2.89)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.7)	ND (0.7)	ND (0.95)	ND (0.95)	ND (1.9)
MANGANESE	**568**	**487**	**489**	**456**	**467**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (1.88)	ND (1.41)	ND (1.29)	ND (1.48)	NA
PCB 81	ND (1.9)	ND (1.43)	ND (1.32)	ND (1.42)	NA
PCB 105	2.98 B	ND (1.27)	ND (0.863)	ND (0.94)	NA
PCB-106	ND (1.33)	ND (1.16)	ND (0.893)	ND (0.936)	NA
PCB-118	5.4 B	3.23 B	ND (0.781)	**1.49**	NA
PCB 114	ND (1.39)	ND (1.25)	ND (0.783)	ND (0.877)	NA
PCB 123	ND (1.36)	ND (1.25)	ND (0.826)	ND (0.944)	NA
PCB 126	ND (1.7)	ND (1.32)	ND (0.917)	ND (1.07)	NA
PCB 156/157	ND (1.95)	ND (1.36)	ND (1.22)	ND (1.27)	NA
PCB 167	ND (1.53)	ND (1.02)	ND (0.943)	ND (0.966)	NA
PCB 169	ND (1.93)	ND (1.22)	ND (0.978)	ND (1.14)	NA
PCB 189	ND (1.43)	ND (1.21)	ND (1.19)	ND (0.945)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (2.44)	ND (1.07)	**8.73**	ND (0.632)	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	130 B	30.1 B	26.4 B	17.7 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	148 B	4.36 B	19.7 B	8.29 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	92.7 B	20.7 B	20.7 B	4.86 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	63.7 B	32.1 B	8.6 B	4.16 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	29.8 B	10.2 B	2.45 B	4.69 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	6.52 B	ND (1.35)	ND (1.15)	ND (1.14)	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	ND (1.11)	ND (1.13)	ND (0.916)	ND (1.04)	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (2.5)	ND (4.03)	ND (3.17)	ND (2.74)	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	**6.38**	ND (1.47)	ND (1.92)	ND (1.23)	NA
TOTAL PCB (CONGENER SUM) (ND=0)	477 B	97 B	78 B	40 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	594 B	204 B	159 B	125 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved
(1): PCB congener 209
EMPC: Estimated Maximum Potential Concentration
B: Not detected substantially above the level measured in lab or field blanks
J: Analyte present. Reported concentration may not be accurate or precise
ND: Not Detected
NA: Not Analyzed
BOLD: Analyte detected above MDL and not 'B' flagged

Groundwater Concentrations: MW-10
Post-Closure Care Plan Addendum 1 Revised Monitoring and Maintenance Plan Closed Surface Impoundments
DuPont Edge Moor Plant
Edgemoor, Delaware

Sample Date	5/16/2007	8/22/2007	11/13/2008	5/29/2009	10/22/2009
Total 2,3,7,8-TCDD Equivalent Concentration (TEQ) (pg/L)					
TEQ (1998 WHO TEFs)	**0.104**	**0.00124**	**0.137**	**0.0639**	NA
TEQ (2005 WHO TEFs)	**0.128**	**0.00228**	**0.168**	**0.0855**	NA
Polychlorinated Dibenzo(p)dioxin Congeners (pg/L)					
2,3,7,8-TCDD	ND (0.963)	ND (0.663)	ND (0.982)	ND (0.516)	NA
1,2,3,7,8-PECDD	ND (1.51)	ND (0.564)	ND (0.969)	ND (0.694)	NA
1,2,3,4,7,8-HXCDD	ND (1.38)	ND (0.493)	ND (3.77)	ND (0.755)	NA
1,2,3,6,7,8-HXCDD	ND (1.33)	ND (0.552)	ND (4.49)	ND (0.797)	NA
1,2,3,7,8,9-HXCDD	ND (1.43)	ND (0.509)	ND (4.23)	ND (0.905)	NA
1,2,3,4,6,7,8-HPCDD	**9.2**	ND (1.91)	**8.97**	**4.48**	NA
OCDD	**118**	**7.07**	**183**	**108**	NA
Polychlorinated Dibenzofuran Congeners (pg/L)					
2,3,7,8-TCDF	ND (0.597)	ND (0.524)	ND (0.401)	ND (0.447)	NA
1,2,3,7,8-PECDF	ND (0.907)	ND (0.758)	ND (0.943)	ND (0.454)	NA
2,3,4,7,8-PECDF	ND (0.885)	ND (0.604)	ND (0.82)	ND (0.436)	NA
1,2,3,4,7,8-HXCDF	ND (0.414)	ND (0.254)	ND (0.43)	ND (0.369)	NA
1,2,3,6,7,8-HXCDF	ND (0.388)	ND (0.29)	ND (0.4)	ND (0.318)	NA
1,2,3,7,8,9-HXCDF	ND (0.654)	ND (0.466)	ND (0.665)	ND (0.493)	NA
2,3,4,6,7,8-HXCDF	ND (0.491)	ND (0.338)	ND (0.485)	ND (0.352)	NA
1,2,3,4,6,7,8-HPCDF	ND (0.792)	ND (0.385)	**2.23**	**0.831**	NA
1,2,3,4,7,8,9-HPCDF	ND (1.24)	ND (0.682)	ND (2.59)	ND (0.715)	NA
OCDF	**7.14**	ND (2.06)	ND (3.72)	ND (2.04)	NA
Metals (ug/L)					
ANTIMONY	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)	ND (9.7)
ARSENIC	ND (0.7)	ND (0.7)	**2.3**	ND (0.95)	ND (1.9)
MANGANESE	**699**	**952**	**48.9**	**634**	**1740**
THALLIUM	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.15)	ND (14)
Dioxin-like PCB congeners (pg/L)					
PCB 77	ND (2.21)	ND (1.34)	ND (1.49)	ND (1.21)	NA
PCB 81	ND (2.21)	ND (1.27)	ND (1.51)	ND (1.12)	NA
PCB 105	ND (1.58)	1.91 B	**8.45**	**2.39**	NA
PCB-106	ND (1.51)	ND (1.11)	ND (1.13)	ND (0.849)	NA
PCB-118	5.67 B	3.37 B	**20**	**5.96**	NA
PCB 114	ND (1.61)	ND (1.23)	ND (0.972)	ND (0.851)	NA
PCB 123	ND (1.54)	ND (1.2)	ND (1.04)	ND (0.851)	NA
PCB 126	ND (2.1)	ND (1.09)	ND (1.04)	ND (0.792)	NA
PCB 156/157	ND (1.84)	ND (1.54)	**7.7**	**3.22**	NA
PCB 167	ND (1.8)	ND (1.17)	**3.74**	ND (0.891)	NA
PCB 169	ND (2.32)	ND (2.45)	ND (1.03)	ND (1.03)	NA
PCB 189	ND (1.91)	ND (0.881)	ND (1.56)	ND (1.07)	NA
PCB Homologs and Total PCBs (pg/L)					
TOTAL MONOCHLOROBIPHENYLS (CONGENER SUM)	ND (1.93)	**25.2 EMPC**	**5.07**	2.05 B	NA
TOTAL DICHLOROBIPHENYLS (CONGENER SUM)	67.7 B	16.5 B	39.5 B	22.2 B	NA
TOTAL TRICHLOROBIPHENYLS (CONGENER SUM)	41 B	5.29 B	39.5 B	9.24 B	NA
TOTAL TETRACHLOROBIPHENYLS (CONGENER SUM)	32.4 B	17.9 B	31.5 B	10.8 B	NA
TOTAL PENTACHLOROBIPHENYLS (CONGENER SUM)	32.5 B	29.6 B	124 B	32.4 B	NA
TOTAL HEXACHLOROBIPHENYLS (CONGENER SUM)	20.2 B	12.2 B	215 B	56.4 B	NA
TOTAL HEPTACHLOROBIPHENYLS (CONGENER SUM)	9.99 B	3.19 B	**124**	31.9 B	NA
TOTAL OCTACHLOROBIPHENYLS (CONGENER SUM)	5.87 B	ND (1.05)	**40.1**	13 B	NA
TOTAL NONACHLOROBIPHENYLS (CONGENER SUM)	ND (2.97)	ND (2.82)	**21.6**	**7.26**	NA
TOTAL DECACHLOROBIPHENYLS [(1)]	**8.93**	ND (1.34)	**51**	**8.6**	NA
TOTAL PCB (CONGENER SUM) (ND=0)	219 B	110 B	691 B	194 B	NA
TOTAL PCB (CONGENER SUM) (ND=1/2 MDL)	362 B	208.6 B	751 B	252 B	NA
SVOCs (ug/L)					
HEXACHLOROBENZENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
HEXACHLOROBUTADIENE	ND (0.9)	ND (1)	ND (1)	ND (1)	ND (1)
OCTACHLOROSTYRENE	NA	NA	NA	NA	ND (2)
PENTACHLOROBENZENE	NA	NA	NA	NA	ND (2)

Results are total concentrations in water, except those from November 2008, which are dissolved
(1): PCB congener 209
EMPC: Estimated Maximum Potential Concentration
B: Not detected substantially above the level measured in lab or field blanks
J: Analyte present. Reported concentration may not be accurate or precise
ND: Not Detected
NA: Not Analyzed
BOLD: Analyte detected above MDL and not 'B' flagged

Appendix F
Sitewide Data Management Plan

PARSONS

QUALITY ASSURANCE PROJECT PLAN

DUPONT EDGE MOOR SITE
EDGEMOOR, DELWARE

Prepared for:

E. I. du Pont de Nemours and Company
Corporate Remediation Group
4417 Lancaster Pike
Wilmington, DE 19805

Prepared by:

PARSONS
1601 Market Street
Suite 900
Philadelphia, PA 19103

December 2009

DuPont PN 507887
Parsons PN 445384

This page intentionally left blank

TABLE OF CONTENTS

1.0 Project Management 1
1.1 Project Background 1
1.2 Project Description 1
1.3 Project Organization 2
1.4 Data Quality Objectives (DQOs) 3
1.4.1 Step 1: State the Problem 4
1.4.2 Step 2: Identify the Decision 5
1.4.3 Step 3: Identify Inputs to the Decision 6
1.4.4 Step 4: Define the Boundaries of the Study 7
1.4.5 Step 5: Develop a Decision Rule 8
1.4.6 Step 6: Specify Tolerable Limits on Decision Errors 9
1.4.7 Step 7: Optimize the Design for Obtaining the Data 9
1.5 Training/Certification 10
1.6 Documentation and Records 10
1.6.1 Document Control 10
1.6.2 Field Logbook 10
1.6.3 Sample Log 10
1.6.4 Laboratory Deliverables 11
1.6.5 Report Preparation 13
1.6.6 Electronic Data Deliverables 13
1.6.7 Archival Requirements 13
2.0 Data Generation and Acquisition 15
2.1 Sampling Process Design 15
2.1.1 Sample Naming 15
2.2 Sampling Methods 16
2.2.1 Preliminary Activities 16
2.2.2 General Instructions for All Sampling 17
2.2.3 Soil Boring and Soil Sampling 18
2.2.4 Groundwater Sampling (Wells) 19
2.2.5 Containers, Preservatives and Holding Times 20
2.2.6 Decontamination 20
2.2.7 Sample Location Survey 20

2.3 Sample Handling and Custody 20
2.3.1 Chain-of-Custody 21
2.3.2 Field Chain-of-Custody 21
2.3.3 Laboratory Chain-of-Custody 21
2.4 Analytical Methods 22
2.5 Quality Control 23
2.5.1 Trip Blanks 23
2.5.2 Equipment Blanks 23
2.5.3 Field Duplicates 24
2.5.4 Laboratory Blank Samples 24
2.5.5 Laboratory Control Samples 24
2.5.6 Laboratory Duplicate 24
2.5.7 Matrix Spikes/Matrix Spike Duplicates 24
2.5.8 Surrogates 25
2.5.9 Internal Standards 25
2.6 Instrument/Equipment Testing, Inspection, and Maintenance 25
2.6.1 Instrument/Equipment Testing and Inspection 25
2.6.2 Instrument/Equipment Maintenance 26
2.7 Instrument Calibration and Frequency 26
2.8 Inspection/Acceptance Requirements for Supplies and Consumables 26
2.9 Data Acquisition Requirements 26
2.10 Data Management 27
2.10.1 Logbooks and Forms 27
2.10.2 Data Storage and Retrieval 27
3.0 Assessment and Oversight 29
4.0 Data Review and Usability 31
4.1 Data Review and Verification 31
4.1.1 Laboratory Review 31
4.2 Verification and Review Methods 32
4.2.1 DuPont In-House Review Process 32
4.2.2 Data Usability Summary 33
4.3 Reconciliation with Data Quality Objectives 33

TABLES

Table 1	Quality Control Performance Criteria
Table 2	Analytical Quality Control Limits
Table 3	Sample Container, Preservation, and Holding Time Requirements

FIGURES

Figure 1	Organization Chart

APPENDICES

Appendix A	Contact Information
Appendix B	Electronic Data Deliverable Format
Appendix C	Groundwater Sample Collection Forms
Appendix D	Sampling Standard Operating Procedures
Appendix E	Quality Control Criteria for Dioxin/Furans and PCB Congeners

This page intentionally left blank

ACRONYMS

Acronym	Explanation
% D	Percent Difference or drift
% R	Percent Recovery
ADQM	DuPont Analytical Data Quality Management Group
AL	Action Level
ARAR	Applicable or Relevant and Appropriate Requirements
BOD5	biochemical oxygen demand (5 day)
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CLP-NFG	Contract Laboratory Program – National Functional Guidelines
COC	Chain of Custody
COI	Constituent of Interest
CRG	DuPont Corporate Remediation Group
CRIM	DuPont Corporate Records and Information Management
CSM	Conceptual Site Model
DNREC	Delaware Department of Natural Resources and Environmental Control
DQI	Data Quality Indicator
DQO	Data Quality Objective
DUP	Duplicate
DUS	Data Usability Summary
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
FP	False Positive
GC/MS	Gas Chromatography/Mass Spectrometry
ICP	Inductively Coupled Plasma (emission spectroscopy)
ID	Identification
IDW	Investigation-Derived Waste
ISO	International Organization for Standardization
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LD	Laboratory Duplicate
LEL	Lower Explosive Limit
LIMS	Laboratory Information Management System
MCAWW	Methods for Chemical Analysis of Water and Waste
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goals
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCCSS	New Castle County Special Services
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute of Standards and Technology
PCB	polychlorinated biphenyls
PCE	tetrachloroethene

Acronym	Explanation
POTW	Publicly Owned Treatment Works
PQL	Practical Quantitation Limit
PRB	Permeable Reactive Barrier
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manager
QAP	Quality Assurance Plan
QAPP	Quality Assurance Project Plan
R	Correlation coefficient
RCRA	RCRA Conservation and Recovery Act
RL	Reporting Limit
ROD	Record of Decision
RPD	Relative percent difference
SOPs	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
VOC	Volatile Organic Compound
WDP	Wastewater Discharge Permit
WWTP	Wastewater Treatment Plant

1.0 PROJECT MANAGEMENT

This Quality Assurance Project Plan (QAPP) is written to present policies, project organization, functional activities, and quality assurance/quality control (QA/QC) measures intended to achieve the project data quality objectives for sampling activities associated with a site-wide investigation in and around the DuPont Edge Moor site. This QAPP is intended to meet requirements for conducting the work in accordance with QA/QC field procedural protocols for environmental measurement data.

This QAPP has been prepared in general accordance with the U.S. Environmental Protection Agency (EPA) documents:

- EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5 (EPA/240/B-1/003, March 2001)
- EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA/240/R-02/009, December 2002)

1.1 Project Background

The DuPont Edge Moor manufacturing facility (site) is located in the town of Edgemoor in New Castle County, Delaware. The Edge Moor facility has been manufacturing titanium dioxide (TiO_2) pigment since the early 1930s.

During March 2006, a Delaware Department of Natural Resources and Environmental Control (DNREC) Corrective Action Permit #HW-03A16 (Permit) was issued for the site. One of the permit requirements was to create a Phase I RFI work plan (Module II.D.1). As part of that work plan, a QAPP was also required (Module II.D.2.b.iii).

As work on the Site continues into the Phase II RFI, the QAPP has been updated to reflect changes in scope per Module II.E.2.a of the Permit.

1.2 Project Description

DuPont Corporate Remediation Group (CRG) anticipates the following scope of activities to be conducted by Parsons or its designated subcontractor(s):

- Install approximately 47 soil borings throughout the site.
- Install 1 monitoring well just north of SWMU 5. This includes well development and groundwater sampling activities.
- Collect samples:
  - Collect groundwater samples from the on-site existing monitoring wells (MW-11D through MW-22 S/D) along with the newly installed monitoring well (MW-23).
  - Collect soil samples from the newly installed soil borings.

This QAPP also governs general soil investigations and groundwater sampling activities throughout the Site, and may be updated as necessary.

1.3 Project Organization

An organizational chart for the project is shown in Figure 1, and contact information is provided in Appendix A. Responsibilities for project team members are summarized below:

The **DuPont Project Director,** Ms. Michelle Thomson, has overall responsibility for the execution of the project, including correspondence with and coordinating activities with DNREC.

The **Parsons Project Manager**, Mr. Douglas Groux, manages Parsons personnel involved in the project and will be responsible for Parsons cost and schedule tracking. The Parsons Project Manager will also provide technical review of project deliverables. The Project Manager is the focal point for all on-site project communication and problem resolution. Issues related to field sampling and on-site activities are relayed to the Project Manager via the Field Team Leader. Issues concerning the laboratory analysis of project samples or data quality are transmitted to the Project Manager by the Project Chemist. It is the responsibility of the Project Manager to keep the Project Director informed of any issues involving scope, budget, or significant technical concerns. The Project Manager also immediately advises the Health and Safety Officer of any concerns, occurrences, or issues involving personnel safety and welfare.

The **Laboratory Project Managers** will coordinate and manage the subcontract laboratory analysis.

Ms. Nancy Bornholm of Lancaster Laboratories, will oversee performance of all routine analytical tests conducted for the project.

Ms. Kim Mace of Analytical Perspectives will oversee performance of high-resolution analytical tests [dioxins, furans, and polychlorinated biphenyls (PCBs)] conducted for the project.

The Laboratory Project Managers are responsible for providing the Project Quality Assurance Manager a confirmation of sample receipt within one working day of sample receipt and for notifying the Project Quality Assurance Manager of any sample integrity issues [holding time exceedance, chain of custody (COC) discrepancies, etc.] promptly when discovered. The confirmation of sample receipt will include the following:

- A copy of the COC form
- A sample login sheet that summarizes sample IDs, as entered into the laboratory information management system (LIMS) and the analyses requested for each sample
- A summary of the target analytes to be reported for each analysis requested
- A summary of any discrepancies or sample integrity issues noted during sample login

The Laboratory Project Manager is also responsible for submitting the final data package, including hardcopy deliverable and electronic data deliverable (EDD), within the requested turnaround time (see Appendix B).

The **Project Quality Assurance Manager**, Ms. Wanda Davis, will place orders for sample coolers and containers, track sample receipt and data package deliverables for the project, verify completeness of the data packages (hardcopy and EDD), verify that the hardcopy and EDD match, maintain the project database, and maintain copies of the

analytical reports. The Project Quality Assurance Manager will notify the Field Investigation Manager of sample integrity issues and data package deliverable issues. All members of the project team will be carbon-copied on any such notifications. The Project Quality Assurance Manager will notify the Laboratory Project Manager of sample receipt issues, data turnaround issues, and data package discrepancies or omissions. The Project Quality Assurance Manager will evaluate if sampling procedures, laboratory analyses, and project documentation conducted as part of the project are in accordance with this QAPP and the requirements of DNREC. The Project Quality Assurance Manager will prepare a Data Usability Summary (DUS) in conformance with the guidance of the Contract Laboratory Program National Functional Guidelines (CLP-NFG). The Project Quality Assurance Manager will submit original copies of all hardcopy laboratory deliverables to the URSD Project Manager following data review.

Technical Support Personnel will perform sample collection in accordance with this QAPP. Technical support personnel will be responsible for organizing and coordinating sampling activities and will update the Parsons Project Manager on project progress. Staff personnel will coordinate ordering the appropriate number of sample containers and coolers from the analytical laboratory with the Project Quality Assurance Manager. After samples are collected, the staff personnel are responsible for providing the Project Quality Assurance Manager with a copy of the COC form within one working day of sample delivery to the analytical laboratory. At the end of each sampling event, the staff personnel will deliver copies of all logbook pages and sample collection forms completed during that event to the Parsons Project Manager.

1.4 Data Quality Objectives (DQOs)

The purpose of this QAPP is to provide the requirements for collecting and analyzing soil and groundwater samples to characterize the sampled media. As indicated in Tables 1 and 2, samples will be collected and analyzed for the following parameters:

- Metals
- Semivolatile Organic Compounds (SVOCs)
- Volatile Organic Compounds (VOCs)
- Dioxins and Furans
- Polychlorinated biphenyls (PCBs)
- Total petroleum hydrocarbons-oil-range organics (TPH-ORO)
- Total Petroleum hydrocarbons-diesel-range organics (TPH-DRO)
- Total Organic Carbon (TOC), soil samples only
- pH, water samples only

Table 3 of the Phase II RFI Work Plan lists the target metals, SVOC, VOC, dioxins and furans, PCBs, and general chemistry analytes. The data quality objectives (DQOs) ensure that the data for these analytes will be collected or developed in accordance with procedures appropriate for its intended use and that the data will be of known and documented quality that will withstand legal and scientific scrutiny.

The Phase II RFI objectives (as stated in the permit) are as follows:

- Characterize the presence, magnitude, extent, direction, concentration and migration rate of hazardous waste/constituent releases from each SWMU into groundwater, surface water, air, and/or soil.
- Identify actual/potential human and/or ecological receptors, which can serve as environmental indicators for the site.
- Provide a detailed geologic and hydrogeologic characterization of the Edge Moor site.
- Determine the need for and scope of corrective measures.
- Identify and characterize hazardous waste/constituent releases and hazardous constituent degradation by-products from SWMUs.

DQOs for this site investigation were developed in accordance with the guidance in EPA document *Data Quality Objectives for Hazardous Waste Site Investigations* (EPA QA/G-4HW, January 2000). When data are collected during site investigations, the EPA recommended systematic planning tool is the DQO process. The DQO process is a seven-step planning approach to develop sampling designs for data collection activities that support decision-making:

1. State the problem.
2. Identify the decision.
3. Identify inputs to the decision.
4. Define the boundaries of the study.
5. Develop a decision rule.
6. Specify tolerable limits on decision errors.
7. Optimize the design for obtaining data.

The steps applicable to the collection of environmental data to support characterization of the site are discussed below.

1.4.1 Step 1: State the Problem

The most important activities in this step are as follows:

- Establish the planning team.
- Describe the problem.
- Identify available resources, constraints, and deadlines.

Establish the Project Team

The planning team is composed of project management and technical staff. Project management includes the DuPont Project Director who is responsible for implementing the RFI. The Project Director is familiar with the problem and the budgetary/time constraints involved with site characterization activities. The primary decision-maker is the DuPont Project Director. The technical staff is knowledgeable about technical issues such as representative sampling, analytical, and QA/QC procedures. The technical staff includes a geologist with field sampling expertise, a chemist with environmental laboratory and QA/QC expertise, and a project manager with experience in remedial actions at chemical plants. Figure 1 presents the organization of the project team and Section 1.3 (Project Organization) discusses specific duties of the project team members.

Describe the Problem

The Phase II RFI is intended to provide information that will allow a determination to be made relative to the Corrective Action permit objectives. In general, the Phase II RFI is being conducted to determine if there have been or are current ongoing releases from the SWMUs to the surrounding environment. In particular, the following questions will be addressed:

- Has a release occurred from each SWMU into groundwater, surface water, air, and/or soil?
- If a release has occurred, what is the nature and extent of the release?
- Are there complete or potentially complete exposure pathways, i.e., are there actual/potential human and/or ecological receptors that potentially are exposed to impacted media?
- What is the detailed geologic and hydrogeologic characterization of the area surrounding and underlying each SWMU?
- Is there a need for corrective measures?

Identify Available Resources, Constraints, and Deadlines

The availability of resources along with site-related constraints (e.g., plant operations, underground/overhead utilities, tidal fluctuations, weather, etc.) and required deadlines may affect the schedule of events along with available investigation options. This QAPP provides a mechanism for controlling and managing these issues along with evaluating data quality throughout the investigation.

1.4.2 Step 2: Identify the Decision

The essential components of this step are as follows:

- Identify the principal study questions
- Define alternative actions
- Develop a decision statement

Identify the Principal Study Questions

The principal study questions are as follows:

- Have releases from SWMUs occurred?
- What is the nature and extent of potential or suspected releases from SWMUs?
- Can SWMUs be screened from further investigation?
- Are interim/stabilization measures necessary?
- Have site conditions been adequately defined?

Define Alternative Actions

The alternative actions that could result from the resolution of the principal study questions are:

- Recommend that the SWMU or portion(s) of the site require no further evaluation/action (NFA).

- Recommend that the SWMU or portion(s) of the site warrant further evaluation.
- Recommend that the SWMU or portion(s) of the site warrant consideration of remedial actions.

Develop a Decision Statement

The principal study questions and the alternative actions are combined into the following decision statement:

- Determine whether the following questions have been adequately answered (i.e. is remedial action or NFA appropriate), or additional investigation is necessary
  - Have releases from SWMUs occurred?
  - What is the nature and extent of potential or suspected releases from SWMUs?
  - Can SWMUs be screened from further investigation?
  - Are interim/stabilization measures necessary?
  - Have site conditions been adequately defined?

1.4.3 Step 3: Identify Inputs to the Decision

In Step 3 of the DQO process, the information needed to resolve the decision statement is identified, including decision values and analytical methodology. The following components of this step are addressed:

- Identify the information needed
- Determine the sources of the information
- Determine the basis for the Action Level
- Identify sampling and analysis methods that can meet the Action Levels

Identify the Information Needed

To resolve the principal study questions, the following information is needed:

- Analytical results for the site-specific samples listed in Tables 1 and 2 for the target compounds identified in Table 3 of the Phase II RFI Work Plan
- Actual on-site and adjacent land use along with the current and historical operational information for the Edgemoor Plant
- Geologic and hydrogeologic characterization data of the areas surrounding and underlying each SWMU

Determine the Sources of the Information

The following sources will be contacted or used for information.

- Analytical Sources (most current versions)
  - Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)
  - Methods for Chemical Analysis of Water and Wastes (MCAWW)

- Standard Methods for the Examination of Water and Wastewater
- 40 CFR Part 136 Guidelines Establishing Test Procedures For The Analysis Of Pollutants, Appendix A
- EPA 1600 series methods for analysis of PCBs (method 1668) and dioxins and furans (method 1613) as reflected in the appropriate laboratory standard operating procedures (SOPs)

- DuPont records, personnel, and files
- Publicly available records and files
- Scientific/research literature
- Applicable/relevant regulations and standards
  - Federal
  - State
  - Local/Public Interest
  - DuPont
  - Professional

Determine the Basis for the Screening Levels

Please refer to Section 4.2 of the Phase II RFI Work Plan for information about the basis for the soil and groundwater to surface water screening criteria.

Identify Sampling and Analysis Methods That Can Meet the Data Requirements

Field sampling data will be recorded on the Instrument Calibration and Field Book included in Appendix C. A description of the quality control characteristics of each analytical method is included in Table 1.

Appropriate analytical methods are as follows:

- Metals: SW 846, Method 6010B/6020
- VOCs: SW 846, Method 8260
- SVOCs: SW 846, Method 8270C
- PCBs: SW 846, Method 8082A
- Dioxins/Furans: SW 846, Method 8280B
- TOC: SW 846, Method 9060A
- pH: SW-846, Method 9045
- TPH-ORO and TPH-DRO: SW-846, Method 8015
- percent moisture: MCAWW 160.3 (modified)

1.4.4 Step 4: Define the Boundaries of the Study

The data for site characterization should be collected from a well-defined target population using methods that produce representative samples. Defining the boundaries

of the study defines the requirements to obtain representative samples. The elements of Step 4 include the following:

- Define the target population
- Specify the spatial boundaries
- Specify the temporal boundaries
- Determine the practical constraints on collecting the data
- Determine the smallest subpopulation, area, volume, or time for which separate decisions must be made

Define the Target Population

The target populations are media where potential releases from the SWMUs may have occurred. Media will be characterized by analyzing for target analytes. Target analytes are listed in Table 3 of the Phase II RFI Work Plan.

Specify the Spatial Boundaries

The spatial boundaries have been defined as individual on-site SWMUs.

Specify the Temporal Boundaries

Soil sample collection will be a one-time event. Groundwater sampling will consist of two events, scheduled three months apart.

Determine the Practical Constraints on Collecting the Data

The following constraints apply:

- Safety issues regarding accessibility to sampling locations. This include amount of day light hours, sample locations near bluffs, water, rail lines, plant operations, underground/overhead obstructions, etc.
- Plant/DuPont/Home Land Security schedule restrictions and work requirements.
- Lack of groundwater in the monitoring well/piezometer due to low static groundwater elevations. Should a scheduled sample not be available due to low water level, the field notes must document this circumstance.

Determine the Smallest Subpopulation

The smallest subpopulation is one grab sample, which represents the quality and nature of the sample at the time of the sampling event.

1.4.5 Step 5: Develop a Decision Rule

In this step, the DQO process develops a decision rule based on previous components of the process and the elements listed below:

- Specify the statistical parameter that characterizes the population
- Specify the action level for the decision
- Confirm that the action levels are above the measurement detection limits
- Provide statement of the Decision Rule

Specify the Statistical Parameter that Characterizes the Population

Statistical parameters will not be used to characterize the population. Individual data points will provide the characterization. These data points will be screened against the specified criteria. Decisions will be made based on these individual points, taking into account the full dataset.

The data summary of sample results may include minimum, maximum, and average values. The actual statistics used will be based upon the data set characteristics and relevance to the evaluation.

Specify the Action Level for the Decision

As discussed in Step 3 (Section 1.1.3), the action levels are represented as the screening criteria for each media are presented in Tables 4 and 5.

Confirm that the Action Levels are above the Measurement Detection Limits

Tables 4 and 5 list the action levels (screening criteria) and method detection limits (MDLs) for each analyte.

Statement of the Decision Rule

The inputs from the previous four steps are integrated into an unambiguous *If…then…* statement (Decision Rule):

- *If* all analyte concentrations for a SWMU are equal to or less than the analyte specific screening levels, *then* DuPont will request a NFA.
- *If* any analyte concentrations for a SWMU exceed the screening criteria, *then* further evaluation will be conducted to determine if the elevated concentration(s) is a result of that SWMU's activities.
- *If* this evaluation indicates none of the elevated concentration(s) is a result of that SWMU's activities, *then* DuPont will request a NFA.
- *If* this evaluation indicates the elevated concentration(s) is a result of that SWMU's activities, *then* DuPont will recommend additional investigation or response action, as appropriate.

1.4.6 Step 6: Specify Tolerable Limits on Decision Errors

In accordance with EPA guidance, Step 6 is to specify quantitative performance goals for choosing between alternative actions in the Decision Rule developed in Step 5. Tolerable limits are not being set for this phase of the remedial investigation because the analytical methods chosen include generally recognized acceptable levels of precision and accuracy.

1.4.7 Step 7: Optimize the Design for Obtaining the Data

Sample locations have been cited judgmentally (biased sampling), based on previous site investigations and an evaluation of the current conditions for individual SWMUs. For instance, stained soil will be preferentially sampled when evident. Because the statistical parameter is the maximum concentration, the sampling plan will maximize the probability that affected areas of the site are monitored for further assessment or remedial action.

