



west virginia department of environmental protection

Division of Water and Waste Management
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June 15, 2016

Alison Crane
EHS Senior Competency Consultant
The Chemours Company
8480 DuPont Rd, Building 1
Washington, WV 26181-1217

**RE: Modification to RCRA Hazardous Waste Management Permit # WVD045875291
The Chemours Company FC, LLC, Washington, West Virginia**

Dear Ms. Crane:

Enclosed is the June 2016 Permit Modification developed by The Chemours Company and the West Virginia Department of Environmental Protection (WVDEP). The Modification became effective June 15, 2016. This document is provided for all parties' files. Future permitting issues should be directed to Sudhir Patel at (304) 926-0499 ext. 1295 or Talal Fathallah at ext. 1290.

Sincerely,

Scott G. Mandirola
Director, DWWM

cc: RCRA File # WVD05875291
Jamie Fenske, DWWM
Jason S. McDougal, OER

PERMIT MODIFICATIONS

1. PERMIT, MODULE IV FACILITY WIDE RCRA CORRECTIVE ACTION

On May 11, 2015 WVDEP issued a Statement of Basis (SB) in which a Final Remedy for the Facility was proposed that consisted of: monitored natural attenuation in conjunction with the continued control, capture, and treatment of contaminated groundwater and the implementation of Institutional Controls ("ICs"). The proposed Final Remedy as set forth in the Statement of Basis became final as provided by the Final Decision Response to Comments (FDRTC), which was issued on July 9, 2015. The Final Remedy is hereby incorporated into Module IV Facility Wide RCRA Corrective Action Module (Module).

2. ATTACHMENT IV-1, FINAL DECISION RESPONSE TO COMMENTS

This Attachment contains a copy of the signed Final Decision Response to Comments which became effective on July 9, 2015.

3. ATTACHMENT IV-2, GROUNDWATER MONITORING PLAN

The Groundwater Monitoring Plan once submitted and approved by WVDEP, will be appended to this Permit in Attachment IV-2.

MODULE IV FACILITY WIDE RCRA CORRECTIVE ACTION

On May 11, 2015 WVDEP issued a Statement of Basis (SB) in which a Final Remedy for the Facility was proposed that consisted of: monitored natural attenuation in conjunction with the continued control, capture, and treatment of contaminated groundwater and the implementation of Institutional Controls (“ICs”). Public comments were requested on the proposed Final Remedy from May 11, 2015 until June 10, 2015.

Since no comments were received during the public comment period, the proposed Final Remedy as set forth in the Statement of Basis became final as provided by the Final Decision Response to Comments (FDRTC), which was issued on July 9, 2015. The Final Remedy is hereby incorporated into this Facility Wide RCRA Corrective Action Module (Module) and the requirements thereof are below.

IV-A DEFINITIONS

For the purposes of RCRA Corrective Action and this RCRA Corrective Action Module, the following definitions shall apply:

1. “Project Manager” shall mean the OER RCRA Corrective Action Project Manager.
2. “Facility” shall mean all contiguous land, structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste on the Chemours Company FC, LLC (formerly E.I. duPont de Nemours and Co.) Washington Works property.
3. “Area of Concern” shall mean an area at the Facility or an off-site area, not originally identified as a solid waste management unit, where hazardous waste and/or hazardous constituents are present or suspected to be present.
4. “Solid Waste Management Unit” shall mean any unit at the facility from which hazardous constituents might migrate, irrespective of whether the units were used for the management of solid and/or hazardous wastes.

IV-B REPORTS NOTIFICATIONS AND SUBMISSIONS

1. For the purposes of RCRA CA, all RCRA CA work plans, reports, notifications or other submissions required by Module IV shall be sent by electronic mail (preferred), certified mail, certified carrier, or hand-delivered as follows:

The Chemours Company FC, LLC
Permit Number: WVD045875291

One Copy To:

RCRA CA Project Manager
West Virginia Department of Environmental Protection
Office of Environmental Remediation
601 57th Street
Charleston, WV 25301

One Copy To:

RCRA CA Program Manager
West Virginia Department of Environmental Protection
Office of Environmental Remediation
601 57th Street
Charleston, WV 25301

One Copy To:

EPA Project Manager
United States Environmental Protection Agency, Region III
Office of Remediation
1650 Arch Street
Philadelphia, PA 19103-2029
(3LC20)

2. Additionally, reporting requirements as required by **Module I** through **Module VIII** shall be submitted in accordance with Section I-F-17 Submittal of Reports or Other Information.

**IV-C CORRECTIVE ACTION (CA) FOR CONTINUING RELEASES;
PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT**

1. Section 3004(u) of RCRA, 42 U.S.C. § 6924(u), and regulations codified at 40 CFR §264.101, provide that all permits issued after November 8, 1984 must require CA 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 Section 3004(v) of RCRA, 42 U.S.C. § 6924(v), and 40 CFR §264.101(c), CA at a permitted facility may be required beyond the facility boundary, where necessary, to protect human health and the environment, unless the Facility demonstrates that, despite its best efforts, the Facility was unable to obtain the necessary permission to undertake such action.