1.5 Training/Certification

The project files shall contain the documentation of training specified in 29 CFR 1910.120(e) for all persons working on-site. The level of training required is dependent upon the person's on-site activities and potential for exposure to hazardous substances and/or other hazards encountered during the operations. As appropriate, specialized training required by DuPont will also be documented and retained in the project files.

1.6 Documentation and Records

This section describes the process for maintaining document control of the QAPP, field records, and laboratory deliverables.

1.6.1 Document Control

The Project Quality Assurance Officer and other signatories shall approve revisions to the QAPP. Whenever revisions are made or addenda added to the QAPP, a document control system shall be put into place to ensure 1) all parties holding a controlled copy of the QAPP receive the revisions or addenda, and 2) outdated material is removed from circulation. Project personnel holding controlled copies of the QAPP will provide certification that they have read, understood, and updated their copies of these documents. This certification will be maintained in the project files.

1.6.2 Field Logbook

Each sampling team will maintain a detailed logbook or sample collection form. The signature of the author and the date of entry, the project name and number and the location will accompany all entries in this log. At the beginning of each sampling day, the designated team member will start the daily log by entering the date and time, the locations to be sampled, weather conditions, field team present, and any potential problems. Other information to be entered into the field logbook includes observations of field activity taking place, progress, and any problems, summary of equipment preparation procedures and a description of any equipment problems (including corrective action), reference to SOPs, and explanations of any deviations from the QAPP. Detailed records describing groundwater sample collection will be logged on the forms included in Appendix C or on equivalent forms. At the end of each phase of the investigation, the field sampling team will deliver copies of all logbook pages and sample collection forms completed during that phase of the investigation to the Project Manager.

1.6.3 Sample Log

The Project Manager, or designated representative, will be responsible for keeping a sample log to record information regarding each sample. The sample log may be maintained in the field logbook. The required information will include but is not limited to the following:

- Project number
- Facility location
- Sample location description
- Sample ID
- Depth

- Analyses requested
- Time, date, sampler name
- Equipment used to collect the sample

1.6.4 Laboratory Deliverables

The Laboratory Project Manager will provide the data package described below to the Project Quality Assurance Manager within the specified turnaround time. Each data package should contain a case narrative, COCs, and the reportable and supporting data described below.

Completed Documentation

The data package should include copies of the completed field COC forms and documentation and should also include forms that the laboratory uses to document sample condition upon receipt.

Sample Identification Cross-Reference

Sample identification cross-reference information facilitates the correlation of field and laboratory sample IDs as well as the association of field samples with a particular laboratory batch. The data package should include a listing of COC field sample IDs cross-referenced to the associated laboratory sample IDs. The data package should include an easy and unambiguous means of associating a specific QC sample (for example, the laboratory duplicate, the matrix spike/matrix spike duplicate (MS/MSD) samples, and the laboratory control sample) with specific field samples.

Test Reports for Samples

Sample test reports provide specific information for each sample regarding analytical results and methods. The data package should include the test reports for all reported data. Analytical results (i.e., detected results and non-detected results) should be adjusted for sample characteristics, laboratory preparations/cleanups, and/or laboratory adjustments. Soil samples should be adjusted for moisture content. All analyte detections above the analyte method detection limit should be reported.

Surrogate Recovery Data

The data package should include the surrogate data as applicable to the analytical method performed. The surrogate data can be included on the test report for each sample, or can be included on a summary form, provided that the surrogate results are clearly and unambiguously linked to the sample from which the results were measured. The surrogate data should include the percent recovery (%R) and the laboratory's QC limits.

Laboratory Blank Samples

The data package should include test reports or summary forms for all blank samples (for example, method blanks and preparation blanks) pertinent to sample analyses. Blank sample test reports should contain all of the information (e.g., surrogate data) specified for environmental sample test reports/summary forms. Sample data should not be blank corrected.

Laboratory Control Samples (LCS)

The data package should include the LCS test reports or LCS result summary forms. A LCS should be included in every preparation batch and taken through the entire preparation, cleanup, and analysis procedures. The LCS samples should contain the target analytes identified for the project (see Table 3 of the Phase II RFI Work Plan) applicable to the analytical method performed. Table 2 lists the QC limits for the spiked analytes required for this project. The LCS test report, or LCS results summary form, should include the amount of each analyte added, the %R of the amount measured relative to the amount added, and QC limits for each analyte in the LCS. If required by the laboratory's QAPP and/or SOPs, the %R and relative percent difference (RPD) data for each analyte in the laboratory control sample duplicate (LCSD) should be reported.

Matrix Spike/Matrix Spike Duplicate Samples (MS/MSD)

The project MS/MSD samples should be spiked with the project-specified analytes (see Table 2). The project MS/MSD summary forms should include identification of the compounds in the spike solution, the amount of each compound added to the MS, and the MSD, the parent sample concentration, the concentration measured in both MS and MSD, the calculated %R and RPD, and the QC limits for both %R and RPD. The form should also include the laboratory batch number and the laboratory identification number of the sample spiked.

Laboratory Duplicates

If a laboratory duplicate (replicate or REP) was analyzed, the data package should include the duplicate sample test report summary form. The duplicate sample test report should include the calculated RPD between the sample and the sample duplicate results and the QC limits for the RPD. The test report should also include the laboratory batch number and the identification number of the sample.

Narrative

The laboratory should document and report all observed problems and/or anomalies observed by the laboratory that might have an impact on the quality of the data.

Supporting Data Requirements

Supporting data for each data package contains instrument printouts, laboratory notebook records, calibration and instrument performance records, and other supporting data deliverables. Each record is clearly labeled with the type of data provided and the applicable laboratory quality control batch numbers and dates. Supporting data for each class of analyses (dioxins, furans, metals, PCBs, SVOCs, VOCs, or general chemistry) is grouped together in the deliverable package. The laboratory maintains the entire raw data package indefinitely per the data retention policy of the laboratory for all electronic data.

A summary data package is provided with project monitoring reports. The summary data package includes the laboratory narrative, analyses results, QC summary information, chain of custody, and the DuPont Data Review (DDR) report. The DDR presents the results of the in-house data review process along with an overall assessment statement regarding acceptance of the data. The summary data package is maintained with the in-house project record. The summary data package does not include the entire raw data deliverable sections maintained by the laboratory.

1.6.5 Report Preparation

The Project Manager will be the technical lead for preparing reports that summarize the results of the project. The only anticipated project deliverable is a Phase II RFI Report that will be issued to DNREC. The report will include, at a minimum, items specified in the permit (Module II.D.5.). This includes at a minimum, an analysis of results along with conclusions and recommendations.

1.6.6 Electronic Data Deliverables

The Project Quality Assurance Manager will manage the project data in a project database. The laboratory will submit EDDs in a format suitable for input into the project database, as described in Appendix B.

1.6.7 Archival Requirements

Both hardcopy and electronic data must be archived by the laboratory for a minimum of ten years and made available by the laboratory upon request by the DNREC or DuPont. DuPont records will be kept as per DuPont file retention policy.

This page intentionally left blank

2.0 DATA GENERATION AND ACQUISITION

This section addresses aspects of data generation and acquisition. It also describes the appropriate methods for sampling, measurement and analysis, data collection or generation, data handling, and quality control activities.

2.1 Sampling Process Design

Relevant components of the following elements of the sampling design are included in Tables 1 and 2:

- Types and numbers of samples required
- Sampling locations and frequencies
- Sample matrices
- Measurement parameters of interest

See the Phase II Corrective Action RFI Work Plan for locations of the monitoring wells.

2.1.1 Sample Naming

Sample labels will clearly identify the particular sample and should include the following:

- Facility name and sample ID
- Time and date sample was taken
- Sample preservation
- Analysis requested

Sample identification numbers will be assigned, when possible, prior to sample collection in accordance with the DuPont CRG sample identifier coding system to facilitate loading of samples and results into the Envista database. All samples will have a three-digit location code as follows:

- EDG – Edge Moor Plant

The following characters are the matrix codes:

- A Air
- D Drinking water
- E Sediment
- G Groundwater
- K Blank water
- S Soil (subsurface samples)
- W Surface water
- X Other Solid
- Z Other liquid

The following digits define the sampling point, with maximum character length of 16 that includes sample depth in feet in parentheses when applicable [e.g., EDG-S-S01SB01(0-2)].

Field duplicate samples will receive a sample identification, which is in the same format as that of the original samples, but will have a "DUP" suffix [EDG -S- S01SB01(0-2)-DUP], unless "blind" duplicates are specified (see Section 2.4 of this QAPP).

Matrix spike and matrix spike duplicate samples will receive sample identifications that are similar to that of the original sample, with the exception that the matrix spike and matrix spike duplicate sample identification will have "MS" or "MSD", respectively, as a suffix [e.g., EDG -S- S01SB01(0-2)-MSD].

Trip and equipment blanks will receive sample identification that will include the location and matrix code and sequential number (e.g., EDG -K-EQBLK-1).

Samples collected for dissolved parameters, if any, will have "DIS" suffix (e.g., EDG-G-MW-1-DIS).

Additional instructions for establishing field sample identifications are presented in Appendix D.

2.2 Sampling Methods

Procedures for soil and groundwater sample collection are presented below.

2.2.1 Preliminary Activities

The following preliminary activities will be completed before sampling personnel enter the field to ensure proper preparation for each sampling event:

- Coordination between sampling and laboratory personnel will be established so that sample integrity is retained at all times during the sampling event.
- The laboratory will be notified of each upcoming sampling event so it can prepare the list of parameters to be analyzed for each site, the replicate requirements, and the number of extra bottles needed, if any, for quality control testing will be specified to the laboratory manager.
- All proper field forms (i.e., field logbooks, custody seals, and COC forms) will be prepared for use to enable proper documentation of the sampling event.
- A preliminary inspection and calibration of all field equipment will be performed to ensure accurate measurements of field parameters (i.e., pH, specific conductance, dissolved oxygen, turbidity, and temperature).
- All field personnel will be trained in the sampling protocols contained herein.

The following steps will be performed before beginning each sampling event to ensure sampling is implemented correctly and safely:

- The sample location will be identified.
- All equipment to be used during the sampling event will be inspected, pre-cleaned, and decontaminated.
- Field meters to be used during sampling (e.g., pH and specific conductance meters) will be checked to ensure proper calibration and precision response.

Buffer and standard solutions will be laboratory checked to ensure their accuracy.

- All forms to be used in the field (e.g., field logbook, and COC forms) will be assembled.
- Sampling personnel will review sampling protocols. In addition, health and safety protocols will be reviewed to help ensure that no injuries occur during the sampling event.
- The locations of underground utilities will be determined and marked, as appropriate. Excavation or other permits, if necessary, will be obtained.

2.2.2 General Instructions for All Sampling

Water sample bottles will not be pre-rinsed with site water prior to sample collection. Latex or nitrile gloves will be worn during sampling activities and replaced between samples. All samples will be held chilled (temperature ranging from not frozen to 6°C) with wet ice immediately after collection.

The project geologist or a senior member of the field team will be responsible for sampling and laboratory coordination. The laboratory will provide necessary sample containers with the shipping containers (i.e., shuttles). Containers and any preservative added to the containers will be in accordance with EPA document SW-846 protocol. All samples requiring refrigeration will be shipped overnight courier to the laboratory at approximately 4°C (temperature ranging from not frozen to 6°C).

Field equipment will consist of some or all of the following:

- Polyethylene (nalgene) and/or glass collection bottles (laboratory provided)
- Field sampling record
- Sufficient ice to maintain the samples at approximately 4°C (temperature ranging from not frozen to 6°C)
- Conductivity meter, pH meter, temperature probe, Redox probe, dissolved oxygen probe, turbidity meter, or multi-probe Sonde with a Flow-Thru cell
- Glass beakers
- Photoionization detection (PID) and/or flame-ionization detection (FID) for organic vapor analysis
- Pumps and/or bailers for purging
- Rope
- Stainless-steel or polypropylene leader to attach rope to sampling device
- Bailers or other sampling devices (preferably dedicated, pre-cleaned, or disposable)
- Stainless-steel knife, trowels, spoons, scoops, and bowls
- Soil punch or equivalent

Preparing for sampling includes acquiring all of the necessary monitoring equipment listed above and site-specific information to perform the required monitoring.

2.2.3 Soil Boring and Soil Sampling

Soil sampling activities will be performed at the various SWMUs to determine in general, if a release has occurred to the surrounding environment. In addition, background soil samples will be collected to characterize background soil quality. Soil samples will be collected by means of drilling equipment or manual means such as hand augering.

The Geoprobe is a direct-push technique used to sample shallow soil and groundwater. The hydraulically-powered Geoprobe relies on a relatively small amount of static (vehicle) weight combined with percussion as the energy for advancing a sampling tube vertically downward into unconsolidated materials, such as those occupying the Plant Area. The technique is quick and produces no drill cuttings. Equipped with a 1.5-inch diameter Macro-Core® sampler, the Geoprobe will be used to collect a continuous soil core at each of the Geoprobe sampling stations.

One pair of monitoring wells (MW-23 S/D) will be installed just north of the identified boundary of SWMU 5, using a hollow-stem auger or rotosonic drill rig with continuous split-spoon sampling. Well development activities will occur following installation. Section 2.2.5 presents well development information.

The construction of the shallow and deep monitoring well will be directed by the Parsons oversight geologist. Well construction details will be dictated by subsurface conditions encountered at each location. During drilling, vegetable oil and other non petroleum based products will be used as lubricating oils to minimize potential contamination of the borehole and/or well. Descriptive logs of the soil cores will be completed in the field using the Unified Soil Classification System (USCS), modified. In addition, qualitative moisture content within the core or split spoon samples will be recorded.

The "deep" soil sample will be collected approximately 1 to 3 feet above the smear zone of the first encountered water table. The last 2-foot portion of the soil core collected immediately above the first water table zone encountered will be selected for subsequent chemical analysis. Should any other soil sample within a given (Geoprobe or auger) borehole possess visual signs of impairment, exhibit odors, or produce a PID response, that soil sample may be collected for subsequent laboratory analysis depending upon the SWMU. All waste material generated during drilling activities will be containerized and disposed as per the site- specific Waste Management Plan (WMP).

Except for the VOC analyses, soil will be transferred from the sampling device to a stainless steel mixing bowl for homogenization. Soil samples will be transferred to sample collection jars (supplied by the laboratory) using stainless steel spoons or trowels. For VOC analyses, samples will be collected directly from the sampling device into 5- gram disposable Encore samplers. Four Encore samples plus an additional sample for % moisture determination will be collected at each sample location.

Field equipment will consist of some or all of the following:

- Polyethylene (nalgene) or glass collection bottles (laboratory provided)
- Plastic sheet liners
- Field sampling record and soil boring logs
- Stainless-steel knife, trowels, spoons, scoops, and bowls

Sampling devices used during the investigation (e.g. sample tubes, soil spoons, etc.) will be decontaminated as described in Section 2.2.9 of this QAPP after each use to avoid cross contamination within and between sample locations.

2.2.4 Groundwater Sampling (Wells)

Groundwater samples will be collected from all newly installed and existing monitoring wells during two events, three months apart, in order to characterize groundwater quality. The first sampling event will occur at least two weeks following well installation and development. Procedures for sampling production wells are included in Section 2.2.7.

Prior to initiating sampling activities, a complete round of depth to water levels in production wells, monitoring wells, and the river will be measured to the nearest one hundredth of a foot.

To the extent possible, monitoring wells will be purged and sampled beginning from the least suspected to most suspected contaminated well to minimize the potential for cross-contamination.

Prior to sampling, monitoring wells will be purged using low-flow methodology. All wells will be purged with low-flow type submersible pumps with a flow rate of between 0.1 and 0.5 liters per minute with drawdown not to exceed 0.3 feet. If low-flow purging (as described) is not possible, then a minimum of three well volumes of water will be removed from the well prior to monitoring field parameters for stabilization. If the well runs dry during purging, the well will be sampled after the well has recharged. The water level in the well will be measured periodically during purging. The pump setting for the monitoring wells will be chosen based on the geologic formation opposite the screened interval. Total well depths necessary to calculate the required pump placement will be tabulated and will accompany the sampling team in the field. If the screened interval is unknown, the pump will be placed approximately one foot from the bottom of the well.

During well purging, pH, specific conductance, turbidity, dissolved oxygen, oxidation/reduction potential, color, odor, and temperature will be measured at regular intervals until stabilization is reached. Stabilization will be considered achieved when three consecutive readings of each indicator parameter, taken at three to five minute intervals are within the following limits:

- pH (+/- 0.1 units)
- Specific conductance (within 3%)
- Turbidity (10% for values greater than 5 NTUs)
- Temperature (within 3%)

Indicator parameter instrumentation will be calibrated daily, at a minimum. Once purging is complete, the well will be sampled through the discharge tubing of the pump by directly filling the laboratory-supplied sample containers.

Sample containers will be filled to at least the container shoulder. After the sample containers are filled, they will be labeled appropriately and placed in a sample shuttle containing ice or ice packs. Samples requiring refrigeration for preservation will be stored at approximately 4°C (temperature ranging from not frozen to 6°C) during storage and shipment.

To ensure against cross-contamination between groundwater sampling locations, the sampler collecting the groundwater samples will wear clean, disposable latex or nitrile gloves and will limit his/her contact with the samples. When possible, laboratory-cleaned or disposable sampling equipment should be used (e.g., discharge tubing). Sample bottles and containers will be prepared by the contracted laboratory and will be

sealed to ensure cleanliness. Sample bottles will not be cleaned or reused in the field. Monitoring instruments and sample pumps will be cleaned in accordance with Section 2.2.9 of this QAPP.

2.2.5 Containers, Preservatives and Holding Times

Table 3 lists containers, preservatives, and holding times applicable to the project. Sampling containers are purchased pre-cleaned and treated according to EPA specifications. Note that sample containers should be filled to the preferred volume listed in Table 3. If yield is insufficient to collect the preferred volume, at least the minimum volume listed in Table 3 must be collected for the requested analysis to be performed. If only the minimum sample is collected, the laboratory may have insufficient sample volume in cases where a dilution or reanalysis is required, which may require a resampling event.

The laboratory will supply sample kits consisting of new, pre-cleaned, and pre-preserved sample containers, bottle labels, chain-of-custody forms, and shipping materials. The sample kits will be packaged in coolers and will include the appropriate number of sample containers. Table 3 summarizes sample volumes, container types, preservation requirements, and holding times.

2.2.6 Decontamination

Sample collection apparatus will be fully decontaminated before sampling and between sampling events. Disposable equipment will not have to be decontaminated if the equipment is sealed in the original manufacturer's packaging. Sampling and measurement equipment will be decontaminated using the following sequence:

1. Wash with non-phosphate detergent and tap water.
2. Rinse with tap water twice.
3. Rinse with distilled/deionized water.

Decontamination water will be collected, containerized, and then relocated to the staging area. Disposal of investigation-derived waste (IDW) will be managed and directed by DuPont.

2.2.7 Sample Location Survey

All piezometers, new monitoring wells, and soil sample locations will be surveyed by a Delaware licensed surveyor, using Delaware State Plane and appropriate coordinates. The survey will include x,y, top of casing (for wells), and ground surface elevations. This will allow for each well to be accurately placed on site maps and help determine accurate groundwater contours.

2.3 Sample Handling and Custody

During sample collection, fill sample containers to the preferred volume listed in Table 3. If groundwater yield is insufficient to collect the preferred volume, at least the minimum volume listed in Table 3 must be collected for the requested analysis to be performed. Following sample collection, immediately place the lid on the sample container, wipe the container clean, and affix the completed sample label. Immediately after labeling, place the container in bubble-wrap to protect it from breakage, place the container in an ice-filled cooler, and close the cooler lid. Complete the COC form as samples are collected.

Following collection, samples will be packaged tightly in coolers with bubble wrap to prevent breakage or damage. Samples will be shipped to the laboratory via overnight commercial carrier, delivered to the laboratory by a member of the field sampling team, or picked up from the facility by a laboratory representative. A copy of the COC will be faxed or e-mailed to the Project Quality Assurance Manager by the Technical Support Personnel within one working day of sample shipment.

2.3.1 Chain-of-Custody

Sample custody procedures are summarized below. COC procedures are intended to maintain and permanently document sample possession from the time of collection to disposal, in accordance with EPA guidelines. A sample is considered to be under a person's custody if any of the follow occur:

- It is in that person's possession.
- It is in that person's view, after being in that person's possession.
- It was in that person's possession and was locked up by them to prevent tampering.
- It has been placed in a designated secure area by that person.

2.3.2 Field Chain-of-Custody

The COC record will be initiated in the field for all samples collected. At a minimum, the following information shall be recorded on the form:

- Signature of custodian
- Date of receipt and relinquishment
- Sample identifications (IDs)
- Sampling dates and time
- Sample type and quantity
- Analyses to be performed
- COC tape number (Note: COC tape is not mandatory if samples are hand-delivered)
- Method of shipment and courier name(s) in the remarks box, if applicable

The initial custodian will sign the COC record; enter the date and time; tear off and file the back copy with the appropriate sampling log; and place the remainder in the shipping container with the samples. The sample documentation will be placed in a sealed plastic bag and taped to the inside lid of the cooler.

Detailed procedures for completion of COC forms are included in Appendix D of this QAPP.

2.3.3 Laboratory Chain-of-Custody

The laboratory Quality Assurance Manual and associated laboratory SOPs shall specify the laboratory sample handling and custody requirements. These requirements should be consistent with National Environmental Laboratory Accreditation Conference (NELAC) guidelines. The laboratory sample custodian will receive and sign the COC form for the laboratory, and record the date and time of receipt. The laboratory log-in

record will explicitly state the condition of the sample containers, any evidence of damage, preservation, and the completeness of accompanying records. After inspection, each sample will be logged in and assigned a unique laboratory sample ID. In addition, the following information will be entered in the LIMS for each sample:

- Field sample ID
- Laboratory sample ID
- Date received
- Project name and number
- Collection date
- Sample type
- Analyses to be performed

The condition, temperature, and appropriate preservation of samples shall be checked and documented on the COC form. Preservation of VOC sample containers shall be checked after sample analysis.

After sample log-in is complete, a copy of the COC record, with laboratory sample numbers and notations of any discrepancies will be sent to the Project Quality Assurance Manager to be entered into the project file. The original COC form will be filed in the laboratory with the shipper's waybill or airbill attached. The Laboratory Project Manager will report any problems or discrepancies immediately to the Project Quality Assurance Manager. The Laboratory Project Manager is responsible for sending a confirmation of sample receipt within one working day of sample receipt to the Project Quality Assurance Manager by fax or e-mail. The original copy of the COC form will be included with the final data package submitted to the Project Quality Assurance Manager.

While in the laboratory, samples shall be stored in limited-access, temperature-controlled areas. Refrigerators, coolers, and freezers shall be monitored for temperature daily. The acceptance criteria for refrigerator and cooler temperatures shall be 0.5 to 6°C, and the acceptance criteria for freezer temperatures shall be less than 0°C.

2.4 Analytical Methods

Methods and quality control procedures were previously described in Section 1.4.3. The analytical results will be obtained from the most current versions of analytical methods contained in the following sources:

- Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)
- Methods for Chemical Analysis of Water and Wastes (MCAWW)
- Standard Methods for the Examination of Water and Wastewater
- 40 CFR Part 136 Guidelines Establishing Test Procedures For The Analysis Of Pollutants, Appendix A
- EPA 1600 series methods for analysis of PCBs (method 1668) and dioxins and furans (method 1613) as reflected in the appropriate laboratory SOPs

The contracted laboratories will perform all analytical testing, documentation, and reporting. Specific laboratory operations are governed by the laboratory's Quality

Assurance Plan, which controls all laboratory activities from the arrival of samples to the reporting of reviewed analytical data. Supplemental QC criteria are provided in the individual methods and the laboratory's SOPs used during the analyses of the samples. Appendix E presents a summary of the spike profiles, QC requirements, and exceptions to the listed methods for high-resolution analysis (dioxins and furans and PCB congeners) to be performed by Analytical Perspectives. The laboratory's SOPs will be made available for review upon request.

Laboratory QC acceptance criteria may be stricter than that specified in this QAPP. If the laboratory QC acceptance criteria are less strict, then the acceptance criteria specified in this QAPP shall be the default criteria for the project. Usability of the laboratory data will be evaluated against the criteria specified in this QAPP.

2.5 Quality Control

For each batch of 20 or fewer samples, sufficient QC samples will be collected and analyzed to ensure that the appropriate QC measures described in the following sections will be attained. QC samples will be handled, preserved, and documented in exactly the same manner as those of the sample batch. To minimize bias in the laboratory, field QC samples will be submitted to the laboratory as blind samples using identification codes in the same form as regular samples but identifiable only by select non-laboratory project staff. QC sample requirements are summarized in Table 1.

Field QC samples include trip blanks, equipment blanks and field duplicates. Laboratory QC samples include laboratory control samples, laboratory blanks, and matrix spike/matrix spike duplicate samples. Surrogate recoveries and internal standard areas are used to evaluate the method performance for individual samples.

Tables 6, and 7 summarize project quality control acceptance criteria. for laboratory quality control measures.

2.5.1 Trip Blanks

Trip blanks are prepared prior to the sampling event by the analytical laboratory using Type II reagent-grade water. Trip blanks are kept with the investigative samples throughout the sampling event. They are then packaged for shipment with the investigative samples and sent for analysis. At no time after their preparation are the sample containers to be opened before they reach the laboratory. If multiple shipments of samples are required, trip blanks are to be provided per shipment but not per cooler. Trip blanks are analyzed for VOCs only.

2.5.2 Equipment Blanks

Equipment blanks are defined as samples that are obtained by running Type II reagent-grade deionized water over/through non-disposable, reusable sample collection equipment after it has been cleaned (i.e., rinse water will be poured from the bailer, pumped through the sample pump and tubing, or poured over the augers). Type II reagent-grade deionized water will be obtained from the laboratory or an equivalent from a commercially available source. These samples will be used to determine if decontamination procedures were adequate (the equipment could have been cleaned in the field or prior to the field operation). One equipment blank will be collected each day sampling activities occur. Equipment blanks are collected for each matrix sampled. Equipment blanks are analyzed for all analytical parameters associated with the sampling event.

2.5.3 Field Duplicates

Field duplicate samples are two or more samples collected simultaneously in separate containers from the same source under identical conditions. One duplicate sample will be collected for each batch of 10 or fewer field samples. The duplicate sample provides a measure of precision, or reproducibility of the sample result. During data review, precision as relative percent difference (RPD) will be calculated according to the following equation:

$$RPD = \frac{|R_1 - R_2| * 200}{(R_1 + R_2)}$$

Where:

R_1 = result from sample 1

R_2 = result from sample 2

Field duplicate samples are analyzed for all analytical parameters associated with the sampling event. Precision goals for field duplicate samples collected for this project are 30% RPD for water samples and 50% RPD for soils.

2.5.4 Laboratory Blank Samples

Analytical results for laboratory blanks provide a means to evaluate laboratory precision and bias, and other potential contamination and carry-over problems. Laboratory blanks are carried through applicable sample preparation and analysis procedures. Laboratory blanks are analyzed for all parameters associated with the sampling event.

In addition, the laboratory analyzes a metals calibration blank for every 10 samples. These calibration blanks are not carried through the sample preparation procedure but are prepared using the same final concentrations of acid as the samples.

2.5.5 Laboratory Control Samples

LCS are analyte-free water or solid matrix samples spiked with the target analytes specified in Table 3 of the Phase II RFI Work Plan. The LCS is spiked at the approximate midpoint of the calibration curve and is carried through the entire sample preparation and analysis procedures. LCS results are used to assess method/laboratory accuracy. The LCS is not the continuing calibration verification analysis.

2.5.6 Laboratory Duplicate

Laboratory duplicates are generated in the laboratory and analyzed to assess method/laboratory precision in the matrix of concern. Laboratory duplicate analyses are performed for all inorganic parameter measurements.

2.5.7 Matrix Spikes/Matrix Spike Duplicates

Matrix spikes provide information about the effect of the sample matrix on the preparation and measurement methodology. MS/MSD samples are spiked and analyzed by the laboratory to facilitate identification of effects of the particular matrix of interest on analytical results, particularly biasing of results. Sufficient sample volume will be collected (triple the normal sample volume for groundwater samples) for at least one

sample in each batch of 20 or fewer field samples so that MS/MSD samples can be prepared for analysis. MS/MSD samples are spiked at the approximate mid-point of the calibration curve. MS/MSD samples are not typically analyzed for high-resolution analyses (PCBs and dioxin and furans) because these methods utilize isotope-dilution to correct for bias during the analysis of each sample.

2.5.8 Surrogates

Surrogate recovery data are used to evaluate the precision of the analytical method on a specific sample. Surrogates are compounds similar to the target analytes in chemical composition and behavior but are not normally found in environmental samples. Appropriate surrogates for each method are listed in Table 2. Surrogates are spiked into all field samples and laboratory quality control samples that are analyzed for SVOCs and VOCs.

2.5.9 Internal Standards

Internal standard areas are used to correct sample results affected by bias in the analytical system. Internal standards are measured amounts of compounds (isotopically labeled) not normally found in environmental samples and are added to all field samples and laboratory quality control samples for the analyses of VOCs, SVOCs, PCBs, dioxins, and furans.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance

The purpose of this element is to specify procedures used to verify that instruments and equipment are maintained in sound operating condition and are capable of acceptable performance.

2.6.1 Instrument/Equipment Testing and Inspection

A calibration program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. Field team members familiar with field calibrations and equipment operations will maintain instrument proficiency by performing the prescribed calibration procedures outlined in the operation and field manuals accompanying the field monitoring instruments. Air monitoring instruments (e.g., PID) used in the field to collect data for sample screening and health and safety purposes will be calibrated each day prior to the initiation of fieldwork using the manufacturer's instructions. The instruments will be calibrated using appropriate zero and indicator gases.

The pH, conductivity, and temperature meters will be calibrated prior to each day's use according to the manufacturer's instructions. More frequent calibrations will be performed as necessary to maintain analytical integrity. The pH meter will be calibrated at a minimum of two values that bracket the anticipated pH values of the samples to be analyzed and that are three pH units or more apart. The conductivity meter will be calibrated using a standard solution of known conductivity.

Following calibration, each instrument will be tagged identifying the person who calibrated the instrument and the calibration date. Calibration records for each field instrument used during the investigation will be maintained, and copies of the records will be stored in the project QA files.

Calibration of the laboratory analytical equipment will be performed according to laboratory SOPs. If calibration results do not meet the criteria listed in the SOP, then appropriate steps must be taken to adjust instrument operation and the standards or the relevant set of samples should be reanalyzed.

2.6.2 Instrument/Equipment Maintenance

All field equipment will be subjected to a routine maintenance program before and after each use. The routine maintenance program for each piece of equipment will be in accordance with the manufacturer's operations and maintenance manual. All equipment will be cleaned and checked for integrity after each use. Repairs will be performed immediately after any defects are observed and before the item of equipment is used again. Equipment parts with a limited life (e.g., batteries, membranes, and some electronic components) will be periodically checked and replaced or recharged as necessary according to the manufacturer's specifications.

Each piece of field equipment will have its own log sheet that contains the equipment identification number, information on maintenance procedures, and the date and nature of the last maintenance. Because most equipment will be used on an irregular, as-needed basis, all equipment will be properly stored when not in use.

Laboratory equipment maintenance will be regularly performed by the subcontracted laboratory. It will be the laboratory's responsibility to maintain and document the maintenance of properly functioning equipment so that the data is usable and reproducible. Upon request, a description of the laboratory's equipment maintenance procedures will be provided by the subcontracted laboratory.

2.7 Instrument Calibration and Frequency

The purpose of this element is to define calibration procedures that will be used to generate environmental measurements. Specific requirements for calibration of analytical instruments are described in the field and laboratory SOPs.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables

The purpose of this element is to establish and document a system for inspecting and accepting supplies and consumables that may affect the quality of the project data. Laboratory or field consumables or supplies that come into contact with samples must be documented to be free of contamination. Examples of consumables and supplies include gloves, glassware, soap or detergent, sample containers, reagents, and reagent water. Field consumables and supplies are demonstrated to be free of contamination through the collection of equipment blanks. Laboratory consumables and supplies are demonstrated to be free of contamination through the preparation and analysis of laboratory blanks. The laboratory Quality Assurance Manual should identify critical supplies, such as calibration gases or standards, solvents or reagents, and the acceptance criteria for these supplies.

2.9 Data Acquisition Requirements

This element describes the types of non-measurement data needed for project implementation or decision-making. Non-measurement data may include computer

databases, programs, literature files, and historical databases. This type of non-measurement data is not required for this phase of the project.

2.10 Data Management

This element describes the project data management process, including standard record-keeping procedures, and data storage and retrieval from electronic media.

2.10.1 Logbooks and Forms

Laboratory and field records shall be maintained by appropriate personnel and shall be sufficiently detailed to allow for reconstruction of the collection, handling, preparation, and analysis procedures performed on the samples. These procedures shall be documented in logbooks or on forms. It is sufficient to identify the SOPs and record any deviation from the SOPs in the logbooks or on the forms. Logbook pages and forms shall be initialed and dated by the person making the entry. Entries shall be legible. If errors are made, the error is crossed out with a single line, initialed, and dated by the person making the correction. Maintenance and calibration records must be traceable to the person using the instrument and to the specific instrument.

2.10.2 Data Storage and Retrieval

Field records and laboratory records shall be archived for a minimum of 10 years from the date the record was generated. Software and hardware used to generate, store, and retrieve the records shall be kept on file with the records.

This page intentionally left blank

3.0 ASSESSMENT AND OVERSIGHT

Internal audits and assessments will be performed by the organization primarily responsible for conducting the task being audited. For example, Parsons will conduct on-site field audits of field sample collection activities, and the contract laboratory will perform internal audits.

A technical systems audit of field activities is an on-site, qualitative review of the sampling system to ensure that the activity is being performed in compliance with this QAPP. A technical systems audit of field sampling activities is not planned for this phase of the project.

All contract laboratories to be used for this program will be approved by DNREC. As a standard practice, DuPont conducts a technical systems audit of all their contract laboratories on a bi-annual schedule.

This page intentionally left blank

4.0 DATA REVIEW AND USABILITY

The elements of this group address the QA activities that occur after the data collection phase of the project is completed. Implementation of these elements determines if the data conform to the specified criteria and satisfy the project objectives.

4.1 Data Review and Verification

The review performed on the data at each level shall be documented, beginning with the laboratory's review of the analytical results through the independent data review performed by the data user, and finally review by the DNREC. The intent is to capture the review effort of each party to minimize duplicative efforts, to ensure that critical elements of the review process are not overlooked, and to set in place a system that can be audited or inspected.

4.1.1 Laboratory Review

The laboratory utilized for this project shall have implemented a quality assurance program that meets the requirements of a recognized organization such as DNREC, National Environmental Laboratory Accreditation Program (NELAP) or International Organization for Standardization (ISO). The laboratory shall review the data for technical acceptance based on the project requirements specified in Section 3.

The laboratory analyst is responsible for the reduction of raw data and shall clearly identify any problems or anomalies that might affect the quality of the data. The analyst shall review 100 percent of the data and shall verify that data reduction protocols are correct. At least 10% of the data shall be reviewed independently by a senior analyst or by the supervisor of the laboratory analyst. Both the analyst and independent review shall include the following:

- Calibrations and calibration verifications
- Instrument and system performance checks
- Blanks
- LCS recoveries and precision
- MS/MSD recoveries and precision
- Duplicate sample precision
- Compound identification and quantification
- Surrogate recoveries, if applicable
- Internal standard areas, if applicable
- Serial dilutions, if applicable
- Interference check sample results, if applicable
- Post-digestion spike recoveries, if applicable

The laboratory QA section shall review the completed data packages and perform a reasonableness check review on the completed data packages. The QA section shall ensure that all deliverables are present, that qualifiers have been applied to the data, and that nonconformance and other issues have been addressed in the case narrative.

Either the independent reviewer or the laboratory QA staff shall perform a QA check on 100% of hand-entered data and 5% of electronically transferred data.

4.2 Verification and Review Methods

The in-house data reviewer shall review all of the reportable and supporting data. The results of the review shall be conveyed to the data user in the DUS. Data generated under this QAPP will be evaluated and qualified data using EPA flagging protocols and/or CLP-specified data quality standards as described in the CLP-NFG for Inorganic Data Review (October 2004) and the CLP-NFG for Organic Data Review (October 1999). Data qualifiers are described in the CLP-NFG guidance documents. If the CLP-NFG is not considered appropriate, the data reviewer shall utilize professional judgment to evaluate the effect of the nonconformance on the data quality. All uses of professional judgment shall be documented in the DUS. The DRBC guidance for evaluation of lab and field blanks associated with PCB congener analysis will be utilized during data review (see Appendix E). Third-party validation is not planned for this project; however, should the DuPont in-house review process indicate questions regarding the usability of analytical data and specifically the high-resolution (dioxin and furan and PCB congener) analytical data, the need for third-party validation will be evaluated.

4.2.1 DuPont In-House Review Process

As discussed in Section 1.6, the laboratory data deliverables will be submitted to the DuPont Analytical Data Quality Management (ADQM) Group in both hardcopy and electronic data formats. Upon receipt of the deliverables package, the ADQM group will perform the following data review functions:

- Load the electronic data into the DuPont CRG Envista database to facilitate the semi-automated review process and accessibility of the project data.
- Perform a completeness check of project data to ensure all request samples were analyzed and the test results were reported.
- Conduct a QC review of laboratory data to evaluate batch integrity per SW-846 guidance and to ensure that QC acceptance criteria exceptions (versus laboratory and/or project limits) are properly documented via data qualifiers and/or narrative comments.
- Submit 100% of project laboratory data for evaluation via the DuPont semi-automated in-house Data Review Process (DDR), which applies data usability qualifiers based on the specific project and/or laboratory QC limits; holding time criteria; equipment, trip, and laboratory method blank detections; and quantitation between the MDL and Practical Quantitation Limit (PQL). This automated process, essentially equivalent to a summary level data validation, is described in more detail in Appendix B.

The project chemist will oversee the in-house data review process, coordinate any questions and/or data resubmittals that may be required, and prepare the Data Review Summaries for the project team. Data Review Summaries will include the following information:

- Samples and Analytical parameters reviewed
- QC parameters reviewed

- Review criteria for each QC parameter
- Specific samples and analytes that did not meet criteria and applied qualifiers
- Usability of the data

4.2.2 Data Usability Summary

The DUS should include an examination of the reportable data, the supporting data, the field notes and data associated with the sampling event(s).

The Project Quality Assurance Manager will generate a DUS that contains a review of the deficiencies identified in the data, qualifiers identifying biases and unreliable data, assessments of field and laboratory performance, overall precision and accuracy, representativeness, and completeness of the data set. The DUS should provide the following information:

- Samples and analytical parameters reviewed
- Field data reviewed
- QC parameters reviewed
- Review criteria for each QC parameter
- Specific samples and constituents that did not meet criteria and applied qualifiers
- Usability of the data

The report will be included in the project final report submitted to DNREC.

4.3 Reconciliation with Data Quality Objectives

The DUS shall describe the effect of the uncertainty associated with results qualified as estimated that may affect the usability of the data in meeting data quality objectives. The DUS should include an evaluation of how representative the analytical results are of the medium being evaluated, based on measures such as sampling design, replicate analyses, and quality control results. It shall also include a discussion on the sufficiency of the valid data set for meeting project objectives. The DUS shall also contain a listing of data that have been rejected during review or that have been considered unusable for meeting specific project or data quality objectives. The DUS shall include a discussion of the consequences of having rejected or unusable data.

This page intentionally left blank

TABLES

Table 1
Quality Control Performance Criteria

Quality Control Parameter	Metals	Volatiles	Semivolatiles	PCB Congeners	Dioxin/Furan	TPH-GRO	TPH_DRO	pH	TOC
Method	SW846 6010/6020/7470/7471	SW846 8260B	SW846 8270C	EPA 1668A (per lab SOP)	EPA 1613B (per lab SOP)	SW846 8015B (mod.)	SW846 8015B (mod.)	EPA 150.1	SW846 9060 (aqueous)/Lloyd Kahn (soil)
PQL	See Table 4	See Table 4	See Table 4	See Table 4	See Table 4	See Table 4	See Table 4	NA	See Table 4
Holding Times	See Table 8	See Table 8	See Table 8	See Table 8	See Table 8	See Table 8	See Table 8	See Table 8	See Table 8
Equipment Blank	<PQL, One per day	<PQL, One per day	<PQL, One per day	<PQL, One per day	<PQL, One per day	<PQL, One per day	<PQL, One per day	NA	<PQL, One per day
Field Duplicate	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples	RPD, 30% for aqueous and 50% for soils, One per 20 samples
Trip Blank	NA	Daily, <PQL	NA	NA	NA	NA	NA	NA	NA
Method (Laboratory) Blank	<PQL; One per batch	<PQL; One per batch	<PQL, One per batch	<PQL, One per batch	<PQL; One per batch	<PQL; One per batch	<PQL; One per batch	NA	<PQL; One per batch
Instrument Blank	One per 10 samples analyzed (calibration blank)	NA	NA	NA	NA	NA	NA	NA	NA
Laboratory Duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate	See matrix spike duplicate
Surrogate	N/A	Every sample % Recovery (See Table 7)	Every sample % Recovery (See Table 7)	NA	NA	Every sample % Recovery (See Table 7)	Every sample % Recovery (See Table 7)	NA	NA
Matrix Spike	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	NA	One per lab batch % Recovery, RPD (See Table 7)
Matrix Spike Duplicate	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	NA	One per lab batch % Recovery, RPD (See Table 7)
Internal Standard Area	6020 only: Each sample 30-120% recovery.	Per Laboratory SOP	Per Laboratory SOP	Per Laboratory SOP	Per Laboratory SOP	NA	NA	NA	NA
Laboratory Control Sample	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	One per lab batch % Recovery, RPD (See Table 7)	NA	One per lab batch % Recovery, RPD (See Table 7)

Table 2
Analytical Quality Control Limits

Quality Control Limits
Volatiles in Soil and Water
SW-846 8260B

	WATER				SOIL			
	MS/MSD		LCS/LCSD		MS/MSD		LCS/LCSD	
Compounds	Limit	RPD	Limit	RPD	Limit	RPD	Limit	RPD
1,1,1-Trichloroethane	81-142	30	83-127	30	57-125	30	74-127	30
1,1,2,2-Tetrachloroethane	69-128	30	72-119	30	37-142	30	71-121	30
1,1,2-Trichloroethane	77-125	30	86-113	30	55-128	30	74-117	30
1,1-Dichloroethane	85-135	30	83-127	30	65-125	30	79-124	30
1,1-Dichloroethene	87-145	30	79-130	30	51-121	30	69-123	30
1,2-Dichloroethane	70-143	30	77-132	30	62-130	30	76-126	30
1,2-Dichloropropane	70-143	30	77-132	30	64-120	30	78-119	30
2-Butanone	57-137	30	52-163	30	37-158	30	35-171	30
2-Hexanone	60-135	30	61-140	30	33-146	30	38-154	30
4-Methyl-2-pentanone	68-133	30	70-130	30	42-128	30	51-141	30
Acetone	48-143	30	21-226	30	18-226	30	11-224	30
Benzene	83-128	30	85-117	30	59-120	30	77-119	30
Bromodichloromethane	80-129	30	83-121	30	57-117	30	77-116	30
Bromoform	64-119	30	69-118	30	45-113	30	71-111	30
Bromomethane	52-141	30	47-129	30	45-124	30	59-127	30
Carbon Disulfide	67-150	30	63-133	30	37-124	30	60-126	30
Carbon Tetrachloride	79-155	30	77-130	30	57-127	30	69-130	30
Chlorobenzene	83-120	30	85-115	30	52-120	30	81-112	30
Chloroethane	63-142	30	57-125	30	51-120	30	63-120	30
Chloroform	82-131	30	86-124	30	65-126	30	81-117	30
Chloromethane	59-148	30	56-134	30	41-131	30	51-136	30
cis-1,2-Dichloroethene	83-126	30	84-117	30	59-118	30	76-120	30
cis-1,3-Dichloropropene	80-126	30	78-114	30	54-122	30	71-117	30
Dibromochloromethane	82-119	30	78-119	30	58-113	30	73-116	30
Ethylbenzene	82-129	30	82-119	30	50-127	30	82-115	30
Methylene Chloride	79-133	30	85-120	30	55-125	30	75-120	30
Styrene	76-126	30	82-111	30	40-120	30	79-116	30
Tetrachloroethene	78-133	30	74-125	30	33-137	30	70-117	30
Toluene	83-127	30	85-115	30	49-132	30	81-116	30
trans-1,2-Dichloroethene	82-133	30	83-117	30	57-125	30	77-124	30
trans-1,3-Dichloropropene	77-123	30	79-114	30	54-124	30	81-119	30
Trichloroethene	83-136	30	87-117	30	49-134	30	81-114	30
Vinyl Chloride	67-142	30	62-123	30	43-125	30	54-129	30
Xylene (Total)	82-130	30	83-113	30	44-127	30	82-117	30

Table 2
Analytical Quality Control Limits

Quality Control Limits
Semivolatiles in Soil and Warter
SW-846 8270C

	WATER				SOIL			
	MS/MSD		LCS/LCSD		MS/MSD		LCS/LCSD	
Compounds	Limit	RPD	Limit	RPD	Limit	RPD	Limit	RPD
1,2,4-Trichlorobenzene	65-105	30	62-106	30	48-118	118	68-105	30
1,2-Dichlorobenzene	59-101	30	70-130	30	48-108	30	59-99	30
1,3-Dichlorobenzene	55-105	30	70-130	30	36-112	30	56-103	30
1,4-Dichlorobenzene	50-112	30	54-103	30	37-115	30	58-104	30
2,2'-oxybis(1-Chloropropane)	71-130	30	68-133	30	46-145	30	70-134	30
2,4,5-Trichlorophenol	28-139	30	70-115	30	46-126	30	73-104	30
2,4,6-Trichlorophenol	17-145	30	69-111	30	47-130	30	73-112	30
2,4-Dichlorophenol	33-137	30	66-110	30	53-124	30	74-105	30
2,4-Dimethylphenol	31-132	30	60-107	30	44-131	30	69-103	30
2,4-Dinitrophenol	20-151	30	44-130	30	20-152	30	44-112	30
2,4-Dinitrotoluene	43-147	30	75-122	30	51-131	30	73-115	30
2,6-Dinitrotoluene	73-107	30	70-108	30	57-121	30	75-109	30
2-Chloronaphthalene	57-92	30	56-100	30	42-107	30	60-101	30
2-Chlorophenol	33-132	30	63-112	30	55-117	30	73-105	30
2-Methylnaphthalene	58-110	30	65-101	30	50-114	30	67-101	30
2-Methylphenol	2-135	30	56-105	30	51-123	30	64-112	30
2-Nitroaniline	63-125	30	73-115	30	40-141	30	76-117	30
2-Nitrophenol	33-153	30	83-119	30	47-138	30	74-113	30
3,3'-Dichlorobenzidine	22-131	30	48-116	30	5-139	30	27-116	30
3-Nitroaniline	34-132	30	63-112	30	48-123	30	46-108	30
4,6-Dinitro-2-methylphenol	5-167	30	56-130	30	10-141	30	56-120	30
4-Bromophenyl-phenylether	64-113	30	67-110	30	55-128	30	70-111	30
4-Chloro-3-methylphenol	32-144	30	74-113	30	54-132	30	61-134	30
4-Chloroaniline	13-130	30	39-116	30	16-125	30	7-117	30
4-Chlorophenyl-phenylether	62-113	30	65-110	30	50-128	30	69-110	30
4-Methylphenol	2-143	30	51-98	30	53-124	30	64-116	30
4-Nitroaniline	28-122	30	55-107	30	39-124	30	45-101	30
4-Nitrophenol	10-100	30	14-77	30	23-151	30	46-137	30
Acenaphthene	68-117	30	68-111	30	27-149	30	74-110	30
Acenaphthylene	81-121	30	84-123	30	59-142	30	83-124	30
Anthracene	74-109	30	68-108	30	38-142	30	69-109	30
Benzo(a)anthracene	72-112	30	72-112	30	48-132	30	73-111	30
Benzo(a)pyrene	70-115	30	68-121	30	38-142	30	72-117	30
Benzo(b)fluoranthene	65-120	30	67-117	30	40-140	30	68-117	30
Benzo(g,h,i)perylene	69-122	30	67-121	30	25-154	30	66-120	30
Benzo(k)fluoranthene	68-117	30	67-120	30	2-176	30	69-118	30
bis(2-Chloroethoxy)methane	70-120	30	69-119	30	58-127	30	75-114	30
bis(2-Chloroethyl)ether	58-112	30	57-110	30	37-127	30	60-112	30
bis(2-Ethylhexyl)phthalate	67-118	30	62-126	30	50-134	30	63-131	30
Butylbenzylphthalate	61-114	30	63-120	30	50-133	30	70-120	30
Carbazole	56-132	30	66-109	30	46-133	30	69-109	30
Chrysene	71-111	30	70-111	30	46-133	30	72-110	30
Dibenz(a,h)anthracene	73-126	30	71-129	30	41-151	30	70-130	30
Dibenzofuran	70-105	30	65-110	30	52-121	30	72-107	30
Diethylphthalate	56-114	30	61-110	30	62-116	30	75-109	30
Dimethylphthalate	16-129	30	46-109	30	61-114	30	76-108	30
Di-n-butylphthalate	62-111	30	63-113	30	57-127	30	68-112	30
Di-n-octylphthalate	55-119	30	58-118	30	47-144	30	61-117	30
Fluoranthene	61-112	30	66-108	30	32-137	30	66-109	30
Fluorene	65-110	30	61-116	30	47-126	30	66-115	30
Hexachlorobenzene	62-117	30	68-113	30	55-126	30	69-114	30
Hexachlorobutadiene	37-122	30	32-123	30	43-132	30	66-112	30
Hexachlorocyclopentadiene	13-156	30	32-152	30	5-175	30	36-162	30
Hexachloroethane	31-123	30	33-116	30	20-124	30	56-104	30
Indeno(1,2,3-cd)pyrene	69-118	30	67-122	30	30-147	30	66-123	30
Isophorone	21-138	30	63-105	30	47-117	30	68-99	30
Naphthalene	60-115	30	70-104	30	39-129	30	70-103	30
Nitrobenzene	41-134	30	61-111	30	48-121	30	68-105	30
N-Nitroso-di-n-propylamine	46-122	30	56-109	30	50-115	30	61-109	30
N-Nitrosodiphenylamine	64-127	30	78-110	30	54-135	30	67-105	30
Pentachlorophenol	6-138	30	48-108	30	12-134	30	47-110	30
Phenanthrene	74-111	30	68-111	30	44-138	30	70-107	30
Phenol	10-77	30	29-57	30	48-128	30	66-113	30
Pyrene	63-117	30	68-114	30	38-144	30	67-116	30

Table 2
Analytical Quality Control Limits

Quality Control Limits
Metals in Soil and Water
SW-846 6010B/6020/7470A/7471

	WATER				SOIL			
	MS/MSD		LCS/LCSD		MS/MSD		LCS/LCSD	
Compounds	Limit	RPD	Limit	RPD	Limit	RPD	Limit	RPD
Aluminum	75-125	20	90-112	20	75-125	20	91-151	20
Antimony	75-125	20	80-120	20	75-125	20	24-110	20
Arsenic	75-125	20	80-120	20	75-125	20	80-120	20
Barium	75-125	20	90-110	20	75-125	20	90-112	20
Beryllium	87-114	20	90-111	20	83-111	20	90-113	20
Cadmium	83-116	20	90-112	20	75-125	20	87-110	20
Calcium	75-125	20	90-112	20	75-125	20	89-121	20
Chromium	81-120	20	90-110	20	75-125	20	90-111	20
Cobalt	87-112	20	90-110	20	81-110	20	90-110	20
Copper	86-122	20	90-112	20	75-125	20	90-111	20
Iron	75-125	20	90-112	20	75-125	20	68-158	20
Lead	75-125	20	90-113	20	75-125	20	84-112	20
Magnesium	75-125	20	89-110	20	75-125	20	90-120	20
Manganese	75-125	20	90-110	20	75-125	20	88-115	20
Mercury	80-120	20	80-120	20	80-120	20	66-133	20
Nickel	86-115	20	90-111	20	75-125	20	89-110	20
Potassium	75-125	20	88-119	20	75-125	20	94-132	20
Selenium	75-125	20	80-120	20	75-125	20	74-126	20
Silver	75-125	20	90-117	20	75-125	20	90-126	20
Sodium	75-125	20	80-120	20	75-125	20	56-145	20
Thallium	75-125	20	80-120	20	75-125	20	90-120	20
Titanium	90-110	20	90-113	20	75-125	20	79-174	20
Vanadium	90-111	20	90-110	20	75-125	20	89-115	20
Zinc	75-125	20	90-111	20	75-125	20	85-110	20

Table 2
Analytical Quality Control Limits

Quality Control Limits
PCB Congeners
EPA 1668A (per laboratory SOP)

BCS3 - Acceptance Criteria - 1668A

Analytes		Quantitation Relationship	RRF % Deviation BCS3 vs. ICAL
PCB-77 33'44'-TeCB	A_x	vs. ES	< = 20%
PCB-81 344'5-TeCB	A_x	vs. ES	< = 20%
PCB-105 233'44'-PeCB	A_x	vs. ES	< = 20%
PCB-114 2344'5-PeCB	A_x	vs. ES	< = 20%
PCB-118 23'44'5-PeCB	A_x	vs. ES	< = 20%
PCB-123 2'344'5-PeCB	A_x	vs. ES	< = 20%
PCB-126 33'44'5-PeCB	A_x	vs. ES	< = 20%
PCB-156/157 233'44'5/233'44'5' HxCB	A_x	vs. ES	< = 20%
PCB-167 23'44'55'-HxCB	A_x	vs. ES	< = 20%
PCB-169 33'44'55'-HxCB	A_x	vs. ES	< = 20%
PCB-189 233'44'55'-HpCB	A_x	vs. ES	< = 20%
PCB-209 DeCB	A_x	vs. ES	< = 20%
PCB-1 2-MoCB	A_x	vs. ES	< = 20%
PCB-3 4-MoCB	A_x	vs. ES	< = 20%
PCB-4 22'-DiCB	A_x	vs. ES	< = 20%
PCB-15 44'DiCB	A_x	vs. ES	< = 20%
PCB-19 22'6-TrCB	A_x	vs. ES	< = 20%
PCB-37 344'-TrCB	A_x	vs. ES	< = 20%
PCB-54 22'66'-TeCB	A_x	vs. ES	< = 20%
PCB-104 22'466'-PeCB	A_x	vs. ES	< = 20%
PCB-155 22'44'66'-HxCB	A_x	vs. ES	< = 20%
PCB-188 22'34'566'-HpCB	A_x	vs. ES	< = 20%
PCB-202 22'33'55'66'-OcCB	A_x	vs. ES	< = 20%
PCB-205 233'44'55'6-OcCB	A_x	vs. ES	< = 20%
PCB-208 22'33'455'66'-NoCB	A_x	vs. ES	< = 20%
PCB-206 22'33'44'55'6-NoCB	A_x	vs. ES	< = 20%
Labeled Standards			
PBC-77	ES	vs. JS	< = 50%
PCB-81	ES	vs. JS	< = 50%
PCB-105	ES	vs. JS	< = 50%
PCB-114	ES	vs. JS	< = 50%
PCB-118	ES	vs. JS	< = 50%
PCB-123	ES	vs. JS	< = 50%
PCB-126	ES	vs. JS	< = 50%
PCB-156/157	ES	vs. JS	< = 50%
PCB-167	ES	vs. JS	< = 50%
PCB-169	ES	vs. JS	< = 50%
PCB-189	ES	vs. JS	< = 50%
PCB-1	ES	vs. JS	< = 50%
PCB-3	ES	vs. JS	< = 50%
PCB-4	ES	vs. JS	< = 50%
PCB-15	ES	vs. JS	< = 50%
PCB-19	ES	vs. JS	< = 50%
PCB-37	ES	vs. JS	< = 50%
PCB-54	ES	vs. JS	< = 50%
PCB-104	ES	vs. JS	< = 50%
PCB-155	ES	vs. JS	< = 50%
PCB-188	ES	vs. JS	< = 50%
PCB-202	ES	vs. JS	< = 50%
PCB-205	ES	vs. JS	< = 50%
PCB-206	ES	vs. JS	< = 50%
PCB-208	ES	vs. JS	< = 50%
PCB-209	ES	vs. JS	< = 50%
PCB-28	CS	vs. JS	< = 50%
PCB-111	CS	vs. JS	< = 50%
PCB-178	CS	vs. JS	< = 50%

A_x = Unlabelled Analytes
ES = Extraction Standards
JS = Injection Standards
CS = Cleanup Standards

Table 2
Analytical Quality Control Limits

Quality Control Limits
Dioxins and Furans
EPA 1613B (per laboratory SOP)

BCS3 - Acceptance Criteria: Method 1613B

Analytes		Quantitation Relationship	RRF % Deviation BCS3 vs. ICAL
2,3,7,8-TCDD	A_x	vs. ES	< = 20%
1,2,3,7,8-PeCDD	A_x	vs. ES	< = 20%
1,2,3,6,7,8-HxCDD	A_x	vs. ES	< = 20%
1,2,3,4,7,8-HxCDD	A_x	vs. ES	< = 20%
1,2,3,7,8,9-HxCDD	A_x	vs. ES	< = 20%
1,2,3,4,6,7,8-HpCDF	A_x	vs. ES	< = 20%
OCDD	A_x	vs. ES	< = 20%
2,3,7,8-TCDF	A_x	vs. ES	< = 20%
1,2,3,7,8-PeCDF	A_x	vs. ES	< = 20%
2,3,4,7,8-PeCDF	A_x	vs. ES	< = 20%
1,2,3,4,7,8-HxCDF	A_x	vs. ES	< = 20%
1,2,3,6,7,8-HxCDF	A_x	vs. ES	< = 20%
2,3,4,6,7,8-HxCDF	A_x	vs. ES	< = 20%
1,2,3,7,8,9-HxCDF	A_x	vs. ES	< = 20%
1,2,3,4,7,8,9-HpCDF	A_x	vs. ES	< = 20%
1,2,3,4,6,7,8-HpCDF	A_x	vs. ES	< = 20%
OCDF	A_x	vs. ES	< = 20%
Labelled Isomers			**% Deviation**
$^{13}C_{12}$-2,3,7,8-TCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,7,8-PeCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF		vs. JS	< = 30%
$^{13}C_{12}$-OCDD	ES	vs. JS	< = 30%
$^{13}C_{12}$-2,3,7,8-TCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,7,8-PeCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-2,3,4,7,8-PeCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCD	ES	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCD	ES	vs. JS	< = 30%
$^{13}C_{12}$-OCDF	ES	vs. JS	< = 30%
$^{37}C_{12}$-2,3,7,8-TCDD	CS	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,7-PeCDD	CS	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,6-PeCDF	CS	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,6,9-HxCDF	CS	vs. JS	< = 30%
$^{13}C_{12}$-1,2,3,4,6,8,9-HpCD	CS	vs. JS	< = 30%

A_x = Unlabelled Analytes
ES = Extraction Standards
JS = Injection Standards
CS = Cleanup Standards

Table 2
Analytical Quality Control Limits

Quality Control Limits
General Chemistry
Soil and Water

Miscellaneous
Water

Compounds	MS/MSD		LCS/LCSD		Dup
	Limit	RPD	Limit	RPD	RPD
TPH GRO	63-154	30	70-130	30	-
TPH DRO	56-121	20	62-113	20	-
pH	75-125	25	99-101	1	1
TOC	62-148	20	83-115	20	-
Ethylene dibromide	78-120	30	81-114	30	-
n-Butanol	38-153	30	53-139	30	-

Miscellaneous
Soil

Compounds	MS/MSD		LCS/LCSD		Dup
	Limit	RPD	Limit	RPD	RPD
TPH GRO	39-118	30	67-119	30	-
TPH DRO	52-130	20	74-118	20	-
TOC	51-115	20	40-148	20	-
Moisture	-	-	99-101	1	15
Ethylene dibromide	58-115	30	78-115	30	-
n-Butanol	58-115	30	78-115	30	-

Table 2
Analytical Quality Control Limits

Quality Control Limits
Surrogates

8260B Soil Surrogates

Surrogates	Window
DBFM	71-114
d4-1,2-DCA	70-109
Toluene-d8	70-123
4-BFB	70-111

8270C Water Surrogates

Surrogates	Window
Phenol-d6	10-80
2-Fluorophenol	10-99
2,4,6-Tribromophenol	31-148
Nitrobenzene-d5	51-123
2-Fluorobiphenyl	64-112
Terphenyl-d14	52-151

8270C Soil Surrogates

Surrogates	Window
Phenol-d6	45-120
2-Fluorophenol	50-118
2,4,6-Tribromophenol	46-136
Nitrobenzene-d5	47-128
2-Fluorobiphenyl	55-123
Terphenyl-d14	51-158

TPH-DRO Water Surrogates

Surrogates	Window
orthoterphenyl	54-127

TPH-ORO Soil Surrogates

Surrogates	Window
trifluorotoluene-F	61-122

TABLE 3
Sample Container, Preservation, and Holding Time Requirements

Parameters	Media	Container and Volume	Preservative	Maximum Holding Time
TCL Volatile Organic Compounds	Water	Three 40 ml glass vials with septum caps (Two 40 ml vials minimum)	Cool 4°C ± 2°C, pH<2 with HCl	14 days from collection
TCL Volatile Organic Compounds	Soil	One 4 oz glass bottle w/Teflon ® lined lid Four – 5 g EnCore™ Samplers	Cool all at 4°± 2°C from collection to receipt at laboratory. Test glass bottle for effervescence with sodium bisulfate. Store glass bottle at 4± 2°C for % moisture determination. If glass bottle does not effervesce, transfer sample from EnCores™ into VOA vials with 1 g sodium bisulfate, 5 ml organic-free reagent water, and stir bar for low-level analysis. Store at 4± 2°C.	Test for effervescence within 48 hours of collection. Add EnCores™ to sodium bisulfate within 48 hours; analyze within 14 days from collection.
TCL Volatile Organic Compounds (cont.)	Soil (cont.)		If glass bottle does effervesce, transfer sample from 2 EnCores™ into VOA vials with 5 ml organic-free reagent water and stir bar for low-level analysis. Freeze at -10 to -15°C, slanted slightly to minimize the potential for breaking the vial as the water freezes. Transfer 1 EnCore™ Sampler for high-level analysis into VOA vial with 10 ml of methanol (MeOH). Store at 4± 2°C. Freeze 1 EnCore™ at –10 to -15°C for special contingency.	Freeze EnCores™ in water within 48 hours; analyze within 12 days of freezing. Add EnCore™ to MeOH within 48 hours; analyze within 14 days from collection. Freeze EnCore™ within 48 hours; analyze within 14 days from collection (for special contingency).