IV-D REMEDY IMPLEMENTATION

1. The Final Remedy for the Facility was developed and is described in the Final

Decision Response to Comments (FDRTC) (See Attachment IV-1).

The components of the remedy to implement are:

1. Continued Institutional and/or Administrative Controls
2. Monitored Natural Attenuation with Continued Production Well Pumping and Hydraulic Containment
3. Ex-situ Treatment of Waste Process Water at the Wastewater Treatment Plant
4. Treatment of Potable Water
5. Riverbank Landfill (RBL) / Anaerobic Digestion Pond (ADP) Monitoring and Maintenance (M&M)

IV-E EVALUATION OF THE SELECTED REMEDY

The Facility shall submit annual progress reports on the remedy performance, including any Institutional Controls. If the Agencies determine that the selected remedy will not comply with the media clean-up requirements, the Agencies may require the Permittee to perform additional studies and/or perform modifications to the existing Corrective Action remedy.

IV-F EMERGENCY RESPONSE; RELEASE REPORTING

1. If at any time, the Permittee discovers that a release of hazardous waste or hazardous constituents from a SWMU at the Facility is presenting or may present an imminent and substantial endangerment to human health or the environment, the Permittee shall notify the WVDEP 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.
2. Within five days of discovery, the Permittee shall notify WVDEP, in writing, of the nature, source, extent, and location of such release of hazardous waste or hazardous constituents from the SWMU.
3. If, based on the information submitted a release has not been adequately remediated to be protective of human health and the environment, WVDEP may require the SWMU and/or AOC to be included in an RFI or an IM.

IV-G GUIDANCE DOCUMENTS

All work to be performed at the Facility pursuant to this Permit shall be in general accordance with applicable EPA RCRA corrective action guidance available at http://www.epa.gov/reg3wcmd/ca/ca_resources.htm.

IV-H NEWLY DISCOVERED SOLID WASTE MANAGEMENT UNIT (SWMU) ASSESSMENT

1. The Permittee shall notify the Project Manager, in writing, of any newly identified SWMU at the Facility, no later than thirty days after the date of discovery. The notification shall include, but is not limited to, the following known information:
 - a. A description of the newly identified SWMU(s), 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 newly identified SWMU(s) 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 newly identified SWMU. Include information on the date of release, type of hazardous waste or hazardous constituents, quantity and 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 have not occurred or is not occurring.
2. Upon receipt of the notification of any newly identified SWMU, the Project Manager will determine the need for corrective action at such SWMU. If corrective action is necessary to protect human health or the environment, the Project Manager will determine whether an RFI will be performed and the need for any IMs.
3. In lieu of a separate RFI, the Permittee may propose either to incorporate any

newly identified SWMU into an ongoing RFI or to submit a proposal for the performance of corrective measures at such newly identified SWMU. Any such proposal shall be submitted to the Agencies along with notification of the discovery of the SWMU(s). Incorporation of any newly identified SWMU(s) into an ongoing RFI shall be through the submission of an RFI Work Plan Addendum by the Permittee. Any such RFI Work Plan Addendum shall receive approval by the Agencies prior to initiation of the related RFI work.

IV-I FINANCIAL ASSURANCE

1. Initial Cost Estimate: Within ninety calendar days of the effective date of this Permit, the Permittee shall submit an initial cost estimate (Cost Estimate), in current dollars, to perform the work required under Section IX-D "Remedy Implementation". The Cost Estimate must account for the costs of all foreseeable work, including all investigation and reports, construction work, monitoring, and other long term care work, etc.
2. Annual Cost Estimate Updates: Within sixty days prior to the anniversary date of the establishment of the financial instrument for the work required Section IX-D "Remedy Implementation", the Permittee shall submit to the CA Program Manager updated cost estimates, adjusted for inflation, for completing the approved work. If the financial test or corporate guarantee is used as the financial instrument, the owner or operator must send updated cost estimates to the CA Program Manager within 90 days after the close of each succeeding fiscal year in accordance with 40 CFR 264.145(f)(5).
3. Financial Assurance Demonstration: Within thirty calendar days of approval of the initial cost estimate for the work required under this Module, and annually thereafter, the Permittee shall demonstrate compliance with financial assurance to CA Program Manager in accordance with 40 CFR § 264.143 for completing the work required under Section IX-D "Remedy Implementation" in accordance with 40 CFR § 264.101(b). Within thirty calendar days of approval of any revised cost estimate, the Permittee shall demonstrate to the CA Program Manager financial assurance for the updated cost estimates.

IV-J RECORDKEEPING

Upon completion of closure of any current or future SWMU, the Permittee shall maintain in the Facility operating record, documentation of the closure measures taken.