TABLE 3
Sample Container, Preservation, and Holding Time Requirements

Parameters	Media	Container and Volume	Preservative	Maximum Holding Time
TCL Semivolatile Organic Compounds	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	7 days from collection for extraction, 40 days for analysis
TCL Semivolatile Organic Compounds	Soil	500 g glass (minimum 100g)	Cool to 4°C ± 2°C	14 days from collection for extraction, 40 days for analysis
Dioxins and Furans	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	30 days from collection for extraction, analyze within 45 days of collection
Dioxins and Furans	Soil	500 g amber glass (minimum 100g)	Cool to 4°C ± 2°C	30 days from collection for extraction, analyze within 45 days of collection
PCB Congeners	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	1 year from collection for extraction, analyze within 1 year of extraction
PCB Congeners	Soil	500g amber glass (minimum 100g)	Cool to 4°C ± 2°C	1 year from collection for extraction, analyze within 1 year of extraction
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Water	Two 1 L amber glass (minimum 1L)	Cool to 4°C ± 2°C	7 days from collection for extraction, 40 days for analysis
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Soil	500 g amber glass (minimum 100g)	Cool to 4°C ± 2°C	14 days from collection for extraction, 40 days for analysis
Total Petroleum Hydrocarbons-Gasoline Range Organics (TPH-GRO)	Water	Three 40 ml glass vials with septum caps (Two 40 ml vials minimum)	Cool 4°C ± 2°C, pH<2 with HCl	14 days from collection

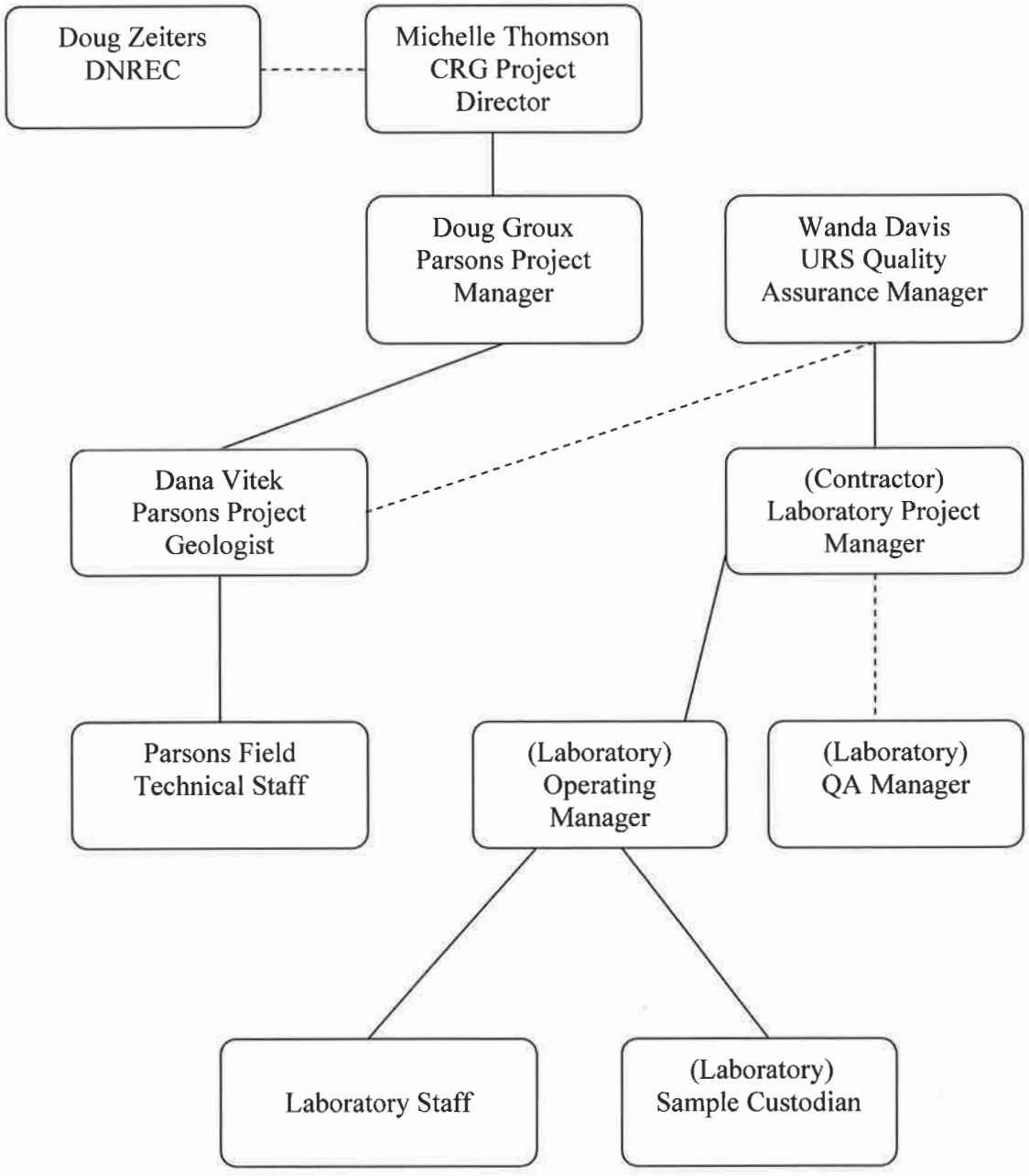
TABLE 3
Sample Container, Preservation, and Holding Time Requirements

Parameters	Media	Container and Volume	Preservative	Maximum Holding Time
ICP/ ICP/MS Metals, Total	Water	1 L polyethylene (minimum 500 ml)	Cool to 4°C ± 2°C, pH<2 with HNO3	6 months from collection
ICP/ ICP/MS Metals, Dissolved	Water	1 L polyethylene (minimum 500 ml)	Cool to 4°C ± 2°C, pH<2 with HNO3 following field filtering	6 months from collection
ICP/ICP/MS Metals, Total	Soil	500 g glass (minimum 100g)	Cool to 4°C ± 2°C	6 months from collection
Mercury, Total	Water	1 L polyethylene (minimum 100 ml)	Cool to 4°C ± 2°C, pH<2 with HNO3 following field filtering for dissolved Hg	28 days from collection to analysis
Mercury, Dissolved	Water	1 L polyethylene (minimum 100 ml)	Cool to 4°C ± 2°C, pH<2 with HNO3	28 days from collection to analysis
Mercury, Total	Soil	500 g glass (minimum 100g)	Cool to 4°C ± 2°C	28 days from collection to analysis
Cyanide, Total	Water	1 L polyethylene (minimum 100 ml)	Cool to 4°C ± 2°C, pH>12 with NaOH	14 days from collection to analysis
Cyanide, Total	Soil	250 ml glass or polyethylene (minimum 100 g)	Cool to 4°C ± 2°C	14 days from collection to analysis
Ethylene Dibromide	Water	Three 40 ml glass vials with septum caps (Two 40 ml vials minimum)	Cool to 4°C ± 2°C, $Na_2S_2O_3$	7 days from collection to analysis
Ethylene Dibromide	Soil	As above for TCL Volatile Organic Compounds - Soil	As above for TCL Volatile Organic Compounds - Soil	As above for TCL Volatile Organic Compounds - Soil
pH	Water	500 ml polyethylene (minimum 50 ml)	Cool to 4°C ± 2°C	Analyze immediately
Percent Moisture	Soil	250 g glass or polyethylene (minimum 50 g)	Cool to 4°C ± 2°C	Not applicable

Note: Samples collected for multiple parameters may be collected into a larger size sample container provided container type and preservation requirements are the same.

FIGURES

Figure 1
Project Organization Diagram
DuPont Edge Moor
Edgemoor, Delaware
Phase II RFI



APPENDICES

APPENDIX A

CONTACT INFORMATION

Contact Information

Michelle Thomson
Project Director
E. I. du Pont de Nemours and Company
Chestnut Run Plaza, Building 715-242
4417 Lancaster Pike
Wilmington, DE 19805
(302) 999-6195

Douglas Groux
Project Manager
Parsons
1601 Market Street, Suite 900
Philadelphia, PA 19103
(215) 606-2348

Wanda Davis
Senior Project Chemist
URS Corporation
Iron Hill Corporate Center
4051 Ogletown Road, Suite 300
Newark, DE 19713
(302) 781-5892

Nancy Bornholm
Laboratory Manager
Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
(717) 656-2300

Kim Mace
Laboratory Manager
Analytical Perspectives
2714 Exchange Drive
Wilmington, North Carolina 28405
(910) 794-1613

APPENDIX B

ELECTRONIC DATA DELIVERABLE (EDD) FORMAT

DuPont Lab Network
Envista EDD Specification

Version 1.0a

May 2, 2005

Revison History:
Version 1.0, April 23, 2003, original version
Verions 1.0a, May 2, 2005, added TIC explanation

Copyright (c) 2003, 2005. E. I. du Pont de Nemours and Company. All rights reserved.

Introduction

The DuPont Corporate Remediation Group (CRG) maintains a corporate environmental database (Envista) that stores field data, analytical results, QA/QC results, water levels, and other information resulting from the activities of the DuPont environmental projects. Much of this data is provided by analytical labs or sampling contractors performing analytical and sampling services for DuPont. To optimize loading data generated by these contractors, a format of an ASCII text file has been developed for conveying data to DuPont for loading into the database. These text files will be referred to as Envista EDD files. Following is a description of the Envista EDD specification.

General Information

Envista EDD files are electronically submitted to CRG in an agreed upon manner. The EDD must match the hardcopy report in terms of samples, tests, analytes, and results. Also, DuPont requires the lab composite results such that only one result is reported for each analyte (i.e., the lab submits only the result judged best when a sample is re-analyzed for particular analytes due to exceeding calibration range, etc.)

Normally, all data for a particular sample delivery group will be contained in one file. This group is normally referred to as a lot (or group), which makes up a normal reporting/invoicing group and usually consists of samples for a given project and site that the lab has received in one day, including all associated QC samples and results. Note that QC results may be contained in more than one EDD if field samples from different lots were analyzed in the same QC batch.

All data must be written in text format (ASCII). Each data field within a record must be delimited by the caret (^) symbol. Therefore, each record must begin with a ^. If another format is required, arrangements must be made with the DuPont Envista database administrator and another format will be provided. This format must be agreed upon between the lab and DuPont prior to the delivery of the data to DuPont.

Some data fields are required to be populated, while others are populated depending on the project circumstances or the particular data being reported. These requirements are described in the "When Required" column of the EDD specification in Table 1. The length of each field must not exceed the width specified in the "Width" column of the EDD specification in Table 1, or the data will be truncated. Fields designated as a number (N) in the "Width" column of Table 1 must contain a text string that will convert to a number. The record format of the deliverable is positional and therefore, each field must be listed in the order specified in Table 1. Also, null or blank fields must be delimited. For example, if MDL was not applicable to a sample, the field would be designated with a ^^ indicating the MDL was null. Each field begins with a ^ and ends with a ^, but the trailing ^ also becomes the beginning ^ for the next field. Missing data, truncated data, or improperly ordered fields within a record may result in the deliverable being judged to be incomplete.

There is only one type of record, and all records must be the same format (i.e., flat file format). Note that this is changed from the previous DuPont CED EDD specification.

Note that different laboratory samples (samples with different Lab_IDs) may come from the same field sample. This is preferable for results that are from different lab samples that may have the same parent field sample, such as composited results from different dilutions.

Samples taken for matrix spike/matrix spike duplicates (MS/MSD) and laboratory replicates (REP) are QC samples that have field samples. If the field sample is from DuPont and is in the current lot for the current project, the parent or unspiked sample and result information should be included in the EDD and the Field_Sample_ID for the MS, MSD, and REP should be included for those records. If the parent field sample is not from a DuPont site or is from a DuPont site but not the current site and project, the field sample and result should not be included, and the field sample name will be null for the MS, MSD, and REP. Lab originated (QA/QC) samples such as lab control spikes or method blanks will not have a field sample information (field sample ID, date and time sampled, etc.).

The Batch Number is a unique number that identifies the laboratory QC batch. Note that this is changed from the previous DuPont CED EDD specification.

QA/QC results involving relative percent recoveries and relative percent differences, e.g. MS/MSDs, REPs, lab control spikes and lab control spike duplicates (LCS/LCSD), and surrogates must also include these recoveries and differences plus the maximum and minimum recoveries and differences that are acceptable, as applicable. For example, an MS sample requires a result, the relative percent recovery, and the maximum and minimum permissible relative percent recovery. An MSD sample requires a result, the relative percent recovery, the relative percent difference, the maximum and minimum permissible relative percent recovery, and the maximum permissible relative percent difference (see Table 2).

DuPont will no longer require the laboratories to comment on items already flagged in the hardcopy report. For example, laboratories will not be required to comment on poor matrix spike/matrix spike duplicate recoveries, poor laboratory control sample/control sample duplicate recoveries, poor surrogate recoveries, and method blank contamination (if flagged in the hardcopy report).

Laboratories will be required to comment on issues not flagged in the hardcopy report. For example, if samples had to be reextracted/redigested/reanalyzed for any reason, hold times missed, sample was reextracted due to poor surrogate recovery and outcome of reanalysis, sample received without correct preservation, not enough volume to perform matrix spike/matrix spike duplicate samples, etc., laboratories will provide a comment on the analysis report or in the case narrative. Note that comments and/or case narratives should also be included electronically in the comment field, or may be submitted as a separate electronic file in an agreed upon format.

Table 1. DuPont Envista EDD flat file field format			
Field Name	**When Required**	**Maximum Length (C=Character, N=number)**	**Description**
Lot_ID	All Records	C30	Identifier for the lot (group of samples that came lab receives in same shipment, and is the typical EDD/hardcopy report/invoice unit)
Lab_ID	All Records	C30	ID used to identify the sample at the lab
Field_Sample_ID	All Field samples (FS, TB, FB, EB) and MS/MSD/REP when parent is DuPont sample for project	C60	Field sample ID or Client ID (normally from chain of custody)
Sample_Type	All Records	C30	Designates the type of sample as a Field Sample (FS), Equipment Blank (EB), Field Blank (FB), or Trip Blank (TB), Matrix Spike (MS), Matrix Spike Duplicate (MSD), Lab Control Spike (LCS), Lab Control Spike Duplicate (LCSD), Lab Duplicate (REP), Method Blank (MB)
Collection_date	Field samples (FS, TB, FB, EB) only	C9	Date sample was collected (Format is DD-MMM-YY, e.g. 15-JAN-97)
Collection_time	Field samples (FS, TB, FB, EB) only	C4	Time sample was collected (Format is HHMM military time, e.g., 1:30 p.m. is 1330, 9:30 a.m. is 0930)
Receipt_date	Field samples (FS, TB, FB, EB) only	C9	Date received at the lab (Format is DD-MMM-YY, e.g. 15-JAN-97)
Sample_Matrix	All Records	C30	Matrix of the sample (Water, soil, sediment, air, oil…) as collected
Lab_Name	All Records	C30	The name or code for the lab (these will be assigned by DuPont for each lab)
Project_Name	All Records	C30	Name assigned to the project
Sample_comments	As applicable	C600	Lab comments regarding handling of samples (e.g. Sample came in above temperature.) Note that comments may be provided as a separate electronic file in an agreed upon format.
Batch_ID	All Records	C30	Unique ID that identifies the group of samples prepared & analyzed together (QC batch)
Analyte_name	All Records	C60	Compound or sample property tested for.
CAS_No	All Records	C30	Chemical Abstract number of the analyte or lab assigned number (without dashes preferred).
Result_Mod	See Table 2	C30	"<" if result is non-detect, otherwise null
Result	See Table 2	C20	Result of an analysis. If non-detect, use reporting limit; either PQL or MDL as specified by the project. For high-resolution isotope dilution methods, use EDL for non-detects.
PQL	See Table 2	C20	Practical Quantitation Limit for an analysis in same units as result, adjusted for sample amount and

			dilution. For high-resolution isotope dilution methods, use EDL.
MDL	See Table 2	C20	Method Detection Limit for an analysis in same units as result, adjusted for sample amount and dilution. For high-resolution isotope dilution methods, this would be null.
Reporting_Units	See Table 2	C30	Units that the analysis is reported in (mg/l, ug/kg, etc.)
Upper_Error	As applicable	C20	Upper error range (e.g., for rad data, + error measurement)
Lower_Error	As applicable	C20	Lower error range (e.g., for rad data, - error measurement)
Qualifiers	As applicable	C30	Flags applied to the analysis to qualify the data.
Dilution_Factor	All Records	N20	Sample dilution factor. If not diluted, enter one (1).
Analysis_Method	All Records	C30	Method used to run an analysis
Analysis_Date	All Records	C9	Date that the analysis was run (Format is DD-MMM-YY, e.g. 15-JAN-97)
Analysis_Time	All Records	C4	Time that the analysis was run (Format is HHMM military time. e.g. 1:30 p.m. is 1330, 9:30 a.m. is 0930)
Prep_Method	When prep performed	C30	Method used to prep an analysis (if prep method = analysis method, then this should be 'METHOD' without the quotes, or can be null).
Prep_Date	When prep performed	C9	Date that the sample was prepared. (Format is DD-MMM-YY, e.g. 15-JAN-97)
Prep_Time	When prep performed	C4	Time that the sample was prepared (Format is HHMM military time. e.g. 1:30 p.m. is 1330, 9:30 a.m. is 0930)
Preprep_Method	When preprep performed	C30	Method used to preprep/leach an analysis (e.g., 1310, 1311, 1312).
Preprep_Date	When preprep performed	C9	Date that the sample was prepreped (Format is DD-MMM-YY, e.g. 15-JAN-97)
Preprep_Time	When preprep performed	C4	Time that the sample was prepreped (Format is HHMM military time. e.g. 1:30 p.m. is 1330, 9:30 a.m. is 0930)
Analyte _Type	All Records	C30	Target analyte (FS), Surrogate (SU), tentatively identified compound (TIC) or Internal Standard (IS)
Filtered	All Records	C1	Total (T) or Dissolved (D)
Dry_wet_basis	All Records	C2	D for dry weight basis, W for wet weight basis, NS for (air, wipe, etc.)
Instrument	All Records	C30	Lab defined identifier for instrument on which analysis was performed.
TIC_number	For TIC results	N2	Tentatively identified compound number beginning with 1 and consecutively numbered to include all TIC's found in the sample. If no TICS are found, can either submit 1 TIC result with ND as result, or not include TIC result record
Spike_added	See Table 2	N20	Amount of the analyte spiked into a quality control sample, in same units as result
RPR	See Table 2	N20	Relative percent recovery. For MS/MSD, if concentration in unspiked parent sample > 4x spike amount, RPR should be null and enter NC as qualifier. For surrogates, if dilution factor > 4, RPR should be null, and enter NC as qualifier.

Min_RPR	See Table 2	N20	Lowest recovery limit acceptable for the method
Max_RPR	See Table 2	N20	Highest recovery limit acceptable for the method
RPD	See Table 2	N20	Relative percent difference between duplicate sample types (sample & REP, MS & MSD, LCS & LCSD). For MSD, if concentration in unspiked parent sample > 4x spike amount, RPD should be null and enter NC as qualifier.
Max_RPD	See Table 2	N20	Highest relative percent difference allowed for the method/analyte
Initial_weight_volume	Optional	N18	Initial sample weight or volume before any preps or prepreps
Initial_weight_volume_units	If initial weight/volume included	C30	Units for initial sample weight/volume
Final_weight_volume	Optional	N18	Final sample weight/volume after any preps or prepreps
Final_weight_volume_units	If final weight/volume included	C30	Units for final sample weight/volume
DuPont_Cost_Code	Optional	C30	The DuPont cost code (specifies method/matrix/deliverable/turnaround time) from Exhibit B of the current contract. This is currently optional, but will be required in the future.
Result_Comments	As applicable	C600	Any result specific comments. Note that comments may be provided as a separate electronic file in an agreed upon format.
Fraction	All Records	C30	This field is used to differentiate laboratory samples and results as required. For example, some labs use the LabID (2nd field in this list) to identify the client field sample, which does not sufficiently differentiate lab samples and results from different dilutions. This field could also be a more specific internal Lab ID

Table 2. Fields Required for each Sample Type and Surrogates/Internal Standards								
SAMPLE Types---> Fields	**FS, EB, TB, FB**	**MS**	**MSD**	**MB**	**LCS**	**LCSD**	**REP**	**Surrogates**
Result_Mod (if non-detect)	X	X	X	X	X	X	X	
Result	X	X	X	X	X	X	X	
MDL (not TICs)	X	X	X	X	X	X	X	
PQL (not TICs)	X	X	X	X	X	X	X	
Spike_Added		X	X		X	X		
RPR		X	X		X	X		X
Min_RPR		X	X		X	X		X
Max_RPR		X	X		X	X		X
RPD			X			X	X	
Max_RPD			X			X	X	
Reporting_Units	X	X	X	X	X	X	X	

Explanation for Tentitively Identified Compounds (TICs)

The EDD flat file format can accommodate a variety of TIC analysis data that may seem confusing. Results from TIC analyses must be handled differently than Target analyses. In order for the importer to determine that a result is a product of a TIC analysis from that of a Target Analyte, certain triggers must be employed.

The following rules are a summary of how the Labs should report a TIC analysis in the EDD. Any variation from these results will constitute an error and subsequently delay loading the EDD into Envista. The rules below do not supercede the rules explained in the EDD flat file format Spec, but these rules are additionally required in order to flag a TIC analysis and differentiate it from a Target Analyte analysis.

EDD FIELD NAME	CRITERIA	ACCEPTABLE FIELD VALUE
Analyte_Type	Always	TIC
TIC_Number	Always	> 0 i.e. 1,2,3…99. For No TICs found, use 1
Result_Mod	Non Detected analyte result	<
	Detected analyte result	Null
Result	Non Detected analyte result	ND
	Detected analyte result	Numeric Value
Qualifiers	Non Detected analyte result	Null
	Detected analyte result	J or other char that qualifies result
MDL	For MDL jobs	NS
PQL	Always	NS
CAS_No	TIC detected but not identified	Null
	TIC detected and identified	The casno associated with the Analyte.
	Library Scan Analysis performed but no analytes found.	Null
Analyte_Name	TIC detected but not identified	Unknown
	TIC detected and identified	The Analyte Name Identified.
	Library Scan Analysis performed but no analytes found.	No TICs found.

Below are some examples of typical TIC requests and analyses results:

NON DETECTED TICs

If a TIC analysis required a full library scan of analytes:
Qualifier = Null; Result_Mod = "<"; Result = "ND"; Analyte_Name = "No TICs Found"; Casno = Null; TIC_Number = 1

If a TIC analysis was requested for a particular compound:
Qualifier = Null; Result_Mod = "<"; Result = ND; Analyte_Name = The name of the tentatively Identified analyte; Casno = The casno for the tentatively identified analyte; TIC_Number = sequential number for each TIC

DETECTED TICs

If a TIC analysis identified a particular compound:
Qualifier = "J"; Result_Mod = null; Result = Numeric Value; Analyte_Name = The name of the tentatively identified analyte; Casno = The casno for the tentatively identified analyte; TIC_Number = sequential number for each TIC

If a tic analysis could not identify a particular compound:
Qualifier = "J"; Result_Mod = null; Result = Numeric Value; Analyte_Name ="Unknown"; Casno = Null; TIC_Number = sequential number for each TIC

DUPONT IN-HOUSE DATA REVIEW PROCESS

1.0 A Description of Electronic Diskette (EDD) and Hardcopy Deliverables Received from the Laboratory

The DuPont Corporate Remediation Group uses a pre-selected group of commercial laboratories to provide environmental analytical support services. One of the key capabilities of these laboratories is to have internal operational and data structure capability based on the RCRA or SW846 quality control batch concept (versus the USEPA Contract Laboratory Program model). DuPont receives hardcopy and electronic diskette deliverables from the laboratories for each sample group or lot. There may be one or more lots in an "analytical project." These projects are typically subsets of a remediation project, and are based on logical sampling events associated with a particular project.

Key components for a laboratory deliverable set are: samples by project or sampling event; test results by sample; parameters by test (may vary by sample as well); and reporting thresholds by parameter by test.

The deliverables are also characterized by quality control test results reported for each QC batch element associated with an appropriate set of sample results. The QC batch elements reported in deliverables include: method blank (MB), laboratory control spike (LCS), laboratory control spike duplicate (LCSD), sample matrix spike (MS), sample matrix spike duplicate (MSD), and sample matrix replicate (REP). Measures of accuracy are represented by percent recovery (%R), and measures of precision are represented by relative percent difference (RPD) for spike duplicates or REP's. Sample QC results reported in the deliverables include surrogate standard (SS) recovery.

The rule of thumb for DuPont deliverables is: "each QC batch must include a measure of accuracy and precision for the associated samples in the batch; and these measures preferably should come from the representative sample matrix". % R's and RPD's are measured in the sample matrix (%R's from MS vs. LCS; and RPD's from MS/MSD or REP vs. LCS/LCSD). The MB must be reported for all parameters in the associated samples and must be less than the PQL for each parameter. Acceptance criteria for %R's and RPD's are method dependent, and are supplied by the laboratory with each deliverable for review purposes only. The default requirement is that batch QC is performed on a DuPont project specific basis. Exceptions, based on individual project needs, are DuPont sample QC (same nominal matrix, but sources limited to DuPont sites), and generic method QC (same nominal matrix, but sources limited to DuPont sites), and generic method QC (same nominal matrix – different client source).

The DuPont database architecture utilizes a QC batch identifier derived from laboratory operations (in contrast to an alphanumeric code or other "social security number" type convention). Six fields in the analysis and results records are concatenated to form the unique "batch identifier." These are: Pre-Prep Method (e.g. 1310, 1311, 1312), Prep Method, Analytical Method, Batch Start Date (to accommodate multiple batches on the same day), Batch No. (assigned by the lab), and Instrument Identifier (samples and batch QC must be performed on a single instrument).

Field QC elements, such as Trip Blank (TB), Field Blank (FB), and Equipment Rinsate Blank (EB), are treated as field samples.

Method QC information, (e.g. calibration information, internal standard recoveries, instrument tunes, etc) is not included in the DuPont deliverables specification.

Certain field specific sample types are identified through the sample naming convention. These include field duplicates, field specified samples for matrix spikes/duplicates, aqueous samples field filtered for "dissolved Metals," and aqueous samples unpreserved with acid and intended for separate assay for acrolein and acrylonitrile.

Hardcopy and electronic formats include batch QC element results in addition to sample results. The laboratory establishes significant figure conventions for reporting results. Reporting thresholds are normally based on either method detection limit (MDL) or practical quantitation limit (PQL) conventions.

Chemical Abstracts Registry numbers (CAS nos.) are used to establish a common nomenclature base for synonyms. Arbitrary numeric codes are established by DuPont to fill CAS No. data fields for non-chemical based parameter names (e.g. for pH, alkalinity, etc.)

2.0 Basic Elements and Flow of the DuPont CRG Analytical Data Review Process

The DuPont Corporate Remediation Group has a centralized staff to provide analytical planning and liaison functions. The group, known as the Analytical and Data Quality Management Group (ADQM), also perform an in-house quality control review of all data received from laboratories.

The objective of the DuPont data evaluation process is to determine if the project defined data quality objectives for precision, accuracy, representativeness, comparability, completeness, and usability are met. Data qualifiers are assigned, as appropriate to specifically indicate data points which do not meet stated DQO's. Field parameters such as pH, specific conductance, redox, dissolved oxygen, and temperature are not typically evaluated for accuracy, precision, and representativeness. These tests do not include quality control samples related to the data quality characteristics, however field system audits can provide a level of quality control assurance for the parameters.

The review process includes comparison of available laboratory data inventory (hardcopy and EDD) versus the original project specifications, examination of the completed Chain of Custody, thorough review of the Laboratory Case Narrative and deliverables as appropriate, utilization of the DuPont diagnostic "Backstop" software during loading of the EDD and

utilization of the interactive "DDR" software during data evaluation. Data qualifiers are applied as described in the following Section and corrective action is initiated as appropriate.

ADQM analytical project QC review is assigned to a technically qualified chemist or scientist, with assistance from administrative support staff, and database management staff, as needed.

The initial step following receipt of deliverables from the laboratory is to complete a preliminary administrative inventory. Diskettes are loaded into the system. The deliverables are inspected to ensure that the assigned job name and work location are correctly assigned to the deliverables. When a set of project data is complete, the review process continues with subsequent steps.

The diskette deliverables are listed and compared in content to the hardcopy version supplied by the laboratory. Inconsistencies are communicated to the laboratory and corrected. This step is referred to as the Accuracy Check. Accuracy Checks are normally performed on all deliverables from laboratories new to the DuPont program; any that have recently implemented a new data management system; and a percentage of routine deliverables submitted by veteran laboratories.

The Completeness Check involves a review to determine if all samples submitted were processed at the lab for desired test parameters. In the present form, this is a manual, software assisted process. Again, inconsistencies are communicated to the Sampling Team and/or Laboratory for resolution.

Appropriateness of deliverables is reviewed with assistance of a series of diagnostic software queries called the "Backstop". The electronic deliverables are reviewed to ensure that correct dates and times of sample collection have been entered, that QC batch integrity exists for all sample tests, that no duplicate records are present, that QC acceptance criteria exceptions are adequately documented, that tentatively identified compound listings are consistent, and that reported results have been properly entered.

The "DDR" phase of the review process, is performed by the Chemist, using an interactive software system (see section 3.0) in combination with the interpretation of appropriate elements of the hardcopy material. In general, all chemistry data submitted by the laboratories is reviewed and evaluated using this process. In addition, third party data validation, if required for the program, is applied to a subset of the project data; the extent of third party validation varies with the individual project design, and is typically detailed in the project Quality Assurance Project Plan.

Project level review is performed to ensure consistent application of descriptor information relating to site history and sample location naming conventions. Tasks include review of sample tables for sample source identification, sample type descriptor, matrix descriptor, field duplicate descriptors, designation of samples for total or dissolved metals, and proper entry of sample depths (if soil matrix) and time of collection. Data sets are checked to ensure that field data has been loaded; if not, it is hand entered. Data sets are checked to ensure that the source name, date, and time of collection for each sample are consistent between sample table and field table. Data sets are checked to ensure proper formatting.

3.0 Overview of the interactive Software for Quality Control Review (DDR)

DuPont has designed an interactive software program designed to perform a semi-automated review on a predefined project data set, using a compatible electronic diskette format. The software is interactive in that the QC Chemist uses a series of screens to define the data set in terms of samples, tests, parameters, and specific quality control acceptance limit criteria. The software then performs a review, using a pre-defined series of decision trees, and completes a summary report for the Chemist, describing data points with qualifiers applied due to quality control criteria exceedances. The Chemist then reviews other supporting documentation, including the laboratory hardcopy deliverables, case narrative, and Chain of Custody, as appropriate. This overall review may result in modification of the qualifiers or application of additional data qualifiers. A data evaluation summary report will then be developed by the Chemist to accompany the analytical data for project management and agency review.

The attached table entitled "DuPont In-House Review Process (Labstats Version) outlines the basic design characteristics of the interactive software review. Each analytical batch will contain a measure of precision and accuracy as per SW 846 guidelines. Data review will be conducted using available quality control parameters contained in each analytical batch. Hold Time, Method Blank, Trip Blank, Equipment Blank, Field Blank, Matrix Spike/Matrix Spike Duplicate, Lab Control Spike/Lab Control Spike Duplicate, Replicate, and Surrogate results are included in this portion of the review process. The table explains how specific review criteria are to be applied for each review parameter; it includes a glossary of data qualifiers and a hierarchy for applying those qualifiers; it details appropriate application of data qualifiers; and it contains additional comments to clarify the review processes.

The default quality control acceptance limits by matrix to be applied for matrix spike percent recovery, matrix spike duplicate relative percent difference, laboratory control spike percent recovery, and lab control spike duplicate relative percent difference are provided by the laboratory on the electronic deliverable. In addition, the DDR has "standard" default criteria for qualifying data as quantitatively estimated, and limit criteria for rejection of data. The default values are based on Region III data validation guidelines, and on National Functional Guidelines for Data Validation. They represent norm values commonly employed in third party data validation, as opposed to acceptance limits specified in SW 846 methods. The SW 846 approach is generally used for laboratory operations control purposes, and are typically much more liberal; the limits presented here reflect values appropriate for data usability decision making. Actual acceptance criteria limit values may vary from these default values, as dictated by individual project needs. Tables of specific project acceptance limits will be included as an essential part of each QAPP for review and approval.