IV-K ACCESS FOR CORRECTIVE ACTION OVERSIGHT

The WVDEP and its authorized representatives shall have access to the Facility at all reasonable times for monitoring compliance with the provisions of this Permit. The

Permittee shall use its best efforts to obtain access to property for all parties beyond the boundaries of the Facility at which corrective action is required by this Permit.

IV-L COMPLETION OF REMEDY

Within ten days of receipt of notification by the Project Manager that the remedy is complete, the Permittee shall submit a written certification to the Project Manager stating that the remedy has been completed in accordance with the requirements of this Permit Module. The certification must be signed by the Permittee. In cases where no other Permit Conditions remain, the Permit may be modified not only to reflect the completion determination, but also to change the expiration date of the permit to allow earlier permit expiration in accordance with 40 CFR Parts 124, 270.41, and 270.42, as applicable.

The Chemours Company FC, LLC
Permit Number: WVD045875291

ATTACHMENT 1
FINAL DECISION RESPONSE TO COMMENTS

The Chemours Company FC, LLC
Permit Number: WVD045875291



WEST VIRGINIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FINAL DECISION AND RESPONSE TO COMMENTS

The Chemours Company FC,
LLC (A subsidiary of E.I. duPont
de Nemours & Co) - Washington
Works Facility

Washington, West Virginia
EPA ID No. WVD045875291

Prepared by
West Virginia Department of Environmental Protection

JULY 2015

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I. INTRODUCTION

The West Virginia Department of Environmental Protection (WVDEP) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) in connection with the Chemours Company FC, LLC (formerly E.I. duPont de Nemours and Co.) Washington Works facility located in Washington, West Virginia.

The Facility is subject to the 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. Sections 6901 to 6992k. 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.

On May 11 2015, WVDEP issued a Statement of Basis (SB) in which a Final Remedy for the Facility was proposed. The proposed Final Remedy consisted of: monitored natural attenuation in conjunction with the continued control, capture, and treatment of contaminated groundwater and the implementation of Institutional Controls ("ICs").

Consistent with public participation provisions under RCRA, the WVDEP requested comments from the public on the proposed Final Remedy. The thirty (30) day public comment period began on May 11, 2015 and ended June 10, 2015. No comments were received by WVDEP during the comment period.

Based on the no comments received during the comment period, WVDEP has determined that it is not necessary to modify its proposed Final Remedy as set forth in the SB.

II. FACILITY OWNERSHIP AND HISTORY

a) Facility Location and Setting

The 1,200-acre facility is located along the Ohio River in Washington, West Virginia, Approximately seven miles southwest of Parkersburg, West Virginia (see Figure 1). The Site also includes Blennerhassett Island, located upstream of the plant in the Ohio River where one of several site groundwater extraction well fields is located. The site is located in an area of industrial and residential land use. Immediately adjacent to the western boundary of the site are the Sabic Plastics (formerly General Electric Plastics) plant and two industrial warehouses. The northern side of the site is bounded by the Ohio River, which flows from east to west. A heavily wooded and hilly 250-acre closed solid waste landfill (i.e., Local Landfill), owned by E.I. du Pont de Nemours and Company (DuPont), is located contiguous with the site on its southern boundary. The eastern side of the site is bounded by U. S. Route 50, Robert Byrd Highway. Residential areas are located within one mile on the southern, eastern, and western boundaries of the site.

b) Facility Background

The land at the site was originally used for agricultural purposes. The initial manufacturing units constructed at the site were completed in 1948. Since the site opened it has expanded to include manufacturing of hundreds of products for the automotive and construction industries. The site has produced a variety of products including the following:

- Compounded engineering plastics
- Nylon molding pellets and filaments
- Acrylic molding compounds
- Polyvinyl butyral
- Acrylic resins
- Fluoropolymers
- Polyacetal products

Currently, the manufacturing operations reside on about 200 acres of the site and consist of 14 operating and service divisions that span nearly a mile along the Ohio River.

The Facility currently utilizes 20 wells pumping at an average of 4 million gallons of water per day. This pumping rate maintains an inward hydraulic gradient throughout the plant and due to the long term pumping has depressed the water table by over 26 feet in places. The inward gradient can be maintained at much lower pumping rates. The Facility replaces wells or augments the groundwater supply system as demand dictates. The USEPA and USACOE reviewed the groundwater model utilized to evaluate well placement and to ensure that the hydraulic gradient captures site groundwater. The model is also used to evaluate the impact of pumping scenarios on the plume of impacted groundwater, with the goal of maintaining or reducing the footprint of the plume. It is conceivable that pumping rates at the plant will be reduced in the future, if plant processes change or process efficiencies are achieved. The groundwater flow model and groundwater measurements will continue to be utilized to monitor the Facility's hydraulic control of the site as the Facility's water demands change.

All Facility water discharges are regulated by the Facility's NPDES (National Pollutant Discharge Elimination System) permit, which is administered by the WVDEP, and requires location specific analyses and regulatory compliance limits.