The DDR program also permits the chemist to set up alternative evaluation criteria in accordance with the data evaluation requirements of a particular U.S. EPA Region or state

agency, providing the variability and versatility needed to meet varying project needs. In addition to the standard data acceptance windows, it can also be set to include hold times, specific citations to inorganic tests, and common organic contaminants with associated contamination decision limits. The software set-up entries can be modified by adding or deleting test elements, changing pre-selected acceptance limit criteria, and by adding site/project specific organic contaminants for blank qualification.

4.0 Documentation:

All data qualifiers applied, as a result of the DuPont In-House Data Quality Control Review Process, will be stored in the Corporate Environmental Database. Reports of analytical results will include the qualifiers as a result modifier. The QC Chemist will compile an overview of data usability for the project in a case narrative format. This will be included with the data evaluation summary report to project management and the agency. Results qualifiers will be summarized and explained. Corrective action taken will be documented. An objective statement regarding data usability will be included. Any associated data validation report done by a third party will be appended to this report, and conclusions will be incorporated into the data evaluation summary report.

DUPONT IN-HOUSE REVIEW PROCESS (LAB STATS VERSION)

Review Parameter	Review Criteria	Comments
Results	Flag hits J where value > MDL but < PQL	Lab will also apply qualifier on the result.
Hold time	Flag J (hits) or UJ (non-detects) if preprep, prep or analysis/reanalysis hold time exceeded Flag J (hits) or R (non-detects) if preprep, prep or analysis/reanalysis hold time exceeded by >= 2X	Hold times specified in Federal Register.
MB	If MB >= RL, If result <RL, no flag If result <= 5X MB, flag hits B If result <= 10X MB, flag hits B for acetone, 2-butanone, methylene chloride, phthalate esters only	RL defined as MDL or PQL per location/jobname.
TB, EB, FB	As above for MB	As above for MB.
MS/MSD	If MS/MSD %R outside criteria and unspiked sample result <= 4X spike conc, flag associated results (see comments) as follows: %R above criteria and sample result < RL, no flag %R above criteria and sample result >= RL, flag hits only J %R below criteria but above 'reject' limit, flag hits J and non-detects UJ %R below 'reject' limit, flag hits J and non-detects R If MS/MSD RPD above criteria, flag associated results J	RL defined as MDL or PQL per location/jobname. Criteria for %R and RPD applied to soil and water samples for organic and inorganic parameters per laboratory generated statistical windows. Qualify 'parent' (background) sample only for organic %R or RPD outside criteria. All samples in batch will be qualified for inorganic %R or RPD outside criteria. Evaluate and qualify only compounds spiked and outside criteria.
LCS/LCSD	If LCS/LCSD %R outside criteria (except Sb and Ag), flag all associated results as follows: %R above criteria and sample result < RL, no flag %R above criteria and sample result >= RL, flag hits only J %R below criteria but above 'reject' limit, flag hits J and non-detects UJ %R below 'reject' limit, flag hits J and non-detects R If LCS/LCSD RPD above criteria, flag associated results J	RL defined as MDL or PQL per location/jobname. Criteria for %R and RPD applied to soil and water samples for organic and inorganic parameters per laboratory generated statistical windows. All samples in batch will be qualified for %R or RPD outside criteria. Evaluate and qualify only compounds spiked and outside criteria.

DUPONT IN-HOUSE REVIEW PROCESS (LAB STATS VERSION)

REP (lab dup)	If REP RPD outside criteria, flag all associated results J Criteria are per laboratory generated statistical windows when both results are >5X PQL If one or both samples are < 5X PQL, criteria are +/- PQL for waters, 2X PQL for soils	Criteria for RPD applied to soil and water samples for organic and inorganic parameters per Review Criteria. Qualify 'parent' (background) sample only for organic RPD outside criteria. All samples in batch will be qualified for inorganic RPD outside criteria. Qualify only compounds outside criteria.
Surrogates (organics only)	Qualify associated results only as follows when DF <= 4X: If one surrogate %R is high or low (for VOCs only), or two or more surrogates with some high, some low, flag hits J and non-detects UJ If two or more surrogates have %R all high, flag hits only J If two or more surrogates have %R all low, flag hits J and non-detects UJ If one or more surrogates have %R < 10%, flag hits J and non-detects R	Criteria for %R are lab generated statistical limits (as per SW-846). Qualify volatile aromatics only if volatile aromatic surrogate(s) outside criteria; similarly qualify only volatile halogenated, semivolatile base neutral, or semivolatile acid compounds if specified surrogate(s) outside criteria. Qualify associated pest/PCB compounds only if both surrogates outside criteria, or at least one surrogate %R < 10%.
Tentatively Identified Compounds (TICs)	Flag TICs with a J.	

Laboratory Stats qualifiers – hierarchy is R, B, J, UJ

Qualifier	Definition
U	Not detected at the associated reporting limit.
B	Not detected substantially above the level reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.
R	Unusable result. Analyte may or may not be present in the sample.

APPENDIX C

GROUNDWATER SAMPLE COLLECTION FORMS

Instrument Calibration

Date	Time	Personnel	pH Meter			Conductivity		Dissolved Oxygen	Redox		PID	
			Buffers	Slope	Buffer Check	Standard	Actual	Calibration Slope	Standard	Actual	Standard	Actual

Corporate Remediation Group - Field Book

Site: _____ **Event:** _____ **Date:** _____ **Time:** _____

Personnel: _____ **Project Manager:** _____

Well ID: _____ **Permit No:** _____ **VO Vapors:** *PiDIFID BZ:* _____

PIDIFID CA:. _____

Weather Conditions: ☐ Clear ☐ Cloudy ☐ Other ☐ Wind: ☐ Temp: ?F

Well Depth: _____ **LNAPL:** _____ **Purge Method:** _____

Depth to Water: _____ **DNAPL:** _____ **Purge Start:** _____

Water Column: _____ **Casing Dia:** _____ **Purge Stop:** _____

Well Vol: _____ **Conv. Factor:** _____ **Parameter Collection Time:** _____

Well Vol (3x): _____ **Purge Rate:** _____ **Water Level Stable @:** _____

Parameters						Sample	Analysis Time
PH							
Temperature (?C)							
Specific Conductance (umho)							
Dissolved Oxygen (mg/l)							
Redox (mV)							
Turbidity (ntu)							
Color							
Odor							

Sample Date: _____ **Sample Collection Time:** _____ **Sample Method:** _____

Analysis	Volume (ml)	#	Preservative	Zero HS	Comments:

Analyst Name: _____

Analyst Signature: _____ **Date:** _____

00850

APPENDIX D

SAMPLING STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE FOR COMPLETING CHAIN-OF-CUSTODY FORMS

Date: May 11, 2001

Prepared for: DuPont Remediation Group

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

Kelly A. Rinehimer
URS Diamond
ADQM Project Chemist

John C. McVoy
URS Diamond
ADQM Manager

Alan P. Egler
URS Diamond
Quality Assurance Officer

TABLE OF CONTENTS

1. Purpose 4

2. General Information 4

3. Procedures 4
   3.1 Chain-of-Custody (COC) 4
      3.1.1 Option A (Pre-printed COC originated by Laboratory Personnel) 4
      3.1.2 Option B (Pre-printed/Blank COC Originated in the Field) 5

4. Signatures 5
   4.1 Option A 5
   4.2 Option B 6

5. Derived COCs 6

6. "Cross Outs" on COC 8

7. Location of COC with respect to cooler 8

8. Bottle Labels 8

9. Date/Time of Sample Collection 8

10. Custody Seals 9

11. Cooler Numbers 9

12. Special Requests/Concerns 9

13. Step-By-Step Instructions 9

FIGURES

Figure 1 Example of laboratory originated COC sent to the field

Figure 1A Example of laboratory originated COC after completed in the field

Figure 2 Example of COC to be originated in the field

Figure 2A Example of COC to be originated in the field once completed in the field.

Figure 3 Original COC/Derived COC from original COC

Figure 4 COC Exception Report Form

APPENDICES

Appendix A Sample Identifier Coding

Appendix B Example Custody Seal

Appendix C Step-by-Step Instructions on How to Complete a Chain-of-Custody

1. PURPOSE

The purpose of this standard operating procedure is to establish a CRG/URSD proper chain-of-custody (COC) standard for tracking samples from the field to the laboratory. A proper COC is necessary if there is any possibility that the analytical data or conclusions based upon the analytical data will be used in litigation (SW846, Chapter 9, Section 9.2.2.7). The persons entering information on the COC are responsible for ensuring the document can withstand scrutiny during litigation.

2. GENERAL INFORMATION

The COC is a legal document/record that must include: facility name, facility address, phone numbers (primary contact and laboratory), sample identification, preservation, dates and times of collection of samples, possession, analyses, and laboratory performing the analyses.

3. PROCEDURES

3.1 Chain-of-Custody (COC)

The policy is to use either Option A or Option B as stated below.

3.1.1 Option A (Pre-printed COC originated by Laboratory Personnel)

If the regulatory agency requires initiation of the COC at the laboratory, use Option A. See Figures 1 and 1A for examples of COC Option A.

Laboratory Personnel do the following:

- ❑ Originate the pre-printed COC by relinquishing the bottles with a signature. The pre-printed COC contains the following information: header information (e.g., facility name, facility address, facility supervisor, project name), location code, matrix code, sample source (e.g., KIN-G-MW1), sample depths, sample type, volume, preservative (if applicable), quantity, bottle type, method and/or analyte.
- ❑ If the sample IDs are known at the time of bottle preparation, pre-print the location code, matrix code, and sample location (e.g., KIN-G-MW1) on the COC.
- ❑ If the sample IDs are **not** known at the time of bottle preparation, either pre-print the location code and matrix code only on the COC (e.g., KIN-G) or leave the sample ID blank.

Field Personnel do the following:

- ❑ If a sample is pre-printed on the COC but will never be collected:
  1. Cross out the sample on the COC.
  2. Date and initial next to the cross-out and give reason on the COC (e.g., well is dry).

- ❑ If an extra sample is collected that was not pre-printed on the laboratory relinquished COC, add this sample to a blank COC not the COC that was relinquished by Laboratory Personnel.
- ❑ If all of the samples listed on the laboratory relinquished COC cannot be collected in one day, use derived COC (see Section 5). (A way to avoid using derived COC is to have one well or boring location per COC.)
- ❑ If a sample is moved from one cooler to another:
  1. Add the comment "Moved to COC Y" (where Y is the unique COC number located on the top right-hand of the COC) in the date and time field on COC X next to the sample being moved.
  2. Add the sample to COC Y.
  3. Add the comment "moved sample from COC X" (where X is the unique COC number located on the top right-hand of the COC) in the margin of the COC Y next to the sample that was moved.

3.1.2 Option B (Pre-printed/Blank COC Originated in the Field)

- ❑ Laboratory Personnel issue forms along with the bottles to be used as chains-of-custody. These forms can be pre-printed or left blank.
- ❑ Field Personnel do the following:
  1. Collect the samples, write the sample ID according to the naming convention as described in Appendix A, if not already present, on the COC.
  2. Write the date and time of sample collection on the COC.
  3. Enter the remaining information on the COC [i.e., sample type, volume, preservative (if applicable), quantity, bottle type, method and/or analyte (if not already pre-printed on the COC)].
  4. Once the samples are ready to be shipped to the laboratory and all of the aforementioned information has been entered for the samples collected, relinquish the samples to the laboratory with his/her signature, date, and time (see Figure 2 and 2A for examples of Option B).

4. SIGNATURES

4.1 Option A

If Laboratory Personnel initiate the COC:

1. Laboratory Personnel relinquish the bottles with a signature.
2. Project Manager designates Field Personnel.
3. Field Personnel receive the cooler(s) from the courier (i.e., Laboratory/Federal Express/Airborne).
   At this time, Field Personnel sign the shipping paperwork. OR, if someone other than

Field Personnel is designated by Project Manager to receive the bottles from Courier, that person signs the shipping paperwork upon receipt of the coolers.

4. Field Personnel:
   - Check contents of cooler against COC
   - Sign the COC in the "Received By" box.
   - Relinquish the samples to the laboratory once they have finished sampling. (Note: If more than one person is in the field sampling, the person receiving the bottles/samples must also relinquish the bottles/samples.
5. Laboratory personnel:
   - Cross-out the unused "Received By/Relinquished By" boxes prior to signing.
   - Sign the COC upon receipt of the samples.
6. Field Personnel file and keep the Federal Express/Airborne bill of lading **to** and **from** the site (if possible).

4.2 Option B

If Laboratory Personnel did not initiate the COC:

1. Field Personnel sign the COC upon completion of sampling in the Relinquished By box.
2. Laboratory Personnel sign the COC upon receipt of the samples and cross-out the unused "Received By/Relinquished By" boxes.
3. Field Personnel file and keep the Federal Express/Airborne bill of lading **from** the site (if possible).

5. DERIVED COCS

(Necessary to complete the record of custody when using COC Option A and all of the samples on the pre-printed COC cannot be collected on a single day.)

- If the COC was originated by Laboratory Personnel with a relinquished signature and all of the samples listed on the COC cannot be collected and sent in one shipment, Field Personnel must use the Derived COCs. (One way to avoid the Derived COC is to list one well or boring location per COC.)
- Field Personnel must write the sample IDs of the samples that were collected that day and are to be shipped to the laboratory on the Derived COC. It is important that Field Personnel:
  1. Transcribe all of the information pertaining to the sample (e.g., correct sample ID, parameters, preservative, etc.) on the Derived COC.
  2. Reference the Derived COC# on the Original COC in the "Date and Time" boxes of the sample that was transcribed onto the Derived COC.
  3. If the Derived COC doesn't have a number, Field Personnel must assign a number. The assigned number may be the original COC number followed by a –1.

- The original COC remains in the field until all the samples listed on the COC have been collected.
- Field Personnel send the original COC with the last shipment of samples listed on the original COC (see Figure 3 and 3A for examples of "Derived COC").

6. "CROSS OUTS" ON COC

- If corrections are made to the COC while in the field, Field Personnel must date and initial next to the item that was crossed out.
- If corrections are to be made to the COC **after** it has left the field, ADQM Personnel:
  1. Document the error (i.e., email or send out the COC Exception Report form).
  2. Send the email/COC Exception Report form to the person requesting the correction (if other than ADQM Personnel) for signature.
- Once the requestor has reviewed the documentation, he/she sends an email acknowledging the correction or mails the COC Exception Report form back to ADQM personnel with a signature.
- ADQM keeps the original with the file and sends a copy to Laboratory Personnel and to the project manager.

7. LOCATION OF COC WITH RESPECT TO COOLER

Laboratory Personnel:

1. Print the COC on carbon paper so that all parties handling the samples can maintain a copy in their files.
2. Place the original COC or form (which will become a COC once a signature has been added) inside the cooler when shipped to the field.

Field Personnel:

1. Place the original COC and laboratory copy in the cooler containing the samples listed on that COC.
2. Keep one carbon copy of the COC for their files.

8. BOTTLE LABELS

Field Personnel must make sure that the bottle label contains the full sample ID (see Appendix A), the preservative added, the number of bottles, the analyses, and whether or not the sample is filtered. The information on the bottle label must match the information on the COC.

9. DATE/TIME OF SAMPLE COLLECTION

Field Personnel must:

1. Write the date on COC as MM/DD/YY (e.g., 8/31/99)
2. Write the time on COC in 24 hour or military time (e.g. 1330). The time of collection is recorded as the time the sample was initially taken. A separate time of collection is not required for each parameter (e.g., time for volatiles, time for semivolatiles, etc.) The date and time of collection of the matrix spike and matrix spike duplicate samples are the same date and time as the original sample.

10. CUSTODY SEALS

- Laboratory Personnel include custody seals with each cooler shipment.
- Field Personnel:
  1. Pack the samples on ice in the cooler.
  2. Once the cooler is ready for shipment, tape the custody seals to the broad side of the cooler lid opposite the hinges in such a way that the seals will be broken if the cooler is opened.
  3. Sign and date the custody seals prior to shipment to Laboratory Personnel. If Field Personnel break the seals of the cooler prior to shipment (e.g., to re-ice the samples), Field Personnel must attach another set of seals to the cooler with the Field Personnel's signature and the date.
  4. If specified in the QAPP, attach custody seals to the bottles. Place the seal over the cap of the bottle and down both sides in such a way that, if the cap is unscrewed, the seal will be broken (see Appendix B for example custody seal).

11. COOLER NUMBERS

ADQM Personnel instruct the laboratories to write cooler numbers on coolers and associated COC containing samples to be analyzed for volatiles (e.g., label attached with cooler number or cooler number written directly on cooler).

12. SPECIAL REQUESTS/CONCERNS

Field Personnel use comment section of COC for special requests/concerns such as analyze within 7 days, high PID reading, etc.

13. STEP-BY-STEP INSTRUCTIONS

All personnel can follow the step-by-step instructions on how to complete a COC (see Appendix C).

FIGURES

Figure 1 ← **Example of laboratory originated COC sent to the field**

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425 **No. 123**

Job Number: 7035-504116-772000

Facility Name: DuPont Cape Fear	**Telephone Number:** 910-371-4409	**Method of Shipping:** Fed Ex	**Shipping Instructions:** Priority Overnight		
Facility Address: State Road 1426, Leland, NC 28451	**Comments:**				
Facility Supervisor: Bill Jones					
Process Producing Sample: Indicator GW					
Employee(s) Sampling:					
Other Employee(s) Handling:					

Sample Description	Date	Time	Sample Type	Bottle Volume (ml)	Preservative	Quantity	Bottle Type	8260B									
CAP-G-MW-30			WW	40	HCL	2	V	X									
		Laboratory relinquishes the bottles by signing and dating here															

Bottles Relinquished by Bob Adams	**Date/ Time** 03/22/01	10:00	**Bottles Received by**		**Date/ Time**		**Condition of samples upon arrival:**	
Bottles Relinquished by	**Date/ Time**		**Bottles Received by**		**Date/ Time**		**Signature:**	
Bottles Relinquished by	**Date/ Time**		**Bottles Received by**		**Date/ Time**		**Date:**	
Bottles Relinquished	**Date/ Time**		**Bottles Received by**		**Date/ Time**		**Temp of Samples on Arrival:** ____C	

Figure 1A ← Example of laboratory originated COC after completed in the field

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425

No. 123

Job Number: 7035-504116-772000

Facility Name: DuPont Cape Fear	Telephone Number: 910-371-4409	Method of Shipping: Fed Ex	Shipping Instructions: Priority Overnight
Facility Address: State Road 1426, Leland, NC 28451	Comments:		
Facility Supervisor: Bill Jones			
Process Producing Sample: Indicator GW			
Employee(s) Sampling: Joe Sample			
Other Employee(s) Handling: Dave White			

Sample Description	Date	Time	Sample Type	Bottle Volume (ml)	Preservative	Quantity	Bottle Type	8260B
CAP-G-MW-30	03/22/01	1200	WW	40	HCL	2	V	X

Laboratory personnel will accept receipt of the samples by signing and dating here.

Person who received the bottles must also relinquish the bottles by signing here

Laboratory relinquishes the bottles by signing and dating here. The point of contact receives the bottles by signing and dating here.

Bottles Relinquished by	Bob Adams	Date/Time	03/21/01	10:00	Bottles Received by	Joe Smith	Date/Time	03/22/01	900	Condition of samples upon arrival: Good
Bottles Relinquished by	Joe Smith	Date/Time	03/22/01	1600	Bottles Received by	----------	Date/Time	----	----	Signature: Bob Adams
Bottles Relinquished by	----------	Date/Time	----	----	Bottles Received by	----------	Date/Time	----	----	Date: 03/23/01
Bottles Relinquished by	----------	Date/Time	----	----	Bottles Received by	Bob Adams	Date/Time	03/23/01	930	Temp of Samples on Arrival: __2_C

Figure 2 ← Example of COC to be originated in the field

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425 **No. 124**

Facility Name: DuPont Cape Fear		**Telephone Number:** 910-371-4409					**Method of Shipping:**									**Job Number:**	**Shipping Instructions:**	
Facility Address: State Road 1426, Leland, NC 28451							**Comments:**											
Facility Supervisor: Bill Jones																		
Process Producing Sample: Indicator GW																		
Employee(s) Sampling:																		
Other Employee(s) Handling:																		
Sample Description	**Date**	**Time**	**Sample Type**	**Bottle Volume (ml)**	**Preservative**	**Quantity**	**Bottle Type**	8260B										
CAP-G-MW-30			WW	40	HCL	2	V	X										
Bottles Relinquished by		**Date/ Time**			**Bottles Received by**				**Date/ Time**			**Condition of samples upon arrival:**						
Bottles Relinquished by		**Date/ Time**			**Bottles Received by**				**Date/ Time**			**Signature:**						
Bottles Relinquished by		**Date/ Time**			**Bottles Received by**				**Date/ Time**			**Date:**						
Bottles Relinquished by		**Date/ Time**			**Bottles Received by**				**Date/ Time**			**Temp of Samples on Arrival: _____C**						

Figure 2A ← Example of COC to be originated in the field once completed in the field

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425

No. 124

Job Number: 7035-504116-772000

Facility Name: DuPont Cape Fear		Telephone Number: 910-371-4409			Method of Shipping: Federal Express			Shipping Instructions: Priority Overnight											
Facility Address: State Road 1426, Leland, NC 28451					Comments:														
Facility Supervisor: Bill Jones																			
Process Producing Sample: Indicator GW																			
Employee(s) Sampling: Bob Adams																			
Other Employee(s) Handling: Dave White																			
Sample Description	Date	Time	Sample Type	Bottle Volume (ml)	Preservative	Quantity	Bottle Type	8260B											
CAP-G-MW-30	03/22/01	1030	WW	40	HCL	2	V	X											

Field Personnel initiates the COC upon relinquishment of the samples by signing and dating here.

Laboratory personnel will accept receipt of the samples by signing and dating here.

Bottles Relinquished by	Bob Adams	Date/ Time	03/22/01	15:00	Bottles Received by	-		Date/ Time	-	-	Condition of samples upon arrival: Good								
Bottles Relinquished by	-	Date/ Time	-	-	Bottles Received by	-		Date/ Time	-	-	Signature: Joe Smith								
Bottles Relinquished by	-	Date/ Time	-	-	Bottles Received by	-		Date/ Time	-	-	Date: 03/23/01								
Bottles Relinquished by	-	Date/ Time	-	-	Bottles Received by	Joe Smith		Date/ Time	03/23/01	900	Temp of Samples on Arrival: 3C								

Figure 3

ORIGINAL COC ← Original COC

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425 **No. 123**

										Job Number:	7035-504116-772000							
Facility Name:	DuPont Cape Fea	Telephone Number:	910-371-4409			Method of Shipping:	Fed Ex			Shipping Instructions:	Priority Overnight							
Facility Address:	State Road 1426, Leland, NC 28451	Comments:																
Facility Supervisor:	Bill Jones																	
Process Producing Sample:	Indicator GW																	
Employee(s) Sampling:	Bob Adams																	
Other Employee(s) Handling:																		
Sample Description	Date	Time	Sample Type	Bottle Volume (ml)	Preservative	Quantity	Bottle Type	8260B										
CAP-G-MW-30	See COC 123-1		WW	40	HCL	2	V	X		Copy all of the information wrt CAP-G-MW-30 onto derived COC								
CAP-G-MW-28			WW	40	HCL	2	V	X										
CAP-G-MW-28D			WW	40	HCL	2	V	X										
CAP-G-MW-29			WW	40	HCL	2	V	X										
Bottles Relinquished by	Joe Smith	Date/ Time	03/22/01	9:00	Bottles Received by					Date/ Time			Condition of samples upon arrival:					
Bottles Relinquished by		Date/ Time			Bottles Received by					Date/ Time			Signature:					
Bottles Relinquished by		Date/ Time			Bottles Received by					Date/ Time			Date:					
Bottles Relinquished by		Date/ Time			Bottles Received by					Date/ Time			Temp of Samples on Arrival: _____C					

Figure 3

DERIVED COC FROM ORIGINAL COC ← Derived COC

Lancaster Laboratories

2425 New Holland Pike PO Box 12425 Lancaster, PA 17605-2425

No. 123-1

Job Number: 7035-504116-772000

Facility Name: DuPont Cape Fea	**Telephone Number:** 910-371-4409	**Method of Shipping:** Fed Ex	**Shipping Instructions:** Priority Overnight																
Facility Address: State Road 1426, Leland, NC 28451	**Comments:**																		
Facility Supervisor: Bill Jones																			
Process Producing Sample: Indicator GW																			
Employee(s) Sampling: Bob Adams																			
Other Employee(s) Handling: Dave White																			
Sample Description	**Date**	**Time**	**Sample Type**	**Bottle Volume (ml)**	**Preservative**	**Quantity**	**Bottle Type**	8260B											
CAP-G-MW-30	03/23/01	1000	WW	40	HCL	2	V	X											

Number of derived COC to tie it back to the original COC.

Add all information wrt CAP-G-MW-30 from original COC.

Laboratory personnel will accept the samples by signing and dating here.

Field Personnel must relinquish the samples by signing and dating here.

Bottles Relinquished by	Bob Adams	**Date/ Time**	03/23/01	15:00	**Bottles Received by**			-	**Date/ Time**	-	-	**Condition of samples upon arrival:**							Good
Bottles Relinquished by	-	**Date/ Time**	-	-	**Bottles Received by**			-	**Date/ Time**	-	-	**Signature:**					Joe Smith		
Bottles Relinquished by	-	**Date/ Time**	-	-	**Bottles Received by**			-	**Date/ Time**	-	-	**Date:**					03/24/01		
Bottles Relinquished by	-	**Date/ Time**	-	-	**Bottles Received by**			Joe Smith	**Date/ Time**	03/24/01	930	**Temp of Samples on Arrival: 3 C**							

Figure 4
COC Exception Report Form

Job Name: _____ Site: _____
Form Initiated By/Date: _____ Date Samples Collected: _____
Responsible Party: _____

Nonconformance (check appropriate box):

Category I: Sample Collection

- ☐ 1. Sample Containers Broken in Field
- ☐ 2. Requested Measurements Not Performed
- ☐ 3. Sample Not Collected
- ☐ 4. Sample ID Incorrect

*Explanation*_____

_____

Category II: Sample Receiving

- ☐ 5. Holding Time Exceeded By_____
- ☐ 6. Test added by Client After Login (*specify*)
- ☐ 7. Sample Received Broken/Leaking
- ☐ 8. Sample Received in Improper Container
- ☐ 9. No Sample ID on Container
- ☐ 10. Sample ID Does Not Match Paperwork
- ☐ 11. Volatile Sample Received With Headspace
- ☐ 12. COC Not Completed
- ☐ 13. Sample Temperature Exceeds 4°C

Category III: Other

- ☐ 14. _____
- ☐ 15. _____

CORRECTIVE ACTION _____

Root Cause:

_____
_____
_____*Initials/Date*: _____

Corrective Action:

_____
_____
_____*Initials/Date*: _____

Action to Prevent Recurrence:

_____
_____
_____*Initials/Date*: _____

Manager Review:

Date Manager Aware of Problem: _____ Manager's Initials: _____
Manager's Comments: _____
_____
_____
_____

APPENDICES

SAMPLE IDENTIFIER CODING

APPENDIX A

PURPOSE

Sample identifiers are used in the sampling plan, on the Chain-of-Custody, and on sample bottles to identify samples as they are created in the field. When the samples are delivered to the laboratory for analysis, the sample identifier on each sample bottle is verified on the Chain-of-Custody, and then it is entered into the laboratory's information system. When the laboratory analyses are completed, a laboratory report and an electronic deliverable are provided by the lab. The sample id ties these results to the appropriate sample.

By encoding the sample identifier with certain pieces of information about the sample, several things are accomplished. 1)It provides a mechanism for identifying the samples uniquely. 2)It conveys information about the type and location of the sample to those who are setting up the sampling program, those that are working in the field, and those that are reviewing the data. 3)It enables the data management system to automatically decode the information and store the individual data items in separate database fields for later use in data analysis and reporting.

FORMAT

Figure 1 illustrates the sample identifier coding format. The fields making up the sample identifier are described in detail on the following page. Examples of different sample identifiers are also provided.

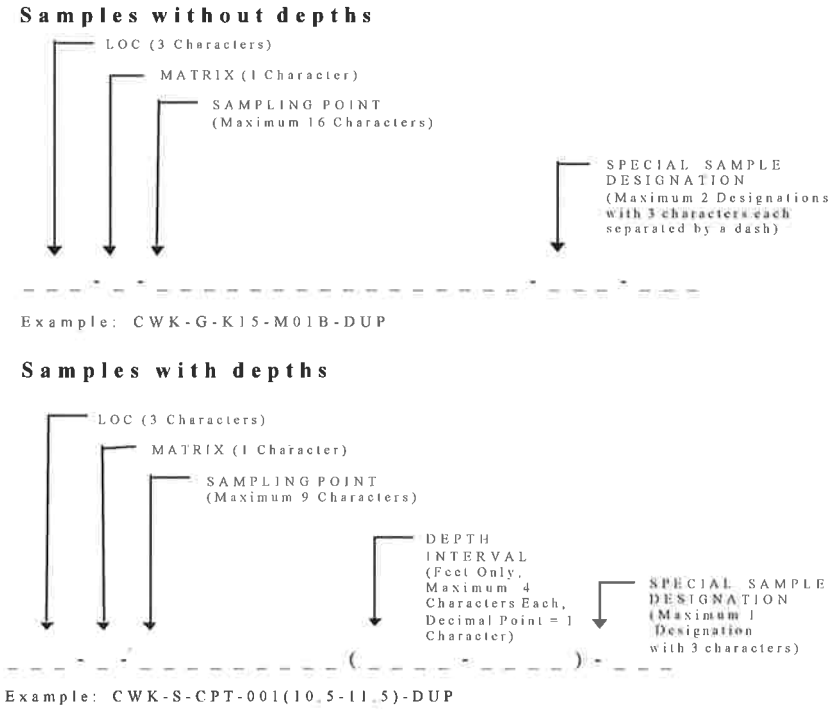


Figure 1

SAMPLE IDENTIFIER CODING

FIELDS

Sample identifiers should consist of the fields listed below concatenated in the order they are listed. The LOC, MATRIX, and SAMPLING POINT are required for all samples. The other fields are optional depending on the type of sample.

LOC -- A three character code designating the plant location or site where the sampling is being done. For example, CWK designates Chambers Works; REP designates Repauno. See Table 1 for a listing of codes. Contact the Lab Service Coordinator for locations not listed. It is required on all sample identifiers and must be the first item in the sample identifier.

SAMPLE TYPE -- A one character code designating the sample type. It is required on all sample identifiers and must immediately follow the LOC code with a dash separating it from the LOC code. If an unusual sample type is being sampled that needs to be specifically classified, contact the Lab Service Coordinator to obtain a new code.

G = Ground Water	S = Soil	A = Air
W = Surface Water	E = Sediment	N = Animal Tissue
D = Drinking Water	U = Sludge	R = Plant Tissue
K = Blank Water	P = Wipe	M = Microbiological
L = Leachate	T = Waste	X = Toxicological
		Z = Other

SAMPLING POINT NAME -- The sampling point name. This may be a well identifier, soil sample code, outfall point, etc. These identifiers should conform to the plant naming convention. Thus, if the official name of a well as defined by the plant is MW-2, then MW2, MW_2, M-2, 2, etc. should not be used. Only MW-2 should be used. Dashes are permitted within the sampling point name.

A sampling point is required in all Sample Identifiers and must immediately follow the matrix code with a dash separating it from the Matrix. For sampling points without depths, the maximum length of the sampling point is 16 characters. For sampling points with depths, the maximum length of the sampling point is 9 characters. Blanks are not permitted but may be denoted by an underscore, i.e. OUTFALL_023.

Blank samples used for QC should be identified as follows: Equipment blanks should be identified as EQBLK-#. Field blanks should be identified as FBLK-#. Trip blanks should be identified as TBLK-#. The # should be replaced with 1 to the number of the particular type of blank included in the sampling event, which may extend over several days. For example, if three trip blanks are included in a sampling event extending over two days, they would be designated TBLK-1, TBLK-2, and TBLK-3

DEPTH INTERVAL-- The depth to the top of the sampling interval followed by the depth to the bottom of the sampling interval. The depth interval must be in feet, and it must be surrounded by parentheses with the top and bottom depths separated by a dash. Each depth may have a maximum of 4 characters with a decimal point counting as one character. Thus, with two decimal places, the maximum depth is 9.99 feet; with one decimal place, the maximum depth is 99.9 feet; with no decimals, the maximum depth is 9999 feet. The depth interval is required for all soil samples.

SAMPLE IDENTIFIER CODING

SPECIAL SAMPLE DESIGNATIONS -- Designates samples used for QC purposes or requiring special handling in the field. The code must be preceded by a dash. Do not specify these if they do not apply.

DUP -- 2nd sample in a duplicate sample set
DIS -- Sample filtered in the field for dissolved metals analysis.
ACR -- This sample is for Acrolein/Acrylonitrile analysis. It requires different preservation than standard VOA samples.
MS -- Matrix Spike sample.
MSD -- Matrix Spike Duplicate sample.

EXAMPLES

1. Groundwater Monitoring Well K16-M05B primary sample at Chambers Works

   CWK-G-K16-M05B

2. Groundwater Monitoring Well K16-M05B duplicate sample at Chambers Works

   CWK-G-K16-M05B-DUP

3. Groundwater Monitoring Well K16-M05B primary sample for dissolved metals at Chambers Works

   CWK-G-K16-M05B-DIS

4. Groundwater Monitoring Well MW-44 Matrix Spike samples at Repauno

   REP-G-MW-44-MS
   REP-G-MW-44-MSD

5. Monitoring Well K16-M05B duplicate sample for dissolved metals at Chambers Works

   CWK-G-K16-M05B-DIS-DUP

6. Surface Water at Outfall 023 primary sample for Acrolein/Acrylonitrile at Niagara

   NIA-W-OUTFALL_023-ACR

7. Surface Water at Outfall 23 duplicate sample for Acrolein/Acrylonitrile at Niagara

   NIA-W-OUTFALL _023-ACR-DUP

8. Soil boring D5534 primary sample at Chambers Works taken at a depth of 6.5 feet to 7 feet

   CWK-S-D5534(6.5-7)

9. Soil Sample P123 duplicate sample at Chambers Works taken at a depth from 6 to 12 inches

   CWK-S-P123(.5-1)-DUP

10. Two Trip Blanks and an Equipment Blank for sampling at Cookson

    CKS-K-TBLK-1
    CKS-K-TBLK-2
    CKS-K-EQBLK-1

TABLE 1

LOC CODES

LOC CODES

LOC	SITE_NAME	LOC	SITE NAME
ABD	ABERDEEN,MS	FLO	FLORENCE
ABN	ABERDEEN,NC	FMN	FORT MADISON
ALB	ALBANY	GEA	GEASLIN
ACT	ALLIS CHALMERS TRUST SITE	GCC	GEON - CALVERT CITY
ANT	ANTIOCH	GLV	GEON - LOUISVILLE
ASH	ASHEPOO	GCK	GILL CREEK
AST	ASTON	GLA	GLASGOW
ATH	ATHENA	GLN	GLENOLDEN
ASC	ATHENS	GLE	GLENPOOL
BAL	BALTIMORE	GSI	GRASSELLI
BAR	BARKSDALE WORKS	GRE	GREENFIELD
BMP	BARLEY MILL PLAZA	GRB	GREENSBORO
BAY	BAYPORT	GRN	GREENWOOD
BEA	BEAUMONT	HAS	HASKELL
BEL	BELLE	HAT	HATFIELD
BET	BETHANY	HER	HERMITAGE ISLAND (NOCED)
BRK	BOERKE SITE	HOE	HOECHST-CELANESE
BRE	BREVARD	JEN	JENKS
BRI	BRIDGEPORT	JNV	JOHNSONVILLE
BUR	BURNSIDE	JON	JONESBORO
CAP	CAPE FEAR	KAN	KANSAS CITY
CAR	CARLYSS	KIN	KINSTON
CRT	CARTERET	WTL	LAKE CHARLES - CONOCO
CWK	CHAMBERS WORKS	LAK	LAKE CHARLES - VISTA
CHA	CHATTANOOGA-DUPONT	LAP	LAPORTE
CHE	CHESAPEAKE	LAV	LAVERNE
CHR	CHESTNUT RUN	LON	LONOKE
CHB	CHOCOLATE BAYOU	LOS	LOS ANGELES
CHI	CHRISTINA LABS	LOU	LOUISVILLE - DUPONT
CIN	CINCINNATI	LOV	LOUVIERS
CIR	CIRCLE RIDGE	LYN	LYNDONVILLE
CVL	CIRCLEVILLE	CDV	MACON-DOCKERY
MAM	CLEVELAND	MAN	MANATI, PUERTO RICO
CFT	CLIFTON	MAR	MARTINSVILLE
CLI	CLINTON	CAM	MAY PLANT
CKS	COOKSON	MEM	MEMPHIS - DUPONT
COO	COOPER RIVER	MIL	MILBERGER
COR	CORPUS CHRISTI	SPA	MILLIKEN
MCC	DACULA	BLA	MILLIKEN CYPRUS PLANT
DCT	DEL CITY	INM	MILLIKEN DEWEY PLANT
DEL	DELISLE	MBR	MOBERLY
DOV	DOVER	MOB	MOBILE - DUPONT
FRO	DUPONT AUTOMOTIVES PLANT	MTG	MONTAGUE
REI	DUPONT-ELSTON AVENUE	MNT	MONTGOMERY - DUPONT
EAG	EAGLE RUN	MTC	MOUNT CLEMENS
ECH	EAST CHICAGO	NAS	NASHVILLE - CONOCO
EDG	EDGEMOOR	NEC	NECCO PARK-NIAGARA FALLS
ELK	ELK GROVE	NWH	NEW HAVEN
ELR	ELK RIVER LEARNING CENTER	NEW	NEWARK
EXP	EXP STATION	NPT	NEWPORT
FAY	FAYETTEVILLE	NTN	NEWTOWN
FER	FERDULA	NIA	NIAGARA FALLS
LEW	FISHING CREEK SITE	NC	NORTH CAROLINA
FLI	FLINT	NTH	NORTHEAST

LOC CODES

OLD	OLD HICKORY	SPR	SPRUANCE SITE
PAM	PAMONA	STH	STINE HASKELL
PAR	PARLIN	TAT	TATNALL STREET
PEN	PENSACOLA	TEC	TECUMSEH
PTC	PITT CONSOL	TOL	TOLEDO
PNA	POMONA	TOW	TOWANDA
POM	POMPTON LAKES	VAL	VALLEY CENTER
PON	PONTCHARTRAIN	VIC	VICTORIA
POT	POTOMAC	WWK	WASHINGTON WORKS
REP	REPAUNO	WAY	WAYNESBORO
RTP	RESEARCH TRIANGLE PARK	WAL	WEST ALTON
ROC	ROCHESTER	WLM	WILMINGTON, PA
SAB	SABINE RIVER	WUR	WURTLAND
SAR	SARTOMER	WYS	WYSHOCK
SEA	SEAFORD		
SEN	SENECA		

LOC CODES

Modifications:

August 26, 1998: Original issued.

Jan 6, 1999 Changed MATRIX to SAMPLE TYPE. Changed G Sample Type from Groundwater to Ground Water. Changed A Sample Type from Air Sample to Air. Changed P Sample Type from Wipe Sample to Wipe.

APPENDIX B

Lancaster Laboratories
Where quality is a science.

029529
CUSTODY SEAL

DATE _____
SIGNATURE _____

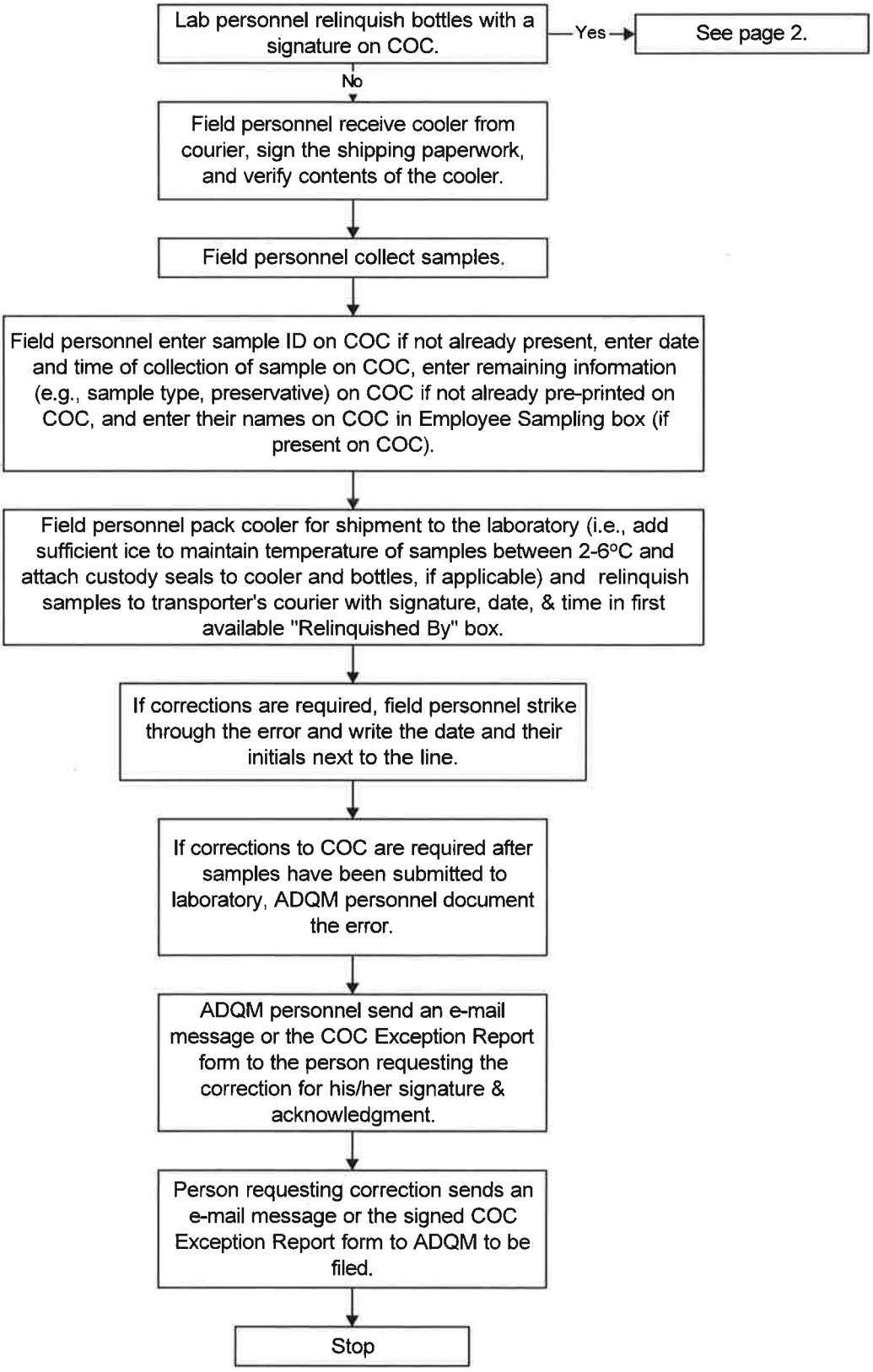
2425 New Holland Pike, Lancasater, PA 17601-5994 (717) 656-2300

Custody Seal

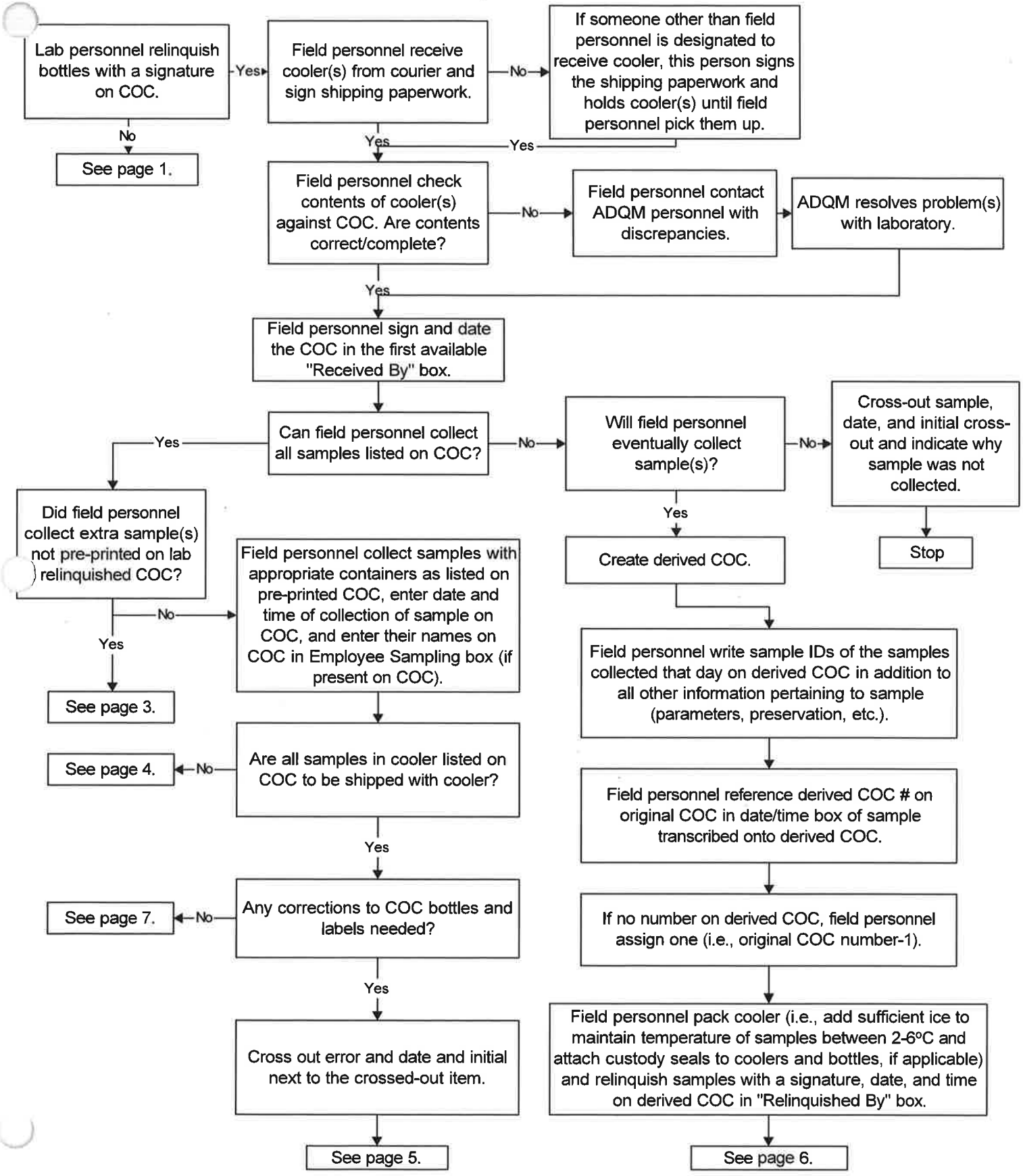
DATE _____

SIGNATURE _____

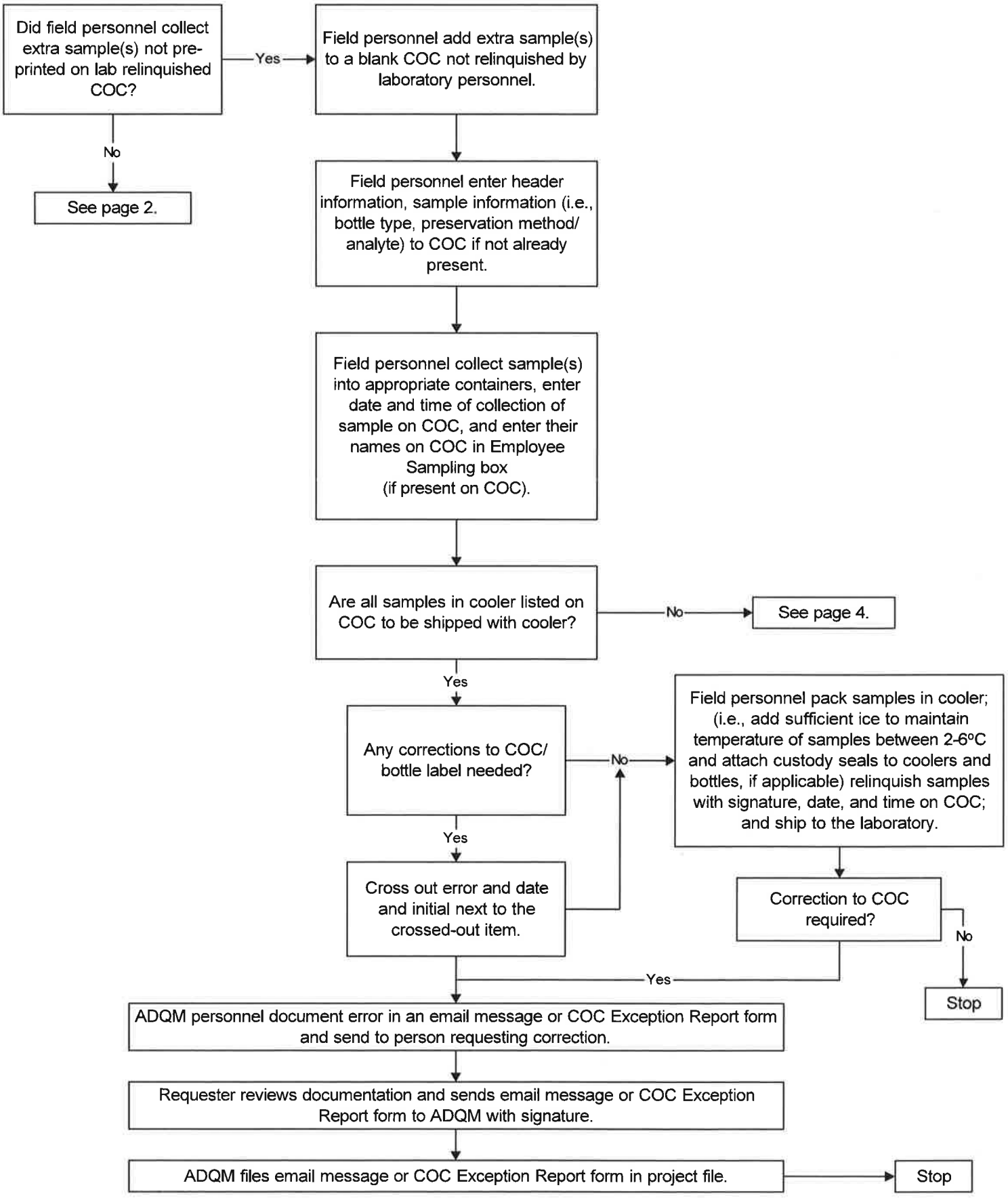
Appendix C
Chain of Custody Flow Diagram



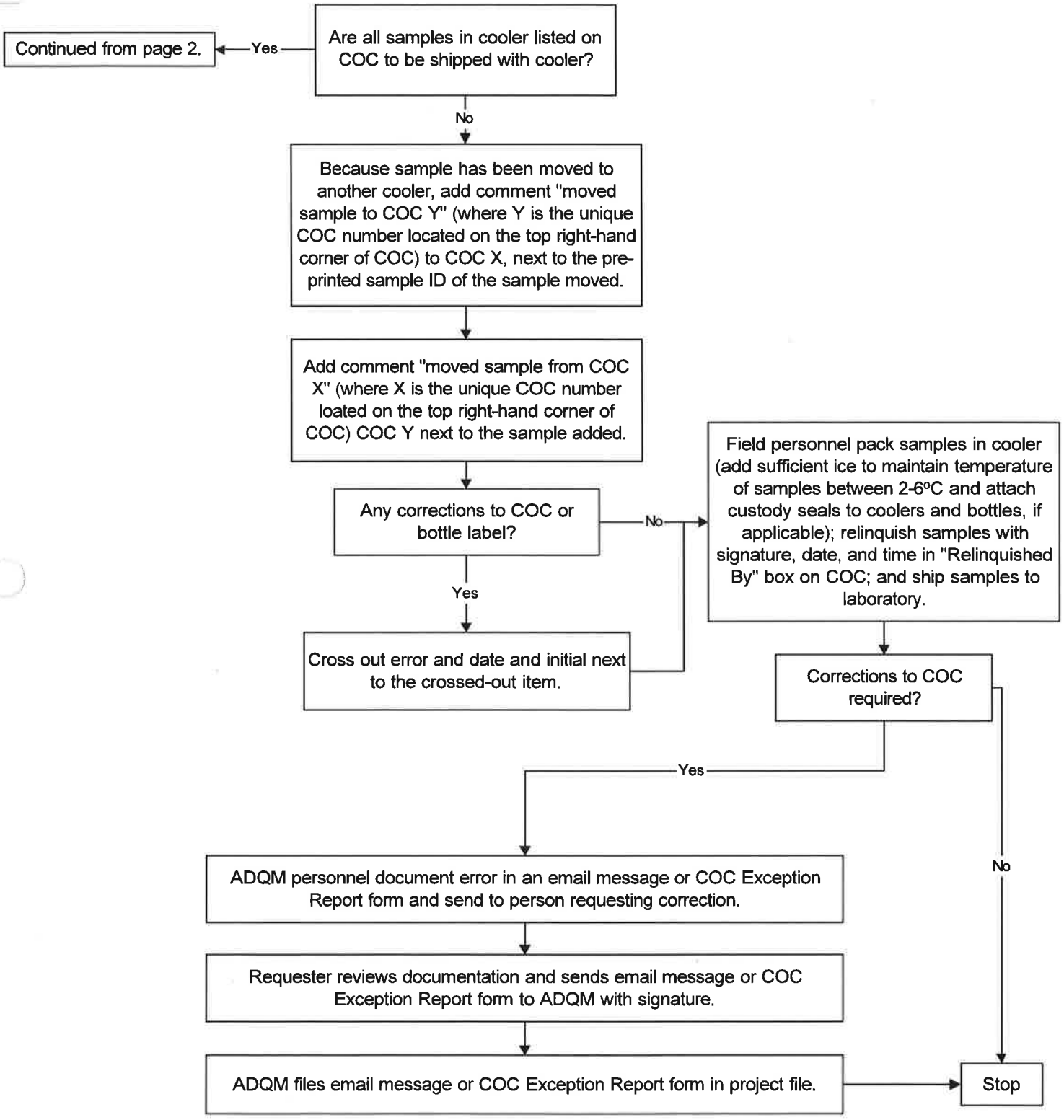
Chain of Custody Flow Diagram



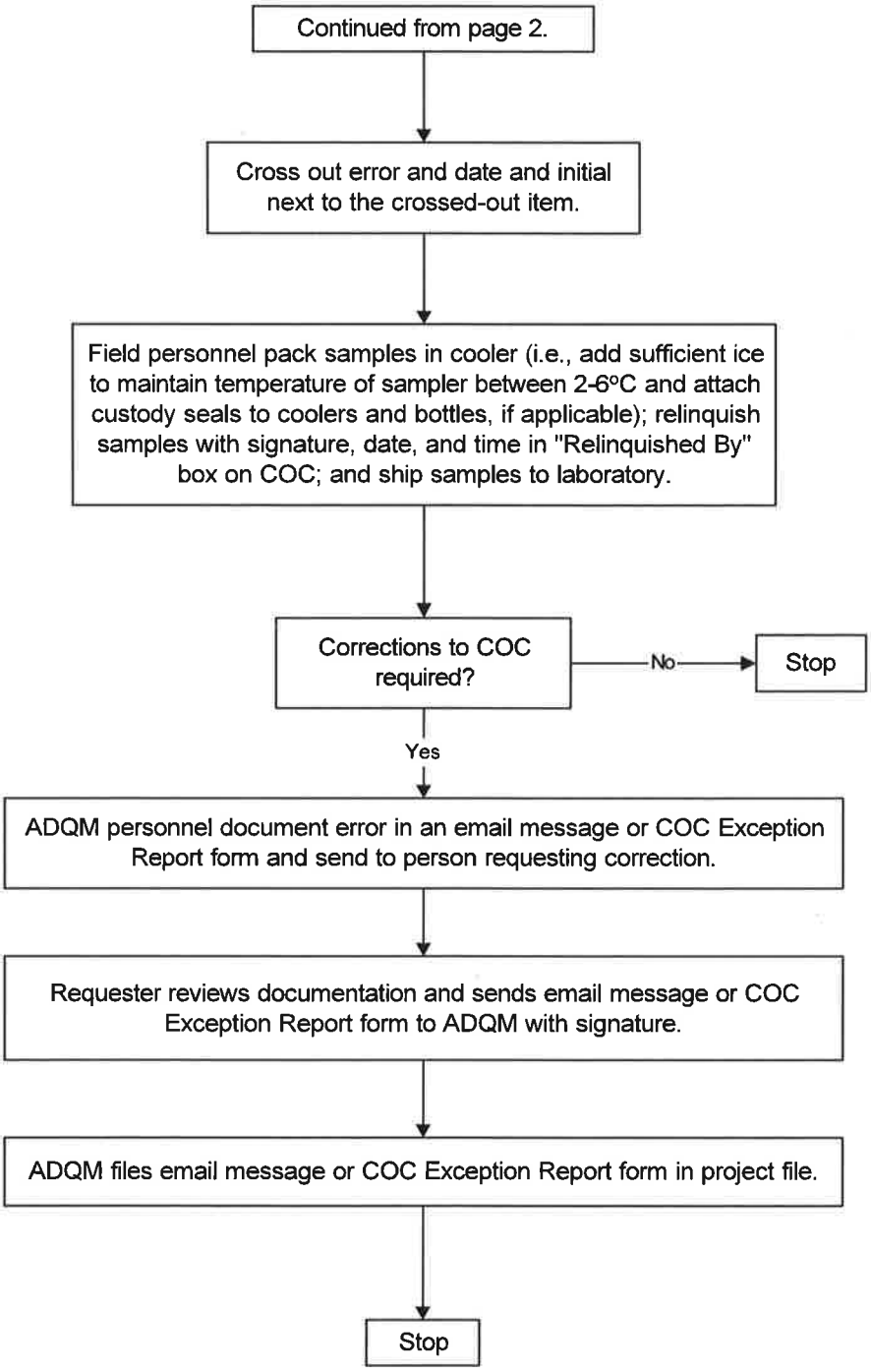
Chain of Custody Flow Diagram



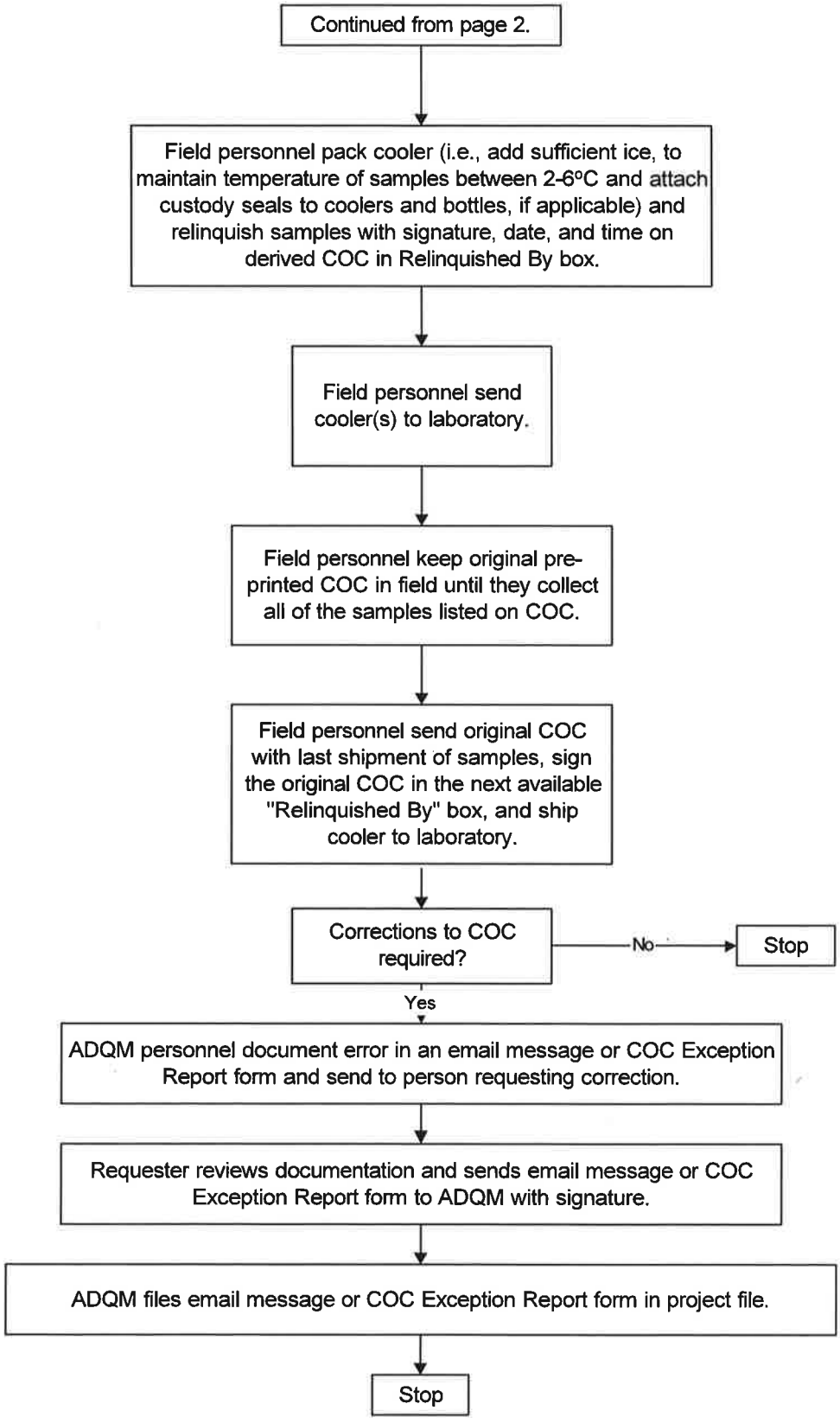
Chain of Custody Flow Diagram



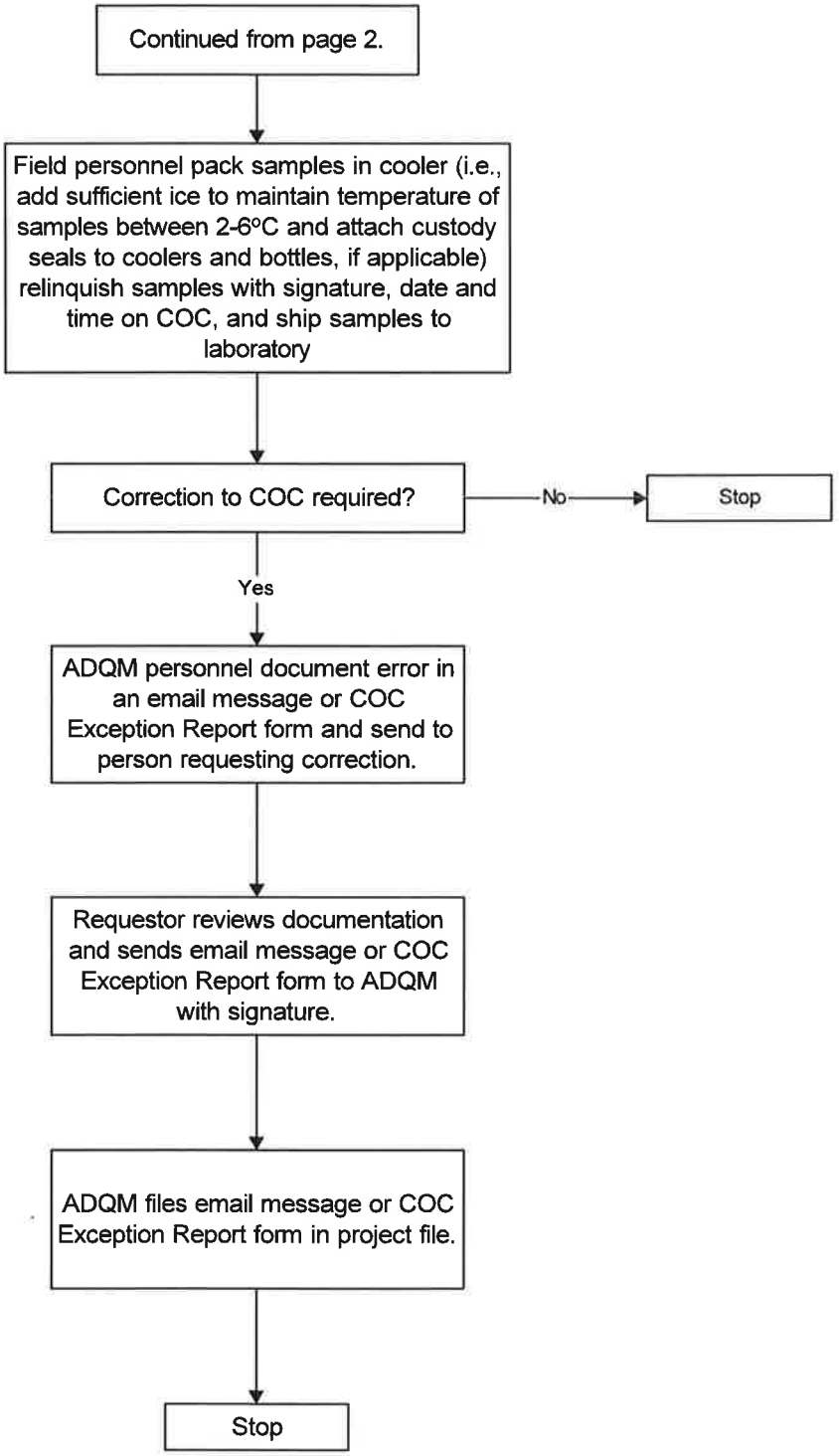
Chain of Custody Flow Diagram



Chain of Custody Flow Diagram



Chain of Custody Flow Diagram



APPENDIX E

QUALITY CONTROL CRITERIA FOR DIOXIN/FURONS AND PCB CONGENERS

Method 1613B spike profile.