III. FINAL REMEDY

WVDEP's remedy is comprised of a program of monitored natural attenuation in conjunction with the continued control, capture, and treatment of contaminated groundwater and the implementation of institutional controls ("ICs").

Introduction

WVDEP's remedy is comprised of a program of monitored natural attenuation in conjunction with the continued control, capture, and treatment of contaminated groundwater and the implementation of institutional controls ("ICs").

1. Continued Institutional and/or Administrative Controls

ICs are non-engineered instruments, such as administrative and legal controls, that minimize the potential for human exposure to contamination and/or protect the integrity of the decision by limiting land or resource use. Under this decision, some contaminants remain in the groundwater and soil at the Facility above levels appropriate for residential uses. Because some contaminants remain in the soil and groundwater at the Facility at levels that exceed residential use, WVDEP's decision requires the compliance with and maintenance of land and groundwater use restrictions. The ICs shall include, but not be limited to, the following land and groundwater use restrictions:

- a. Except for the production water that is already approved for treatment and use as potable water at the Facility, groundwater at the Facility shall not be used for any purpose other than 1) industrial use and non-contact cooling water; and 2) the operation, maintenance, and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such use;
- b. The Facility property shall not be used for residential purposes unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy, and WVDEP, in consultation with EPA, provides prior written approval for such use;
- c. All earth moving activities, including excavation, drilling and construction activities, in the areas at the Facility where any contaminants remain in soils above EPA's Screening levels for non-residential use or groundwater above Federal MCLs/Tap Water RBCs, shall be prohibited unless it is demonstrated to WVDEP, in consultation with EPA, that such activity will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy, and WVDEP, in consultation with EPA, provides prior written approval for such use
- d. The Property will not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy;
- e. No new wells will be installed on Facility property unless it is demonstrated to WVDEP and EPA, that such wells are necessary to implement the final remedy and WVDEP provides prior written approval to install such wells;
- f. Owner agrees to provide WVDEP and EPA with a "Certified, True and Correct Copy" of any instrument that conveys any interest in the Facility property or any portion thereof;

- g. Owner agrees to allow the WVDEP, EPA and/or their authorized agents and representatives, access to the Property to inspect and evaluate the continued effectiveness of the final remedy and if necessary, to conduct additional remediation to ensure the protection of the public health and safety and the environment based upon the final remedy to be selected by WVDEP in the Final Decision and Response to Comments (FDRTC);

2. Monitored Natural Attenuation with Continued Production Well Pumping and Hydraulic Containment

- a. GW monitoring and elevations

The facility is required to continue the production well pumping at 4 million gallons per day to provide hydraulic containment of the groundwater on-site, until such time that the GW CAO is met. The facility may request to WVDEP a change in the production water pumping rate provided that it demonstrates to WVDEP that at the new rates it maintains the hydraulic control of the on-site groundwater. The Facility will maintain a groundwater monitoring program to demonstrate that the inward gradient is maintained and that the contaminant mass is being reduced through natural attenuation.

- b. GW treatment

The Facility will continue the groundwater capture and treatment program and when possible identify source areas of contamination and, where possible, apply a remediation technique to reduce the impacts of the source areas.

3. Ex-situ Treatment of Waste Process Water at the Wastewater Treatment Plant

The Facility is required to continue ex-situ treatment of waste process water at the WWTP at the site, until such time that concentrations of contaminants in the groundwater are reduced to their respective MCLs.

4. Treatment of Potable Water

The Facility is required to treat, for removal of PFOA and VOCs, the production well water that is intended to be used as potable water, until such time that concentrations of contaminants in the groundwater are reduced to their respective MCLs.

5. RBL/ADP Monitoring and Maintenance (M&M)

The Facility is required to monitor and maintain the RBL/ADP engineered cap system. The maintenance and monitoring is required to continue through the life of the Facility to

maintain its effectiveness and protectiveness and to ensure the health and safety of site workers and to reduce the possibility of trespasser exposure to SWMU materials.

IV. SUMMARY OF PREVIOUS ACTIONS AND INVESTIGATIONS

For all environmental investigations, groundwater concentrations were screened against federal Maximum Contaminant Levels (MCLs) promulgated pursuant to Section 42 U.S.C. §§ 300f et seq. of the Safe Drinking Water Act and codified at 40 CFR Part 141, or EPA Region III Screening Levels (RSL) for tap water for chemicals for which there are no applicable MCL. Soil concentrations were screened against EPA RSLs for residential soil and industrial soil.

SWMU C-6, the Polyacetal Waste Incinerator (PWI)

The PWI consisted of two brick-lined pits which operated between 1959 and early 1990. Off-specification polyacetal polymer and non-hazardous solid waste packing materials were burned in the unit. By 1997, closure of the PWI was completed by removing the fire brick to a depth of approximately 2 feet below grade. Toxicity characteristic leaching procedure (TCLP) indicated that the brick was not RCRA hazardous and that the remaining subsurface brick lining the pit could be left in place. The pit was then backfilled with clean soil and covered with gravel. Currently, the area around the former PWI is covered with gravel, asphalt, and/or concrete. Surface soil total chromium results from samples collected at the PWI were within those measured for site background samples. The concentrations of total chromium measured are below the November 2013 EPA Regional Screening Levels (SLs) for Industrial Soil for trivalent chromium, but are above the SL for hexavalent chromium. Hexavalent chromium in soil, however, is expected to be reduced to trivalent chromium by organic matter (<http://www.epa.gov/iris/toxreviews/0144tr.pdf>).

A risk evaluation was conducted during the RFI to determine whether identified releases from the SWMUs were a potential concern for human health or the environment and whether further evaluation or action was warranted. For the PWI, potential concerns for human health were not identified. The presence of a gravel cover mitigates potential worker exposure to underlying soils. Potential exposure that may occur during intrusive activities would be managed by institutional and administrative controls, such as using appropriate personal protective equipment (PPE) required as part of a health and safety plan (HASP) and plant permitting required for all intrusive activities established as part of site standard operating procedures (SOPs). With respect to potential ecological exposures, the RFI risk evaluation concluded that the PWI did not provide ecological habitat and that subsurface soil was not an exposure media of concern for ecological receptors. Because no complete exposure pathways were identified for human health or for ecological receptors at this SWMU, it was not carried forward in the CMS for this site and was recommended as no further action.

SWMU H-14, the Burning Grounds (BG)

The BG was used for open burning of plant trash and organic liquids between 1948 and 1965. Liquids burned included acrylic monomer slurries, polyvinyl butyral ink slurries, high boiling point liquid fluorocarbon compounds and solvents. Solid wastes included paper, trash, and

plastics. Between 1974 and 1990, approximately 6,600 cubic feet of soil were excavated from the BG prior to additional construction in the area. Currently, all surfaces in the area of the BG are covered with gravel, asphalt, and/or concrete.

Comparison of the RFI surface and subsurface soils results to the November 2013 EPA Regional SLs for industrial soil did not indicate any exceedances. Comparison of groundwater results from the RFI to tap water SLs did show an exceedance of one VOC in one well [carbon tetrachloride at a concentration of 16 micrograms per liter ($\mu\text{g/L}$)]. This single exceedance is above the tap water SL ($0.39 \mu\text{g/L}$) and the Federal maximum contaminant limit (MCL) of $5 \mu\text{g/L}$. As with the PWI, complete exposure pathways were not identified for potential human receptors at the BG. Similarly, the risk evaluation conducted during the RFI concluded that the BG SWMU did not provide ecological habitat and subsurface soil was not an exposure media of concern for ecological receptors. Because no complete exposure pathways were identified for potential human or ecological receptors, this SWMU was not carried forward in the CMS.

SWMUs A-3 and B-4 – Riverbank Landfill and Anaerobic Digestion Ponds

Only two of the four SWMUs investigated in the RFI were carried forward in the CMS based on the findings of the 2006 EPA-approved RFI. These two SWMUs are the Riverbank Landfill (RBL; SWMU A-3) and the Anaerobic Digestion Ponds (ADP; SWMU B-4). These SWMUs are carried forward because select VOCs and PFOA released from these SWMUs exceed appropriate groundwater and soil screening level criteria. RBL and ADP are grouped together due to their proximity to one another, with the former ADP lying partially within the footprint of the RBL. Together, these two SWMUs are collectively referred to here as the RBL/ADPs SWMUs. The RBL/ADP SWMUs are approximately 4,500 feet long located along the northern sloping edge of the site and the lower terrace between the plant and the Ohio River.

The RBL operated between 1948 and the late 1960s and received powerhouse ash, incineration ash, plastics, rubble, and plant solid waste. When landfill use stopped, the RBL was covered with 6 to 35 inches of soil and in some locations, by the expansion of production area buildings and the laying of pavement in the manufacturing areas. A seep collection/treatment system was constructed in the early 1990s at the base of the landfill to manage methylene chloride-impacted groundwater discharging at a seep. The source of this methylene chloride was not the landfill itself, but was a spill in a production area adjacent to the SWMU which migrated through the landfill and discharged at the seep.

The ADP consisted of three digestion ponds co-located within the western portion of the RBL (see Figure 2). One of the ponds dates from the 1950s, and the two other ponds date from the 1970s. The ponds were used for the containment and treatment of aqueous waste from the fluoropolymer manufacturing process and were used through 1988. The ponds were of earthen construction, were approximately 6 feet deep, and had a combined estimated volume of 3 million gallons. There were no outfalls from the ponds. Consequently, the ponds were operated to not overflow. The aqueous waste was removed and shipped to another DuPont location for final treatment. In 1988, the ponds' contents, the upper few feet of clay liner, and pond-berm material were removed and disposed of off-site. The ponds area was then backfilled and capped with topsoil, and vegetated with grass.