ANALYTICAL PERSPECTIVES

Sample Path

Version B

P6310

M8290/4613 PCDD/F Spike Profile

Analyte	Cleanup Standards Amount Spiked (ng)
$^{37}Cl_4$-2,3,7,8-TCDD	0.8
$^{13}C_{12}$-1,2,3,4,7-PeCDD	2
$^{13}C_{12}$-1,2,3,4,6-PeCDF	2
$^{13}C_{12}$-1,2,3,4,6,9-HxCDF	2
$^{13}C_{12}$-1,2,3,4,6,8,9-HpCDF	2

Compound	Injection Standards Amount Spiked ng
$^{13}C_{12}$-1,2,3,4-TCDD	2
$^{13}C_{12}$-1,2,3,4-TCDF	2
$^{13}C_{12}$-1,2,3,4,6,7-HxCDD	2

Compound	Alternate Standard Amount Spiked ng
$^{13}C_{12}$-1,3,6,8-TCDD	2
$^{13}C_{12}$-1,3,6,8-TCDF	2

Compound	Extraction Standards Amount Spiked ng
$^{13}C_{12}$-2,3,7,8-TCDD	2
$^{13}C_{12}$-1,2,3,7,8-PeCDD	2
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	2
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	2
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	2
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	2
$^{13}C_{12}$-OCDD	4
$^{13}C_{12}$-2,3,7,8-TCDF	2
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2
$^{13}C_{12}$-2,3,4,7,8-PeCDF	2
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	2
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	2
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	2
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	2
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	2
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	2
$^{13}C_{12}$-OCDF	4

26 JAN 2005

Method 1668A spike profile

ANALYTICAL PERSPECTIVES

P5591

M1668A PCB Spike Profile

Analyte	Sampling Standards Amount Spiked (ng)
$^{13}C_{12}$-2,4,4'-TrCB (PCB-28)	2
$^{13}C_{12}$-2,3,3',5,5'-PeCB (PCB-111)	2
$^{13}C_{12}$-2,2',3,3',5,5',6-HpCB (PCB-178)	2

Compound	Injection Standards Amount Spiked ng
$^{13}C_{12}$-2,5-DiCB (PCB-9)	2
$^{13}C_{12}$-2,2',5,5'-TeCB (PCB-52)	2
$^{13}C_{12}$-2,2',4,5,5'-PeCB (PCB-101)	2
$^{13}C_{12}$-2,2',3,4,4',5'-HxCB (PCB-138)	2
$^{13}C_{12}$-2,2',3,3',4,4',5,5'-OcCB (PCB-194)	2

Compound	Extraction Standards Amount Spiked ng
$^{13}C_{12}$-2-MoCB (PCB-1)	2
$^{13}C_{12}$-4-MoCB (PCB-3)	2
$^{13}C_{12}$-2,2'-DiCB (PCB-4)	2
$^{13}C_{12}$-4,4'-DiCB (PCB-15)	2
$^{13}C_{12}$-2,2',6-TrCB (PCB-19)	2
$^{13}C_{12}$-3,4,4'-TrCB (PCB-37)	2
$^{13}C_{12}$-2,2',6,6'-TeCB (PCB-54)	2
$^{13}C_{12}$-3,4,4',5-TeCB (PCB-81)	2
$^{13}C_{12}$-3,3',4,4'-TeCB (PCB-77)	2
$^{13}C_{12}$-2,2',4,6,6'-PeCB (PCB-104)	2
$^{13}C_{12}$-2',3,4,4',5-PeCB (PCB-123)	2
$^{13}C_{12}$-2,3',4,4',5-PeCB (PCB-118)	2
$^{13}C_{12}$-2,3,4,4',5-PeCB (PCB-114)	2
$^{13}C_{12}$-2,3,3',4,4'-PeCB (PCB-105)	2
$^{13}C_{12}$-3,3',4,4',5-PeCB (PCB-126)	2
$^{13}C_{12}$-2,2',4,4',6,6'-HxCB (PCB-155)	2
$^{13}C_{12}$-2,3',4,4',5,5'-HxCB (PCB-167)	2
$^{13}C_{12}$-2,3,3',4,4',5-/2,3,3',4,4',5'-HxCB(PCB-156/157)	4
$^{13}C_{12}$-3,3',4,4',5,5'-HxCB (PCB-169)	2
$^{13}C_{12}$-2,2',3,4',5,6,6'-HpCB (PCB-188)	2
$^{13}C_{12}$-2,3,3',4,4',5,5'-HpCB (PCB-189)	2
$^{13}C_{12}$-2,2',3,3',5,5',6,6'-OcCB (PCB-202)	2
$^{13}C_{12}$-2,3,3',4,4',5,5',6-OcCB (PCB-205)	2
$^{13}C_{12}$-2,2',3,3',4,5,5',6,6'-NoCB (PCB-208)	2
$^{13}C_{12}$-2,2',3,3',4,4',5,5',6-NoCB (PCB-206)	2
$^{13}C_{12}$-2,2',3,3',4,4',5,5',6,6'-DeCB (PCB-209)	2

Exceptions to Methods

Batch CS_3 (BCS_3) - utilized for each method

With each extraction batch, we prepare and analyze a BCS_3 sample. The BCS_3 is prepared using the same spikes as the method blank and samples, but is not extracted. The BCS_3 is then analyzed at the beginning and at the end of each 12-hour analytical clock and the RRFs from the two analyses are averaged and used for quantitation. The BCS_3 combines the calibration verification and window defining/GC resolution into one analysis and is used to calibrate the instrument, establish the RRFs used for quantitation, measure GC and Mass Spectrometer resolution, and determine the retention time windows. The BCS_3 is also used to assess laboratory accuracy and precision. The RRFs obtained with the BCS_3

must meet a number of QC requirements, specifically the percent difference from the RRFs from the ICAL, and RPD between the beginning and ending BCS_3.

Analytes	% Deviation Requirement 1613B	% Deviation Requirement 1668A
A_x vs ES	±20%	±20%
ES vs JS	±30%	±50%
CS vs JS	±30%	±50%

Ax = Unlabelled Analytes
ES = Extraction Standards
JS = Injection Standards
CS = Cleanup Standards

Relative percent deviation between the beginning and ending BCS_3 must not exceed 20%.

We strongly believe that this quantitation method is superior to the historical approaches and Analytical Perspectives has demonstrated that the data produced under the BCS_3 system are more accurate than data obtained under the traditional OPR system required by Methods 1613B and 1668A.

Exceptions specific to Method 1668A

All individual congeners for which a carbon-13 labeled analog is available are quantified against that standard as per M1668A. Therefore, each of the 12 toxic congeners and the first and last homologue group eluters are quantified according to M1668A.

Quantitations of the other congeners (individual or group of co-eluting congeners) for which no carbon-13 analog are available use RRFs of isomers that are

1. Eluting closer to the target analyte,
2. Eluting in the same mass descriptor,
3. Representative of the target analyte when quantitative interferences are present.

AP's procedure adapts to special circumstances through the use of alternate standards when quantitative interferences are present. This added flexibility—a

must for such assays—optimizes the accuracy of the measurements when faced with challenging situations. A refinement of this approach has led to the development of the "Equalizer"; a custom algorithm correcting the effects of the quantitative interferences.

One other exception that AP takes to Method 1668A, are the storage conditions specified for samples and extracts. AP will store all samples under refrigeration at 4 ±2° C upon receipt at the laboratory. Any back-up or additional samples will also be held under these conditions for a period of time no less than 3 months from the release of final data to the client. Final sample extracts are stored in a refrigerator in the mass spectrometry laboratory at 4 ±2° C for a period of time no less than 6 months .

Accuracy and Precision Objectives

DATA ACCEPTANCE/REJECTION CRITERIA				
METHOD	**ES Recoveries**	**Accuracy & Precision**	**MS/MSD[a]**	**OTHER**
EPA 1613B	ES Recovery 40-135%	Batch CS_3	≤20% RPD	Blank required between calibration verification run and 1st sample.
EPA 1668A	ES Recovery 25-150%	Batch CS_3		Blank required between calibration verification run and 1st sample

a) Levels must be within curve limits

ES = Extraction Standards
RPD = Relative Percent Difference
RSD = Relative Standard Deviation
BCS_3 = Batch Control Spike

CLP-like Deliverables

1. All the information in the hard copy is on the CD. This is guarantied. The CD also contains additional details that are not readily available from the hard-copy report. For instance, the complete set of raw data for the ICAL is on the CD while the hard-copy version only contains the summary table of the ICAL. ICAL can easily be several hundred pages long. The CD also contains high-resolution color pictures of the samples, and when appropriate, pictures of observations

made during the sample handling. In case a paper copy is necessary of either the entire report or sections of it, printing from the CD will generate paper qualities that are identical to (and undistinguishable from) the photocopy of the original.

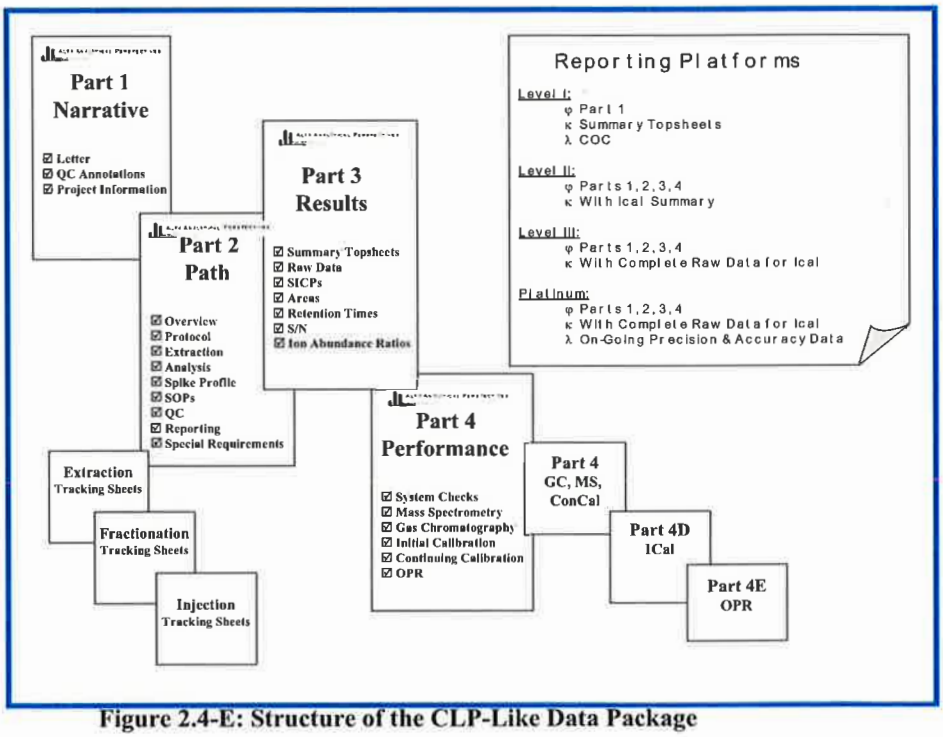
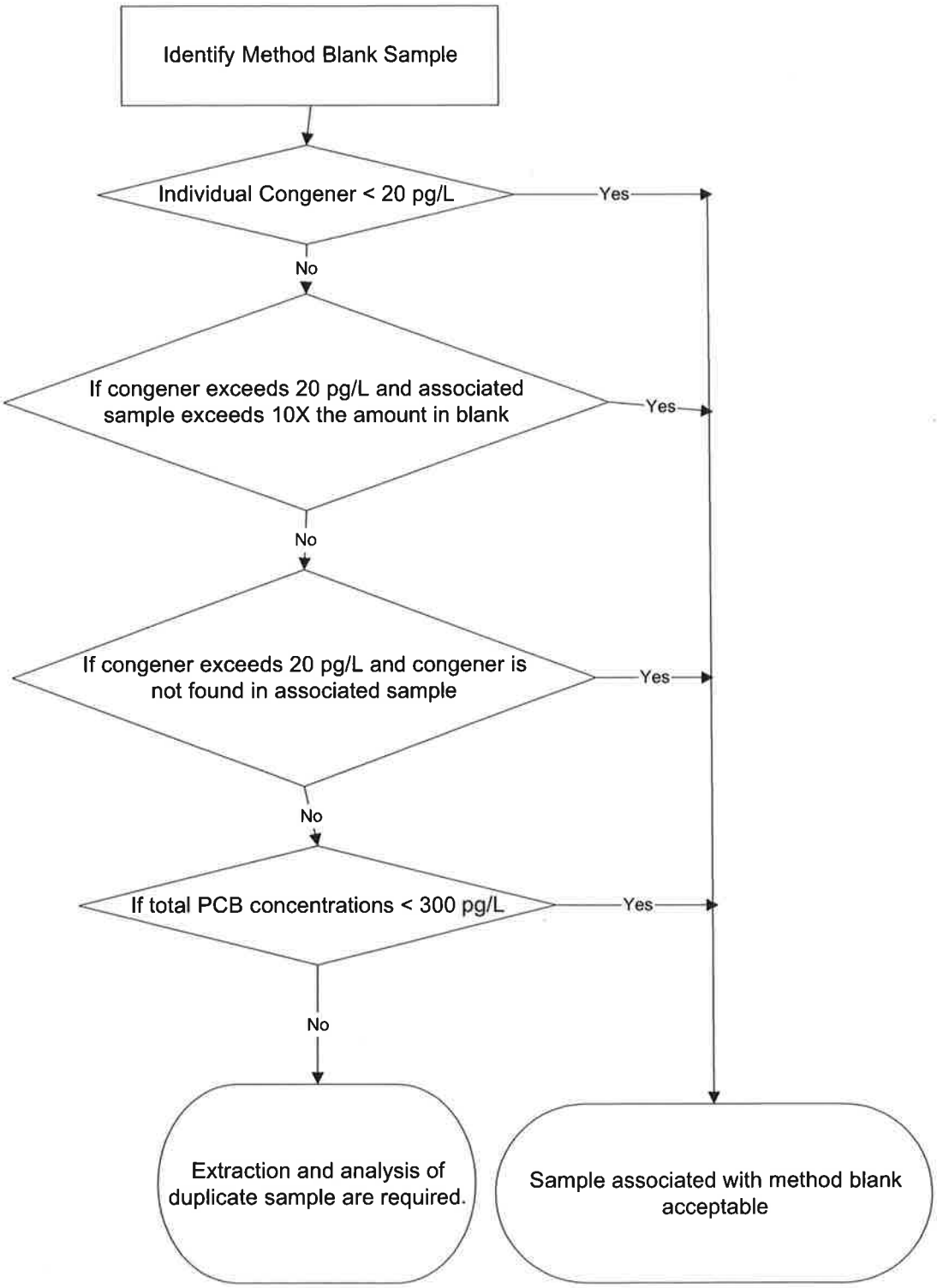


Figure 2.4-E: Structure of the CLP-Like Data Package

- Archiving

Method Blank Contamination Decision Rules



RINSATE BLANK CONTAMINATION ASSESSMENT

The rinsate blank associated with a given set of field samples should be identified and labeled utilizing the sample identification protocols defined in the DRBC letter requesting sampling for the Stage 2 PCB TMDL.

The criteria presented below are set as an interim goal for evaluating rinsate blank contamination and may be reevaluated after the initial Stage 2 data set has been collected. An overall assessment of the rinsate blank results with respect to the associated field sample and method blank results will be conducted to determine if excessive contamination occurred from poor sampling or handling procedures.

Rinsate blank contamination acceptance rules:

- An individual congener cannot exceed 40 pg/L
- If a congener exceeds 40 pg/L and the associated sample concentration exceeds 3× the amount in the blank, then no action is required
- If a congener exceeds 40 pg/L and the congener is not found in the associated field sample, then no action is required
- The total PCB concentration cannot exceed 600 pg/L

If rinsate blank levels violate the rinsate blank contamination rules the source of external contamination should be investigated and eliminated, if possible. Furthermore, resampling and reanalysis may be required at the discretion of the DRBC.

Appendix G
Signed Sampling and Analysis Plan

Sampling and Analysis Plan

Date:	June 2026	**Jacobs Engineering Group Inc.**
Client:	Enstructure DCT LLC	Two Commerce Square
Project Name:	Delaware Container Terminal- a Walsh/Soletanche Bachy International Joint Venture in contract with Enstructure	2001 Market Street th Floor, Suite 900 Philadelphia, PA 19103 T +1.215.569.2900 F +1.215.569.5963 www.jacobs.com
State Permit No.:	HW31B04	
EPA ID No.:	DED000800284	
Project No.:	D3958901	
Attention:	Katie Faulkner	Diamond State Port Corporation
Company:	State of Delaware DNREC-RS	1 Hausel Road Wilmington, Delaware 19801
Prepared By:	Jacobs On behalf of: Diamond State Port Corporation	New Castle County
Document No.:	251223090056_d81747ef	
Copies To:	Walsh: Brian Midlick and Andrew Saunders Enstructure: Diego Lopez and John Reece DSPC: Brian Devine	

Contents

1. Introduction 3

1.1 Construction Phasing 5

2. Quality Assurance Project Plan 5

2.1 Concurrence and Approval 5

2.1.1 Project/Operations Manager 5

2.1.2 Project Quality Assurance Manager 6

2.1.3 EPA Operations Manager 6

2.1.4 EPA Region 3 Delegated Approving Official - Quality Assurance Manager or Designee 6

2.2 Contents, Document Format, and Document Control 6

2.3 Project Purpose, Problem Definition, and Background 6

2.4 Data Generation and Acquisition 7

2.4.1 Sampling Handling/Custody 7

2.4.2 Quality Control 9

2.4.3 Instrument/Equipment Testing/Inspection/Maintenance 10

2.4.4 Data Management 11

2.5 Assessment and Oversight 12
2.5.1 Assessment and Response Actions 12
2.5.2 Reports to Management 13
2.6 Data Validation and Usability 13
2.6.1 Data Review, Verification, and Validation 13
2.6.2 Verification and Validation Methods 13
2.6.3 Reconciliation with User Requirements 14
2.7 Distribution List 15
2.8 Project and Communications Organization 16
2.9 Personnel Training/Certification 16
3. Field Sampling Plan 17
3.1 Sampling Techniques and Protocols 18
3.2 Data Quality Objectives 18
3.3 Sampling Methodology 18
3.3.1 Analytical Testing 19
4. Data Management Plan 19
5. Supplemental Field Investigation Work Plan 19
5.1 Sampling Techniques and Protocols 20
5.2 Data Quality Objectives 20
5.3 Sampling Methodology 20
5.3.1 SWMUs 4, 5, 6A, 6B, 6C, 6D, and 20 20
5.3.2 Unanticipated Conditions 20
5.3.3 Analytical Testing 21
6. Schedule 21
7. References 22

Attachments

Attachment 1 DNREC SOPs
Attachment 2 DNREC Soil Reuse Guidance May 2023

Tables

Table 1. Organization Chart 7
Table 2. Sample Containers, Preservation, and Holding Times 8
Table 3. Field Quality Control Requirements 10
Table 4. Preventive Maintenance - Field Equipment 10
Table 5. Calibration and Corrective Action - Field Equipment 10

Table 6. QAPP Distribution List and Project Roles 15
Table 7. Trainings 17
Table 8. Site Redevelopment Activity Phases 21

Figures

Figure 1. Site Location Map 4
Figure 2. Project and Communications Organization 16

1. Introduction

The following sampling and analysis plan (SAP) describes the sampling protocols and analyses for characterization of materials during redevelopment of the Former Chemours Edge Moor Plant (site) at 104 Hay Road near Edgemoor, New Castle County, Delaware. Figure 1 presents the site location.

The site is a Resource Conservation and Recovery Act (RCRA) site that is regulated under Delaware's Regulations Governing Hazardous Waste and Regulations Governing Hazardous Substance Cleanup. This SAP is prepared in accordance with RCRA guidance (U.S. Environmental Protection Agency [EPA] 2011) for the Corrective Measures Implementation Work Plan (CMI Work Plan) (Jacobs 2026b).

This SAP is proposed as a supplement to the Excavation Materials Handling Contingency Plan (EMHCP) and the CMI Work Plan (Jacobs 2026a, 2026b) and will be implemented if construction activities encounter excavated materials exhibiting different environmental conditions than what was previously identified or the presence of buried wastes. If conditions are observed during soil-disturbing activities that are indicative of buried wastes or environmental concerns (e.g., solid wastes, titanium dioxide pigments, waste solvents, sulfate sludge, petroleum products, and iron-rich wastes), sampling will be required in accordance with this SAP. In accordance with the EMHCP, disturbance/movement of environmentally impacted materials within Solid Waste Management Units (SWMUs) 4, 5, 6A, 6B, 6C, 6D, and 20 also may be sampled.

Materials will be tested to evaluate environmental characteristics as they pertain to additional material handling requirements and to assess potential for reuse of materials onsite. Jacobs environmental personnel will be onsite during soil-disturbing activities in the SWMUs to monitor and sample environmentally impacted materials. Sampling will be completed in accordance with Section 5 of this SAP.

Figure 1. Site Location Map



Sources: 01/2023: Duffield Associates - Esri, HERE, Garmin, U.S. Geological Survey, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC.

1.1 Construction Phasing

The redevelopment of the site as a container port involves redevelopment of the former Chemours Edge Moor Plant into a containerized cargo port. Redevelopment activities will be performed in two phases, as outlined in additional detail in the management plan portion of the CMI Work Plan (Jacobs 2026b).

The construction phasing is as follows:

- Phase 1 - Partial Build
- Phase 2 - Full Build

In Phase 1, SWMUs 4, 5, and 20 are anticipated to be disturbed and will be handled in accordance with the EMHCP (Jacobs 2026a) and this SAP. In addition, SWMU 1 will be partially disturbed during Phase 1 and handled in accordance with the EMHCP, but a prior Department of Natural Resources and Environmental Control (DNREC)-approved SAP from 2022 for SWMUs 1 and 2, as well as any disturbed material at these areas, will be handled under that plan.

In Phase 2, all SWMUs will be covered with pavement, with the exception of SWMU 2 (the lagoon), and will meet the corrective measure requirements outlined in the Final Decision and Response to Comments and additional requirements designated by DNREC. Additionally, a Uniform Environmental Covenant Act covenant will be executed in accordance with the Final Decision and Response to Comments. SWMUs 6A, 6B, 6C, and 6D will continue to have a RCRA cap upon reconfiguration, and grading in the area likely will include additional cover and pavement with bituminous concrete. Site grading during Phase 2 is anticipated to include minor site grading activities and involve movement of material previously disturbed in Phase 1.

2. Quality Assurance Project Plan

This section details the Quality Assurance Project Plan (QAPP) elements included as part of this SAP in accordance with the standard set forth by the EPA.

2.1 Concurrence and Approval

Signatures for concurrence and approval from individuals responsible for implementing this SAP/QAPP are presented in this section.

2.1.1 Project/Operations Manager

Louis Kaminski

Digitally signed by Louis Kaminski
DN: cn=Louis Kaminski, c=US, email=louis.kaminski@jacobs.com
Date: 2026.06.17 10:52:31 -04'00'

Signature

Louis Kaminski, Jacobs

Date

2.1.2 Project Quality Assurance Manager

Sigmond S Rutkowski III

Digitally signed by Sigmond S Rutkowski III
DN: CN=Sigmond S Rutkowski III, dnQualifier=A01410D0000019DE4A2450400033A57, O=Unaffiliated, C=US
Date: 2026.06.26 15:11:16-04'00'

Signature
Sonny Rutkowski, Jacobs

Date

2.1.3 EPA Region 3 Delegated Approving Official - Quality Assurance Manager or Designee

BRUCE SALYER

Digitally signed by BRUCE SALYER
Date: 2026.06.16 14:59:32 -04'00'

Signature
Bruce Salyer, EPA Region 3
Laboratory Services and Applied Sciences Division

Date

2.2 Contents, Document Format, and Document Control

This QAPP was developed in accordance with the EPA QAPP standard. The order of the elements in this QAPP follows the standard, as shown in the Contents. The QAPP also is presented in accordance with the EPA Region 3 *Quality Management Plan* (EPA, Region 3 2020).

2.3 Project Purpose, Problem Definition, and Background

The site is the former location of the Chemours Edge Moor Plant in New Castle County, Delaware, which operated as a titanium dioxide production facility through 2016 before being demolished in 2017. Redevelopment of the site by Diamond State Port Corporation (DSPC) into a containerized cargo port will be performed in phases further outlined in the CMI Work Plan (Jacobs 2026b).

The site is regulated under RCRA and Delaware's regulations governing hazardous waste and hazardous substance cleanup. Based on the findings of investigations to assess the risks it might pose to human health and the environment, the DNREC-Remediation Section (RS) found that active corrective measures are not needed and issued a Hazardous Waste Corrective Action Permit to DSPC for the implementation of corrective measures and post-closure care at the site. The Hazardous Waste Corrective Action Permit includes requirements for asphalt capping, a contaminated materials management plan during construction, the continuation of groundwater monitoring in conjunction with a post-closure care plan, and the establishment of an environmental covenant.

This SAP, prepared in accordance with RCRA guidance (EPA 2011) for the CMI Work Plan (Jacobs 2026b), is a supplement to the EMHCP (Jacobs 2026a) and will be implemented if construction activities during redevelopment encounter excavated materials requiring characterization. This includes materials exhibiting different environmental conditions than those previously identified or the presence of buried wastes. If conditions are observed during soil-disturbing activities that are indicative of buried wastes or environmental concerns (olfactory or visual indicators), sampling will be required in accordance with this SAP. The disturbance or movement of environmentally impacted materials within SWMUs 4, 5, 6A, 6B, 6C,

6D, and 20 may be sampled as described in the EMHCP. Materials will be tested to evaluate additional material handling requirements and assess the potential for reuse onsite. Sampling will be completed in accordance with Section 5 of this SAP.

The organizational chart in Table 1 identifies the individuals responsible for this SAP/QAPP. Certain project members may be responsible for more than one of the project functions.

Table 1. Organization Chart

Role	Personnel
Overall Project Coordination	Sonny Rutkowski +1 215.845.6924 Sonny.Rutkowski@jacobs.com
Project Manager	Louis Kaminski
Overall QA Sampling QC	Sonny Rutkowski/Jeremy Bishop
OEP	TBD
Systems Performance Sampling Operations Field Performance Auditor (Field Leader)	David Perez Colominas David.Colominas@iacobs.com
Laboratory Project Manager Laboratory Analysis Laboratory QC	Eurofins Lancaster Labs, Inc.
Data Processing QC	TBD
Data Quality Review	TBD

OEP = Onsite Environmental Personnel
QA = quality assurance
QC = quality control
TBD = to be determined

2.4 Data Generation and Acquisition

Subsections 2.4.1 through 2.4.4 describe data generation and acquisition.

2.4.1 Sampling Handling/Custody

Sample labels will be securely affixed to each sample container. The sample container types, preservation times, and holding information for analyses that could potentially be requested are provided in Table 2. Sample labels will clearly identify the following information:

- Sample name and identification number
- Site name
- Date and time the sample was collected
- Sample preservation method
- Analyses requested

Table 2. Sample Containers, Preservation, and Holding Times

Parameter	EPA Method	Matrix	Minimum Sample Volume[a]	Sample Container	Sample Preservation	Technical Holding Time
TCL VOCs	8260D	Water	3 x 40 mL	40 mL-glass with Teflon-faced cap	HCl to pH<2[b], zero headspace, 4°C	14 days
		Soil, Sediment	5 grams	40-mL amber glass with Teflon-faced cap	10-mL methanol, 4°C	14 days
TCL SVOCs	8270E	Water	1,000 mL	1-liter amber glass with Teflon-faced cap	Cool to 4°C	7 days to extract, 40 days from extraction
		Soil, Sediment	8 oz	8-oz amber glass	Cool to 4°C	14 days to extract, 40 days from extraction
PCB congeners	1668	Water	2x1-L bottles	2X 1L amber glass with Teflon-faced cap	Cool to 4°C	365 days
		Soil, Sediment	8 oz	8-oz amber glass	Cool to 4°C	365 days
TAL inorganics, mercury (dissolved)	6020B, 7471B	Water	1,000 mL	1,000-mL plastic	HNO_3 to pH<2, Cool to 4°C	6 months, except Hg 28 days
	6020B, 7471B & 9012B	Soil, Sediment	8 oz	Plastic or glass	Cool to 4°C	6 months, except Hg 28 days, CN 14 days
TAL inorganics, mercury (total)	6020B, 7471B	Water	1,000 mL	1,000-mL plastic	Cool to 4°C	6 months, except Hg 28 days
	6020B, 7471B & 9012B	Soil, Sediment	8 oz	Plastic or glass	Cool to 4°C	6 months, except Hg 28 days, CN 14 days

[a] Triple volume is required for matrix spike/matrix spike duplicates analysis, for TCL VOCs this will be 9 x 40 mL HCl preserved zero headspace vials.
[b] Preserved vials will be provided by the laboratory, and preservation will be checked by the laboratory following sample receipt.