During the Verification Investigation (VI; DuPont, 1992) and the RFI, DuPont determined that select VOCs had been released from the RBL to underlying soils and groundwater and that select VOCs and PFOA had been released from the ADP to underlying soils and groundwater as well. PFOA and the select VOCs were measured in soils and groundwater at concentrations that

exceeded appropriate screening level criteria.

The conclusions of the RFI found that the RBL and ADPs SWMUs have released organic constituents to underlying soils. These organic constituents include 1,1,2-trichlorotrifluoroethane, carbon tetrachloride (CT), methylene chloride (MeCl), tetrachloroethene (PCE), trichloroethene (TCE) and ammonium perfluorooctanoate (APFO), commonly known as C-8 and historically known as (FC-143). These impacts tend to occur in subsurface, above the groundwater table, and are limited in aerial extent. In addition, with the exception of a single exceedance of MeCl, the concentrations of these organic constituents do not exceed EPA Region III industrial soil risk based concentrations (RBCs) or the West Virginia Department of Environmental Protection (WVDEP) C-8 Assessment of Toxicity Team (CATT) screening levels for APFO in soil. However, several RBL/ADP-derived organic constituents (MeCl, PCE, TCE, and APFO) were also detected in water quality samples from the underlying site aquifer in the vicinity of the RBL/ADP. While these organic constituents do exceed the EPA Region III tap-water screening criteria and the WVDEP CATT screening levels for APFO in water, groundwater in the underlying site aquifer migrates to and is contained by the onsite production wells.

A multi-media consent order (Order No. GWR-2001-019; Consent Order) was entered into between the West Virginia Department of Environmental Protection (WVDEP), the West Virginia Department of Health and Human Resources – Bureau for Public Health (WVDHHR-BPH) and DuPont on November 15, 2001. The Consent Order identified a series of requirements and tasks to be performed by the parties (WVDEP, WVDHHRBPH, and DuPont) in order to determine whether there has been an impact on human health and the environment as a result of releases of APFO (referred to as C-8 in the Consent Order) from DuPont operations at the Washington Works facility (including the RBL/ADPs) and the associated landfills. The Consent Order established the C-8 Groundwater Investigation Steering Team (GIST) to oversee investigations and activities that were conducted to assess the presence and extent of C-8 in drinking water, groundwater, and surface water at and around the facility and the associated landfills.

In addition, the Consent Order also established the C-8 Assessment of Toxicity Team (CATT). The CATT consisted of scientists from academia, government (including representatives from EPA Region III and EPA Headquarters), non-profit organizations, and industry. The CATT was assembled to assess the toxicity and risk to human health and the environment associated with exposure to C-8 releases from the DuPont activities. In a final report issued in August 2002, the CATT established the human health protective screening criteria for drinking water of 150 ug/l (WVDEP, 2002). In addition, as reflected in the August 2002 report, the CATT also established a C-8 screening criteria of 240 mg/kg for soils (WVDEP, 2002). The CATT also established an Aquatic Life Advisory Concentration for C-8 of 1,360 ug/l in October 2002 (Menzie-Cura & Associates, 2002).

Concentrations of APFO in the underlying soil are highest in the samples from the silt and clay of the Holocene overbank deposits. However, none of the concentrations measured exceeded the screening criteria of 240 mg/kg. In addition, APFO concentrations in water are also highest in groundwater from within the perched water in the area of the RBL/ADP. While these concentrations do exceed the two water criteria listed above, there are no receptors of the perched water. There is only one well that is screened in the site underlying aquifer that has had concentrations of APFO above the 150 ug/L drinking-water screening criteria. This well, Q04-

MW02, is located within the RBL/ADPs and is located within about 700 feet of the Gallery Well. Groundwater in the area of this well flows towards the Gallery Well and is contained on-site.

Release Assessment for the East Field and Chestnut Tree Plantation AOCs

In the third quarter of 2010, DuPont identified two new areas of concern (AOCs) at the DuPont Washington Works facility in Washington, West Virginia, where on-site disposal of C-8-bearing sludge had occurred. Available information regarding the on-site disposal indicated that in 1996 approximately 139 tons of bio-sludge from the Washington Works wastewater treatment plant were land-farmed at the site's East Field. It is estimated that the amount of C-8 in this sludge was less than one pound. Washington Works sanitary treatment plant sludge was also land-farmed at the on-site experimental chestnut tree plantation, a project of the plant employee's Wildlife Habitat Committee, in 1995 and 1996. No records could be found that would allow calculating how much C-8 would have been present in this material, but it is believed to be minor.

A work plan describing the proposed Release Assessment (RA) activities to investigate these two new AOCs was submitted to EPA on April 22, 2013 (URS, 2013). The RA Work Plan was approved by EPA on May 22, 2013 and was implemented on June 10 through 12, 2013.

East Field AOC

Surface soil and subsurface soil were sampled at six locations within the East Field (see Figure 3). At four of these six locations, the subsurface soil contained slightly higher concentrations than the surface soil. At the other two locations, the subsurface soil concentrations were either slightly lower or approximately equal to the surface concentrations.

The PFOA results for East Field soils ranged from 4.3 µg/kg to 71 µg/kg. Surficial soils collected from 0 to 0.5 feet bgs contained between 8.1 µg/kg and 30 µg/kg of PFOA. Subsurface soils collected at depths greater than 0.5 feet bgs contained between 4.3 µg/kg and 71 µg/kg with the subsurface soil sample collected below the possible biosolids observation containing 5 µg/kg of PFOA.

The highest PFOA measured in soil at the East Field, 71 µg/kg (measured in a subsurface soil sample at boring RA0613-EF6) is orders of magnitude below the residential (i.e., human ingestion) soil screening value of 16,000 µg/kg. Concentrations observed at the AOC were consistent with those observed in the site-specific background locations (5.5 µg/kg to 47 µg/kg).

Chestnut Tree Plantation AOC

At the Chestnut Tree Plantation, ten locations were sampled, and soil was sampled from two depths: a surface soil from 0 to 0.5 feet bgs and a subsurface soil (see Figure 4). No evidence of the land-application zone was identified at any of the locations. Therefore, subsurface soil was sampled and composited from the interval from 0.5 feet bgs to 2 feet bgs.

The PFOA results for Chestnut Tree Plantation soils ranged from 8.3 µg/kg to 41 µg/kg. Surficial soils (sampled from 0-0.5 feet bgs) contained between 8.8 µg/kg and 41 µg/kg of PFOA. Subsurface soils contained between 8.3 µg/kg and 31 µg/kg. Concentrations observed at this AOC were consistent with those observed in the site-specific background locations (5.5 µg/kg to 47

µg/kg).

At seven of the 10 locations, the surface and subsurface soil concentrations were approximately equal. At two of the remaining three locations, the surface soils contain slightly lower concentrations than the subsurface soils; and at the third location, the surface soil contained slightly higher concentration compared to the subsurface soil.

Similar to the East Field AOC, the highest PFOA measured in soil at the Chestnut Tree Plantation AOC, 41 µg/kg, is orders of magnitude below the residential (i.e., human ingestion) soil screening value of 16,000 µg/kg.

The following conclusions were made from the evaluation of PFOA results for surface soil and subsurface soil samples collected from the East Field and Chestnut Tree Plantation AOCs and from background locations at the Site:

- Ranges of PFOA results for surface soils are similar between the site-specific background locations and the two AOCs.
- Ranges of PFOA results for surface soils and subsurface soils are similar between the East Field and the Chestnut Tree Plantation AOCs.
- The highest PFOA measured in soil during this investigation, 71 µg/kg (measured in an East Field subsurface sample), is orders of magnitude below the residential (i.e., human ingestion) soil screening value of 16,000 µg/kg derived by EPA Region 4 (EPA, 2009).
- PFOA results observed at the AOCs are within or lower than the range of PFOA soil results measured in 1997-1998 during the RFI.

The results presented in the RA report show that PFOA concentrations within these two AOCs, in which land-farming of PFOA-bearing biosolids occurred, are essentially the same as in background locations at the site. As a result, no releases to underlying soils are indicated from the land-farming activities. In addition, the concentrations measured during this RA are orders of magnitude below the residential soil screening value. Therefore, there is no potential risk associated with possible exposure to these soils and no further action is warranted for these two AOCs.

V. GROUNDWATER MONITORING

The site is located on a series of Quaternary alluvial terraces. The majority of the site lies on the oldest Quaternary alluvial terrace, which is topographically flat and lies approximately 50 feet above the Ohio River, while the remains of younger terraces exist at lower elevations along the riverbank. Lithologies encountered at the site include Holocene overbank deposits, Quaternary alluvium and the underlying bedrock.

The Holocene overbank deposits consist of silt, sandy silt, clay, silty clay, and clayey silt and are approximately 35 feet thick near the riverbank and approximately 5 to 15 feet thick under the central portion of the site. The overbank deposits are absent in the western portion of the site. The Quaternary alluvium ranges approximately from 30 feet thick near the river up to 90 feet thick under the central portion of the site. The alluvium consists of coarsening downward, unconsolidated, poorly to well-sorted, sand, silts, clay, and gravel outwash deposits. The underlying Dunkard Series bedrock consists primarily of sandy shale, sandstone, and siltstone.

The alluvium is the underlying significant aquifer as defined by the West Virginia Solid Waste Management Regulations because it is the first upper most aquifer encountered which is laterally continuous under the entire site and is free flowing throughout the year. Groundwater elevations and flow directions in the alluvial aquifer on-site are strongly influenced by the Ohio River and by the pumping of on-site production wells.