°C = degree(s) Celsius
CN = cyanide
HCl = hydrochloric acid
Hg = mercury
HNO3 = nitric acid
mL = milliliter(s)
oz = ounce(s)
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TCL = Target Compound List

TAL = Target Analyte List VOC = volatile organic compound

All samples will be maintained in accordance with the following chain-of-custody procedures. A sample is under custody when it satisfies the following conditions:

- The sample is in a person's physical possession.
- The sample is in view of that person after they have taken possession.
- The sample is secured by that person so no one can tamper with the sample.
- The sample is secured by that person in an area that is accessible only by authorized personnel.

A chain-of-custody record must be maintained from the time of sample collection until final deposition. Transfers of custody will be noted and signed for with a copy of the record being kept for each individual that endorsed it. At minimum, the chain-of-custody record will include the following information:

- Sample identification number
- Sample location
- Sample collection date and time
- Sample information (e.g., matrix, number of bottles collected, container type)
- Names and signatures of sampler
- Signatures of all individuals who have had custody of samples

When preparing sample containers for transportation, they will be sealed securely. Samples placed in the transport container (e.g., coolers) will be packed in a manner intended to prevent breakage. All sample transport containers will contain ice to maintain a temperature of 4°C. A temperature blank (i.e., container of water) will be added to each transport container and will be used to document the temperature of the samples within the transport container.

2.4.2 Quality Control

The following QA/QC samples will be collected per batch of 20 samples for media being sampled in accordance with the following EPA QA/QC guidance:

- One blind duplicate sample
- One site-specific matrix spike sample
- One matrix spike duplicate sample.

The QA/QC samples will be subjected to the same analyses as the parent samples.

For each day of sampling, one equipment blank will be collected from the equipment reused to collect samples. If no reusable equipment has been used within 1 day of sampling, a field blank will be collected. The equipment blank sample or field blank sample will be analyzed for the same analyses as the media samples associated with the equipment being used. One equipment or field blank will be collected for groundwater/surface water (liquid media), and one equipment or field blank will be collected for sediment/soil (solid media) each day of sample collection. The equipment blank is a sample collected by pouring deionized water overtop of reusable equipment that has been decontaminated using deionized water and Alconox soap to verify equipment cleaning methods are not impacting data usability in a negative way. The field blank sample is collected by exposing either deionized water or sand provided by the laboratory to the field conditions at the location where sampling occurs to verify conditions in the field are not negatively impacting data usability.

One trip blank will be collected per day of sampling and analyzed for TCL VOCs.

The field QC requirements outlined in Table 3 will be followed.

Table 3. Field Quality Control Requirements

QC Sample	Frequency	Acceptance Criteria	Corrective Action
Trip blank	One per trip with samples for analysis of VOCs	No reported concentrations exceeding the quantitation limit	Deviation noted on report
Blind duplicate	One per 20 samples per matrix	30% RPD for aqueous 50% RPD for solids	Deviation noted on report
Matrix spike/matrix spike duplicate[131]	One per 20 samples per matrix	All analytes within laboratory defined limits per method	Deviation noted on report
Equipment rinsate blank	One per 20 samples per matrix per equipment type per decontamination event or one per day, whichever is more frequent	No reported concentrations exceeding the quantitation limit	Review sampling handling and decontamination procedures; alter procedures, as necessary
Cooler temperature blank	One per cooler	4 + 4°C	Review sampling handling and decontamination procedures; alter procedures, as necessary

[a] Sufficient sample will be collected to allow the laboratory to perform this analysis.

RPD = relative percent difference

2.4.3 Instrument/Equipment Testing/Inspection/Maintenance

The preventive maintenance information that will be used for field equipment is summarized in Table 4. If the acceptance criteria are not met, the corrective action presented in Table 5 will be implemented.

Table 4. Preventive Maintenance - Field Equipment

Instrument	Activity	Frequency
PID	Clean lamp and unit	Monthly or as needed when unit shows evidence of problems

PID = photoionization detector

Table 5. Calibration and Corrective Action - Field Equipment

Instrument	Calibration Standards	Frequency Initial and Continuing Calibration	Acceptance Criteria	Corrective Action
PID	Calibration for VOCs with 100 parts per million isobutylene standard and fresh air calibration	At least once daily, more if response is slow	+2%	Rezero and recalibrate

Field equipment used onsite will be maintained in accordance with the respective instrument manufacturer's operating instructions. Field equipment will be calibrated following the procedures found in Table 5. If the acceptance criteria are not met, the corrective actions listed in Table 5 will be implemented.

2.4.4 Data Management

This subsection discusses various methods of data management and documentation as they pertain to this SAP/QAPP.

2.4.4.1 Sample Documentation

Documents will be legibly written in ink. Corrections or revisions to documentation will be made by lining through the original entry and initialing and dating any changes. To reiterate these requirements, the following subsections outline sample documentation procedures, which will be employed when conducting this project.

2.4.4.2 Field Logbook

Field logbook entries will document the following:

- Site name and project number
- Names of personnel and subcontractors onsite
- Dates and times of entries
- Descriptions of site activities and observations
- Noteworthy events and discussions
- Weather conditions
- Identification and description of samples and locations
- Dates and times of sample collections
- Records of photographs
- Site sketches
- Relevant and appropriate information from field data sheets and sample labels

2.4.43 Standard Operating Procedures

Standard operating procedures (SOPs) will be followed. The applicable SOPs are listed as follows, as well as in Sections 3.1 and 5.1:

- SOP for Surface Soil Sampling
- SOP for Shallow Soil Sampling
- SOP for Deep Soil Sampling
- SOP for Sediment Sampling
- SOP for Groundwater Sampling
- SOP for Surface Water Sampling
- SOP for QA/QC Sampling

The full SOPs are provided in Attachment 1.

Field data records will include real-time measurements and observations that will be recorded in project logbooks, field data records, or in similar types of record keeping books. Field data records will be organized into standard formats whenever possible.

2.4.4.4 Analytical Data Deliverable Requirements

At minimum, the analytical data deliverable package for data will include the following:

- Sample documentation (location, date, and time of collection and analysis)

- Chain(s)-of-custody
- Initial and continuing calibration
- Determination and documentation of detection Limits
- Analyte(s) identification
- Analyte(s) quantitation
- QC blanks
- QC sample results

In addition to the Laboratory report, the laboratory will provide an electronic data deliverable (EDD) in the Delaware DNREC EQuIS compliant format. Reference values and requirements for the DNREC EDD are available at the following hyperlink: EQuIS Data Submittal - DNREC.

2.4.4.5 Data Management

Data will be managed and maintained in an organized manner to minimize data interpretation errors and omissions. A field logbook will be used to compile information collected during the field work portion of the project and will include the following information:

- Sampling conditions
- Observations
- Deviations from SOPs, SAP, and QAPP
- Physical parameter data as required during sampling

When applicable, sampling forms will be used to document sampling activities. The data reports will be reviewed by the project QA officer to ensure chain-of-custody documents are completed correctly, analyses were performed within holding Limits, and QA/QC samples meet acceptance criteria.

2.5 Assessment and Oversight

Subsections 2.5.1 and 2.5.2 detail protocols pertaining to assessment and oversight.

2.5.1 Assessment and Response Actions

This subsection discusses assessment and response actions as they pertain to this SAP/QAPP.

2.5.1.1 Field Activities

The OEP and Field Leader are responsible for verifying QC procedures are followed. If problems develop that might cause a specific QA objective not to be met, the OEP will notify the Field Leader and Project Manager and discuss corrective options. The Field Leader and Project Manager will decide on the corrective action. Changes in field procedures will be documented in the field Logbook, reported to the Project Manager, and discussed in the final report.

Because of the limited duration and quantity of sampling for this project, no field system audit is planned.

2.5.1.2 Laboratory Activities

The Laboratory Project Manager will verify QC procedures are followed and results of analyses of the QC samples are within the acceptance criteria. Corrective action in the Laboratory will be handled by the Laboratory QA Coordinator. Corrective actions are implemented when accuracy, precision, calibration, or

other internal method-specific QA criteria are not met. Changes in Laboratory procedures will be documented in the Laboratory report.

Data generated concurrently during the time instrument calibration or other QA criteria are not met will be evaluated for usability. If the deficiency does not impair the usability of the results, data will be reported, and the deficiency will be addressed in the case narrative. If sample results are impaired, the Laboratory Project Manager will be notified, and appropriate corrective action (e.g., reanalysis) will be taken.

2.5.2 Reports to Management

The Project Scientist/Engineer will provide the Project Manager with daily field progress updates. The Project Manager will be notified promptly about field QA situations requiring corrective action, changes in the QAPP, and changes to site-specific SAPs.

Upon request of the Project Manager, the Laboratory QA Coordinator will provide reports that summarize QA activities, including results of performance audits and system audits. Summaries of corrective action and recommendations for revisions of Laboratory procedures will be included in the report. The laboratory will notify the Project Manager promptly when laboratory QA issues requiring corrective action develop.

The laboratory will provide the Project Scientist/Engineer and the Project Manager with data deliverable report packages in electronic (PDF) format, analytical numeric results in Microsoft Excel format, and a DNREC-compliant EQuIS EDD. The Laboratory will not provide hard copies of the data deliverable reports.

The data deliverable reports will summarize the deviations from approved protocols and significant data findings in the case narratives. Analytical reports will be submitted as separate documents and transmitted in electronic format.

2.6 Data Validation and Usability

Subsections 2.6.1 through 2.6.3 detail data validation and usability.

2.6.1 Data Review, Verification, and Validation

Following completion of field activities, field notes, boring Logs, field equipment calibration results, and chains-of-custody will be reviewed for clarity and completeness.

2.6.2 Verification and Validation Methods

Laboratory data will be reviewed for accuracy, completeness, and usability. Because the laboratory results will be compared to DNREC-RS Screening and Reporting Levels, and corrective measures are overseen by DNREC-RS, the review of laboratory data will follow DNREC-RS procedures and guidance as described in the DNREC Hazardous Waste Management QAPP (October 2020).

As stated in the SOPs for Chemical Analytical Programs (DNREC-RS 2023), "it is essential that each data report be reviewed for accuracy and completeness." This statement includes the following items:

- Analysis results will be compared to any past data results and any available screening data to verify precision and accuracy. A direct comparison of field screening data and the fixed laboratory data must be included in all reports. Any inconsistencies must be investigated. This investigation will include confirmation of the analytical results from the fixed Laboratory.

- Any non-conformance issue reported by the laboratory will be reviewed for potential impact on the data.
- For a comprehensive evaluation of the analytical chemistry data, refer to Section 9.1 of the SOPs for Chemical Analytical Programs (DNREC-RS 2023) to verify all pertinent information has been provided by the laboratory.
- Given the required data review described in this section regarding data validation, no other validation process will be required. The methods described in this memorandum will be applied to laboratory data generated from the former Chemours Edge Moor Plant (i.e., the subject of this SAP).

2.6.3 Reconciliation with User Requirements

This subsection describes reconciliation with user requirements.

2.6.3.1 Accuracy

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Analytical accuracy is evaluated by comparing the results from the analysis of surrogates, matrix spikes, or check standards to their known values. Every sample analyzed for organics is spiked with compounds (surrogates), which behave chemically and physically like targeted compounds. The percent recoveries of the surrogates from all samples and blanks are reported as a measure of the method accuracy. Percent recovery of matrix spike compounds or check standards also can be used to assess accuracy for most analytes.

The formula used to calculate accuracy for the laboratory control sample is as follows:

$$Accuracy = \% Recovery = (AT/AF) \times 100$$

Where:

AT = total concentration of the analyte measured or recovered
AF = concentration of the analyte spiked

When calculating accuracy in the matrix spike analysis, a correction for background concentration found in the unspiked sample must be made. The formula for this is as follows:

$$Accuracy = \% Recovery = (AT/AO)/AF \times 100$$

Where:

AT = total concentration of the analyte measured or recovered
AF = concentration of the analyte spiked
AO = unspiked concentration of the analyte

Acceptable ranges for spike recovery and duplicate RPD are specified by the methods used for analysis. The referenced EPA analytical methods cite control limits or give guidance on how to establish control limits. Control limits typically are generated from multiple analyses and inter-laboratory comparison studies. Control limits are method-, compound-, and matrix-dependent.

2.6.3.2 Precision

Precision is defined as a measure of mutual agreement among individual measurements of the same property. Precision is measured by analyzing field and laboratory duplicates and laboratory QC samples.

The RPD and standard deviation of duplication measurements can be used to evaluate analytical precision.

Precision is expressed using the following formula:

$$RPD = (C1 - C2)\ (C1 - C2)/2 \times 100$$

Where:

RPC = Relative percent difference
C1 = Value of original sample
C2 = Value of duplicate sample

Both spike recovery and RPD can be reported from the analysis of duplicate samples.

2.63.3 Completeness

Completeness is a measure of how well the amount of sample data collected meets the needs of the sampling program and is quantified as the relative number of analytical data points that meet the acceptance criteria. Completeness is defined as a comparison between the actual number of usable data points and expected number of points, expressed as a percentage.

The QA objectives for completeness will be based on laboratory QA protocols. The ability to meet or exceed this completeness objective is dependent on the nature of samples submitted for analysis. If data cannot be reported without qualifications, project completion goals may still be met if the qualified data (i.e., data of known quality, even if not perfect) are suitable for specified project goals.

Access to various areas or media and unanticipated difficulties with sample collection affect field data completeness. For example, unsafe site conditions may reduce the number of soil samples that can be collected, which in turn affects completeness. The general goal for completeness is 90%, and the ability to exceed this goal is dependent on the applicability of the analytical methods to the sample matrices analyzed.

2.7 Distribution List

The following individuals in Table 6 will receive a copy of this QAPP and any subsequent revisions. A complete copy of the original version and all revisions of the QAPP shall be maintained in the organization's files by the Project Manager and made available to approval authorities upon request.

Table 6. QAPP Distribution List and Project Roles

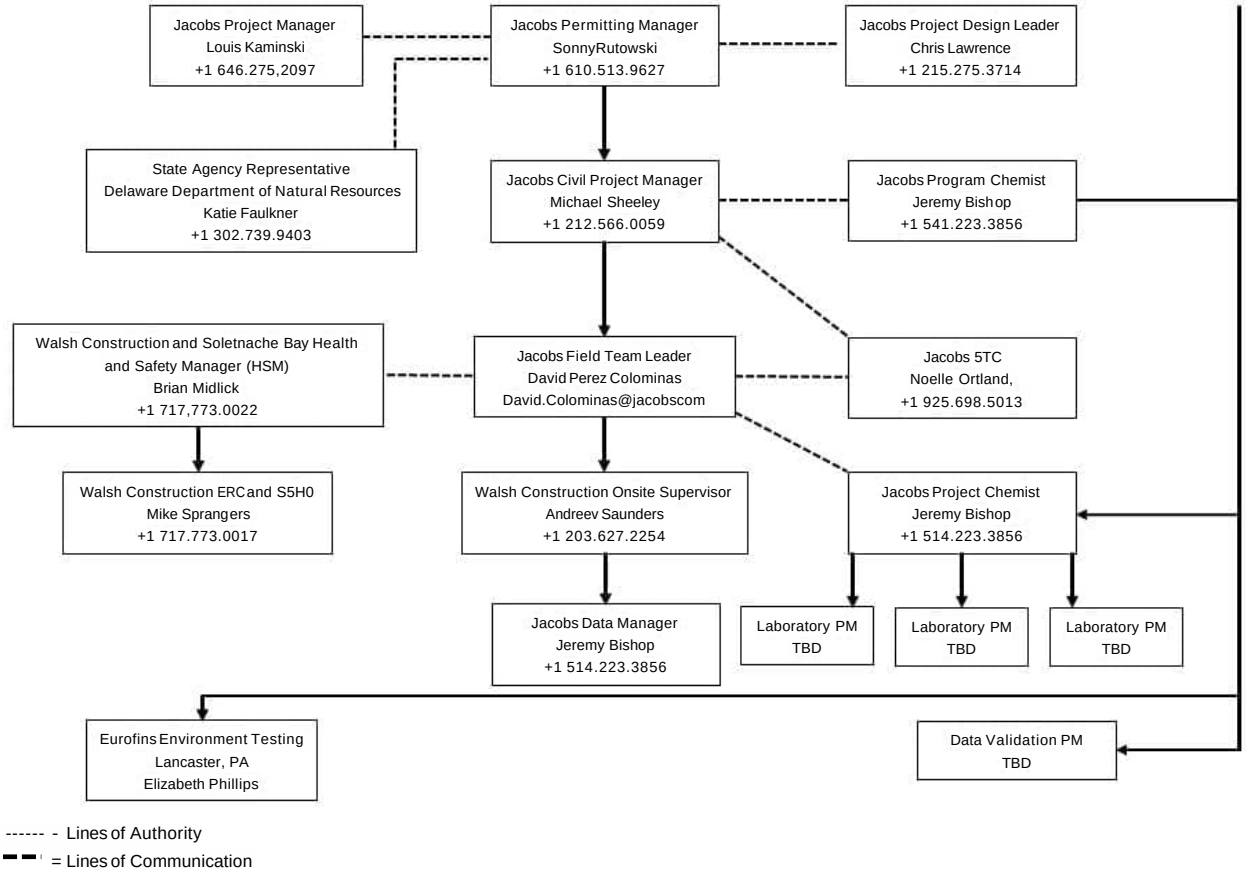
Name	Project Role	Organizational Affiliation
Quinton Ullrich	Remedial Project Manager	EPA Region 3
Bruce Salyer	Delegated Approving Official	EPA Region 3 Laboratory Services and Applied Sciences Division
Katie Faulkner	Hydrologist II Remediation Section Division of Waste & Hazardous Substances	Delaware DNREC
Louis Kaminski	Project Manager	Jacobs

Name	Project Role	Organizational Affiliation
Jeremy Bishop	Scientist/Chemist	Jacobs
Sonny Rutkowski	Permitting Coordinator/Project Manager	Jacobs
Brian Midlick	Contractor	Walsh-Soletanche Bachy JV
Elizabeth Phillips	Laboratory Sample Coordinator	Eurofins Testing America-Lancaster

2.8 Project and Communications Organization

Figure 2 provides the project and communications organization chart.

Figure 2. Project and Communications Organization



2.9 Personnel Training/Certification

The Project Manager is responsible for making sure all scientists involved with data generation have the necessary training to successfully complete their tasks and functions. The Project Manager will document attendance at any training sessions. Certain key individuals may be responsible for more than one of the aforementioned project functions. The project organization chart provides sufficient evidence that the lines of authority for all personnel are appropriate to accomplish the QA objectives of this project. All personnel have the necessary education, training, technical knowledge, and experience for their assigned

functions. Records on the relevant qualifications, training, skills, and experience of the technical personnel are available upon request.

Table 7. Trainings

Name/Project Function	Title/Description	Responsibilities
Sonny Rutkowski	Jacobs Permitting Coordinator	Responsible for overall coordination of permits and verifying compliance with all requirements and conditions.
Louis Kaminski/Project Manager	Jacobs Project Manager	Responsible for site remedial actions and oversight of project operations staff.
Jeremy Bishop/Scientist	Jacobs Scientist/Chemist	Responsible for data management and verifying QC procedures are followed.
Brian Midlick/Contractor	Walsh Contractor	Responsible for onsite construction and safety operations.
Noelle Ortland	Environmental Manager/Jacobs Senior Technical Consultant	Responsible for management of compliance with regulations and the SAP.

3. Field Sampling Plan

Handling of materials will occur in accordance with the EMHCP (Jacobs 2026a)during site redevelopment activities.

If conditions observed during construction activities indicate the need for sampling, sampling will be completed in accordance with Section 5 of this SAP. The intent of this SAP is to supplement guidance in the EMHCP and address sampling and analysis protocols for unanticipated environmental conditions and wastes encountered during construction activities. The purpose of this sampling is to verify the environmental character to determine suitability of the materials for onsite reuse.

Sampling may occur during construction activities in SWMUs 4, 5, 6A, 6B, 6C, 6D, and 20 because of previous identification of buried waste materials and will defer to this sampling plan for guidance.

A separate investigation of SWMUs 1 and 2 was completed, and results are included in a March 2024 data report discussing SWMUs 1 and 2. That data report, in addition to the prior DNREC-approved SAP from 2022 for SWMUs 1 and 2, outlines how materials will be addressed in those areas. No further action is expected before construction begins.

Groundwater is not anticipated to be encountered during redevelopment activities. Based on current proposed site grading, cutting of material is not anticipated to exceed the depth to the estimated piezometric surface of the groundwater table Located in deep lenses, which is between 10 and 12 feet below ground surface.

3.1 Sampling Techniques and Protocols

The following applicable DNREC SOPs have been identified that will be followed based on the type of sampling required/anticipated:

- SOP for Surface Soil Sampling
- SOP for Shallow Soil Sampling
- SOP for Deep Soil Sampling
- SOP for Sediment Sampling
- SOP for Groundwater Sampling
- SOP for Surface Water Sampling
- SOP for QA/QC Sampling

3.2 Data Quality Objectives

Soils and sediments will be assessed as needed for the following reasons:

- Based on field identification of environmental concerns (e.g., staining, odors) not previously identified or the presence of wastes. Sampling will be performed to characterize potential human health risk and risks to the environment that would require changes in material management decisions.

  As referenced in the EMHCP (Jacobs 2026a), a human health risk analysis was completed by Parsons in 2013 for contaminants of concern (COCs) in soils that required further risk assessments. The 2013 Parsons assessment calculated total cancer risk and total Hazard Index for industrial worker and construction worker exposures to COCs in soils located in SWMUs 1, 3, 4, 5, 18, 20, 23, and 27. Results of this assessment were compared to DNREC's acceptable risk levels. The results of the assessment indicated cancer risks in the designated SWMUs are less than the regulatory threshold for cancer and non-cancer risks and would not pose unacceptable risks for workers. In addition, following soil removal and placement in the SWMUs, an asphalt cap will be installed, further eliminating future risk to onsite workers and infiltration of rainwater into the subsurface soil.

- Soil analyzed in accordance with Section 5.3 of this SAP and the EMHCP that does not meet the onsite reuse criteria will be designated for offsite disposal and managed accordingly.

- Soil that meets screening criteria for onsite use will be utilized in accordance with the reuse decision matrix provided in Attachment 2 of the EMHCP.

Groundwater and surface water sampling is not anticipated. However, if groundwater or surface water is encountered that presents potential for environmental concern (e.g., sheen, odor) and needs management during construction activities, this SAP will be followed to verify proper procedures are followed.

3.3 Sampling Methodology

Handling of materials will occur in accordance with the EMHCP during site redevelopment activities.

Soils are anticipated to be the most likely type of media encountered during site redevelopment activities. Sampling of soils will occur if conditions indicating potential environmental concerns are apparent to an environmental professional based on color, odor, texture, and volatility of materials or the suspected presence of waste material. If sampling is necessary, analyses will be selected based on the suggested environmental concern(s). Soil sampling will be performed in accordance with the SOPs provided by DNREC (Attachment 1).

Site materials will remain onsite whenever possible. However, should transportation of site materials to an offsite disposal facility be needed, sampling will follow DNREC' Soil Reuse Policy (May 2023) provided in Attachment 2. If material needs to be characterized for disposal purposes, materials will be analyzed for the parameters designated by the potential disposal facility.

Investigation-derived wastes will be managed in accordance with the QAPP presented in Section 2 of this SAP.

3.3.1 Analytical Testing

Analytical testing will be decided by the project team based on field observations and professional judgment. The proposed testing scheme will be submitted to DNREC-RS for review, comment, and approval prior to sampling.

4. Data Management Plan

Data management strategies have been discussed as part of the QAPP in Section 2.4.4. Data validation and usability will be evaluated as described in Section 2.6. The following steps will be taken upon submission of samples to the laboratory and receipt of laboratory analytic results:

- Review laboratory confirmation files.
- Keep records of all documents from the laboratory.
- Review laboratory results for completeness (i.e., Do results include correct analyses, sample names/IDs/collection times are consistent with chain-of-custody?).
- Review laboratory results for correctness (i.e., Do check laboratory qualifiers and case narratives align with laboratory reported results for accuracy and precision?).
- Compile results into summary tables for ease of viewing by report readers.
- Provide summary tables of QA/QC findings during review of reported analytical results.
- Provide applicable footnotes for tables to aid report reader understanding.
- Clarify the data are being provided as part of the site field sampling and should only be viewed in that context.

Once data have been checked for the aforementioned requirements, Jacobs will compare the data to applicable standards when necessary. Values greater than applicable standards will be highlighted and discussed in a brief report summarizing results. When tables are prepared, they will be reviewed for correctness and completeness before submittal to interested parties.

Data will be discussed within the report, which will be prepared by Jacobs and sent to DNREC-RS for review and approval.

5. Supplemental Field Investigation Work Plan

Sampling may occur during construction activities in SWMUs 4, 5, 6A, 6B, 6C, 6D, and 20 because of previous identification of buried waste materials. In other areas and SWMUs, if unanticipated environmental conditions are encountered during construction, materials will be sampled in situ or excavated and staged on polypropylene ("poly") sheeting for sampling. Stockpiling should be placed on poly sheeting of at least 10-milimeter thickness, with a cover that is weighed down. Stockpiles of materials

of environmental concern will be covered by poly sheeting during wet weather conditions. Sampling is not required if material does not exhibit characteristics indicative of potential environmental concern (e.g., color, PID readings, odor). Characteristics indicative of potential environmental concern may include solid wastes, titanium dioxide pigments, waste solvents, sulfate sludge, petroleum products, and iron-rich wastes. If such environmental characteristics are identified, DNREC-RS will be notified.

5.1 Sampling Techniques and Protocols

The following applicable DNREC SOPs will be adhered to and are provided in Attachment 1:

- SOP for Surface Soil Sampling
- SOP for Shallow Soil Sampling
- SOP for Deep Soil Sampling
- SOP for Sediment Sampling
- SOP for QA/QC Sampling

5.2 Data Quality Objectives

Site grading for use as a containerized cargo port is expected to require grading (cutting) surface elevations in RCRA SWMU areas 4, 5, 6A, 6B, 6C, 6D, and 20. Before initiating grading in these areas, samples will be collected and analyzed to support material management decisions. Materials in these SWMU areas also will be sampled to determine whether the material poses a threat to human health and the environment.

5.3 Sampling Methodology

This section describes the sampling methodology.

5.3.1 SWMUs 4, 5, 6A, 6B, 6C, 6D, and 20

Soils may be sampled in situ before disturbing materials within each SWMU if conditions observed during construction activities indicate the need for sampling. Analytic results will be used to determine risks to human health and the environment and allow for reuse or disposal decision-making. The samples will be collected using either a hand auger or by hand directly from an excavator bucket (if onsite and available). A site figure depicting sampling locations will be prepared and included as part of the field notes.

5.3.2 Unanticipated Conditions

In the event unanticipated conditions are encountered, sampling may be completed using either in situ or stockpile sampling methodology, described as follows:

- In Situ Sampling: To more adequately assess risk, discrete sampling with a bias toward contamination should be taken; follow the May 2023 DNREC Soil Reuse Guidance (Attachment 2), which indicates 14 samples per 900 to 1,000 cubic yards. The samples will be collected using either a hand auger or by hand directly from an excavator bucket (if onsite and available). A site figure depicting sampling Locations will be prepared and included as part of the field notes
- Stockpile Sampling: To more adequately assess risk, discrete sampling with a bias toward contamination should be taken; follow the May 2023 DNREC Soil Reuse Guidance (Attachment 2), which indicates 14 samples per 900 to 1,000 cubic yards.

The primary objective of this sampling is to assess the soils for onsite reuse.

If multiple stockpiles of SWMU material are sampled in 1 day, gloves will be changed between sampling each stockpile of material. If a hand auger is used to collect samples, it will be decontaminated in between composites with Alconox soap and distilled water.

5.3.3 Analytical Testing

SWMU materials within SWMUs 4, 5, 6A, 6B, 6C, 6D, and 20 (or other soil) that indicate need for sampling will be analyzed for the following:

- pH by EPA Method SW-846-9045C
- TCLVOCs by Method 8260D
- TCLSVOCs by Method 8270E
- Total PCBs by EPA Method SW-846 1668
- SW-846 8082A
- TAL inorganics by Method 6020B

Where unanticipated environmental conditions are encountered, the following analyses will be performed:

- TCLVOCs by Method 8260D
- TCL SVOCs by Method 8270E
- TAL inorganics by Method 6020B
- pH by EPA Method SW-846-9045C
- Total PCBs by EPA Method SW-846 1668
- Dioxin and furans by EPA Method 1613
- Diesel-range organics by EPA Method SW-846 8015B
- Gasoline-range organics by EPA Method SW-846 8015B
- Oil and grease by EPA Method 413.1
- 303-d listed contaminants for the Delaware River; including metals (mercury), PCBs, dioxins and furans, and pesticides [Code of Federal Regulations Title 40, Part 130.7, Section 303(d)]
- COCs in Zone 2 are metals, VOCs, SVOCs, PCBs, and dioxins and furans.
- Other analytical testing of materials will be determined as needed and discussed with DNREC-RS Project Manager in advance of sample collection. The analytical testing in this plan is to be used in concurrence with the analytical testing specified in the EMHCP (Jacobs 2026a).

6. Schedule

The site redevelopment activities are anticipated to occur in the phases detailed in Table 8.

Table 8. Site Redevelopment Activity Phases

Phase	Task Description
Phase 1	Partial Build
Phase 2	Full Build

As samples are collected and submitted to the analytical laboratory, receipt of laboratory analytical results will depend on turnaround time of analyses. Jacobs will share final laboratory reports, EDDs, and a report summarizing the results with DNREC and the client for discussion of next steps. Corrective measures will be considered, if necessary.

7. References

Department of Natural Resources and Environmental Control-Remediation Section (DNREC-RS). *Screening and Reporting Levels.*

Department of Natural Resources and Environmental Control-Remediation Section (DNREC-RS). 2020. *Hazardous Waste Management Quality Assurance Project Plan.* October.

Department of Natural Resources and Environmental Control-Remediation Section (DNREC-RS). 2023. *Standard Operating Procedures for Chemical Analytical Programs.* October.

Jacobs. 2026a. *Excavation Materials Handling Contingency Plan.* February.

Jacobs. 2026b. *Corrective Measures Implementation Work Plan.* February.

Parsons. 2013. *Human Health Risk Analysis.*

U.S. Environmental Protection Agency (EPA). 2011. *Attachment A: Corrective Measures Implementation Scope of Work.* July 14. https://www.epa.gov/sites/default/files/2016-01/documents/rcra_correctivemeasureimpli_sow.pdf.

U.S. Environmental Protection Agency, Region 3 (EPA, Region 3). 2020. *Quality Management Plan.* Document Control Number R3QMP001-20200601. June 1.

Verdantas LLC. 2022. *Solid Waste Management Units 1 and 2 Sampling and Analyses Plan.* Prepared for DNREC-RS. On behalf of Diamond State Port Corporation. November.

Verdantas LLC. 2024. *Solid Waste Management Units 1 & 2 Data Report.* Prepared for DNREC-RS. On behalf of Diamond State Port Corporation. March.

Attachment 1
DNREC SOPs

Attachment 2
DNREC Soil Reuse Guidance May 2023