Pumping of on-site production wells and well fields near and parallel to the river (primarily the Ranney Well, the DuPont-Lubeck Well Field, and the East Well Field) lowers the groundwater level at the site to below river stage. This lower level induces water from the river to flow into the alluvium toward the production wells, which replaces water pumped from storage in the aquifer and helps sustain the high-yield production wells. On-site groundwater flows toward production wells in the East Well Field on the eastern side of the site, and toward the Ranney Well from several directions within the western side of the site.

Groundwater modeling and measured groundwater elevation data for 2011 show that the pumping of production wells at the site does not allow for off-site migration of groundwater within the site aquifer. However, the groundwater elevation map for 2003 demonstrates the possibility of some limited off-site migration of groundwater from the far northwestern corner of the site onto the adjacent Sabic Plastics facility because of production well pumping at that facility near the boundary with the DuPont site. In this area of the DuPont site, groundwater recharge is from the river, and there are no SWMUs located here that would impact groundwater prior to any potential off-site migration. This limited off-site migration depicted in a 2003 map appears to have been eliminated prior to 2011, likely due to reductions in the pumping rates of Sabic production wells located near the site boundary. Groundwater flow in this portion of the site in 2011 is ultimately towards the Ranney Well. However, all hydrological studies performed at the site since 1990 have produced measured groundwater elevation maps that consistently depict hydraulic containment of SWMU related perfluorooctanic acid (PFOA) impacted groundwater within the alluvial aquifer.

Perched water zones exist within the overbank deposits near the riverbank that are not depicted on the groundwater elevation contour maps. Recharge for these perched zones comes from precipitation and from the river. Water in these perched zones flows into the underlying alluvial aquifer in response to the pumping of the on-site production wells. Based on the limited data available, there appears to be an upward gradient from groundwater in the bedrock underlying the Quaternary alluvium under the western two thirds of the site and a downward gradient under the eastern portion of the site. However, the groundwater model (DuPont, 2003) predicted an upward gradient from the bedrock to the overlying alluvial aquifer within most of the modeled domain, with the highest gradient predicted near pumping wells, again supporting no off-site migration of groundwater from the alluvial aquifer.

During 2011, URS (on behalf of DuPont) sampled groundwater and measured groundwater elevations in multiple monitoring wells and production wells located on the site (DuPont, 2011). The groundwater was analyzed for PFOA and several VOCs identified during the VI and the RFI as SWMU-related constituents.

The PFOA and VOC analytical data from the 2011 investigation compared to the 1999 RFI results showed that concentrations have increased in some wells, while decreasing or staying constant in others. However, the results were consistent with the analytical data from the RFI that

showed that wells located near the western end of RBL/ADP SWMUs had the highest concentrations of PFOA and VOCs at the site.

VI. EVALUATION OF WVDEP'S PROPOSED DECISION

WVDEP's remedy is protective of human health and the environment and meets both the threshold criteria and balancing criteria. This is accomplished with one major completed interim measure (River Bank Landfill), continued production of groundwater via pumping from a network of wells resulting in hydraulic containment of groundwater in addition to Institutional Controls (ICs) put in place to restrict land use to commercial or industrial purpose. Overall protection of human health and the environment addresses the ability of an alternative to eliminate, reduce or control threats to public health or the environment through institutional controls, engineering controls, removal or treatment. ICs will maintain protection of human health and the environment over time by controlling exposure to the subsurface and groundwater to ensure long-term effectiveness.

The Final Remedy requires the compliance with and maintenance of land use and groundwater use restrictions at the Facility. WVDEP anticipates that the land use and groundwater use restrictions will be implemented through orders and/or an environmental covenant to be recorded in the chain of title for the Facility property. If the mechanism is to be an environmental covenant, the environmental covenant will run with the land and as such, will be enforceable by WVDEP and/or other stakeholders against future land owners.

The Final Remedy does not involve any activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. The Final Remedy is readily implementable and the institutional controls will be implemented through an enforceable mechanism such as an order or an Environmental Covenant, pursuant to West Virginia Code Chapter 22, Article 22, and the Uniform Environmental Covenants Act, West Virginia Code Chapter 22, Article 22B. The Final Remedy is cost effective. The costs associated with the operation and maintenance of the groundwater pumping and monitoring as well as recording of the environmental covenant in the chain of title to the Facility property are reasonable and minimal. Community acceptance of the remedy has been deemed to be positive as WVDEP has received no comments during the public comment period of May 11 through June 10, 2015. WVDEP and EPA has worked in coordination, has reviewed and concurred with the Final Decision described herein this FDRTC.

VII. DECLARATION

Based on the Administrative Record, I have determined that the Final Remedy as set forth in this Final Decision is appropriate and will be protective of human health and the environment.

Date

Program Manager, Office of Environmental Remediation
WV Department of Environmental Protection

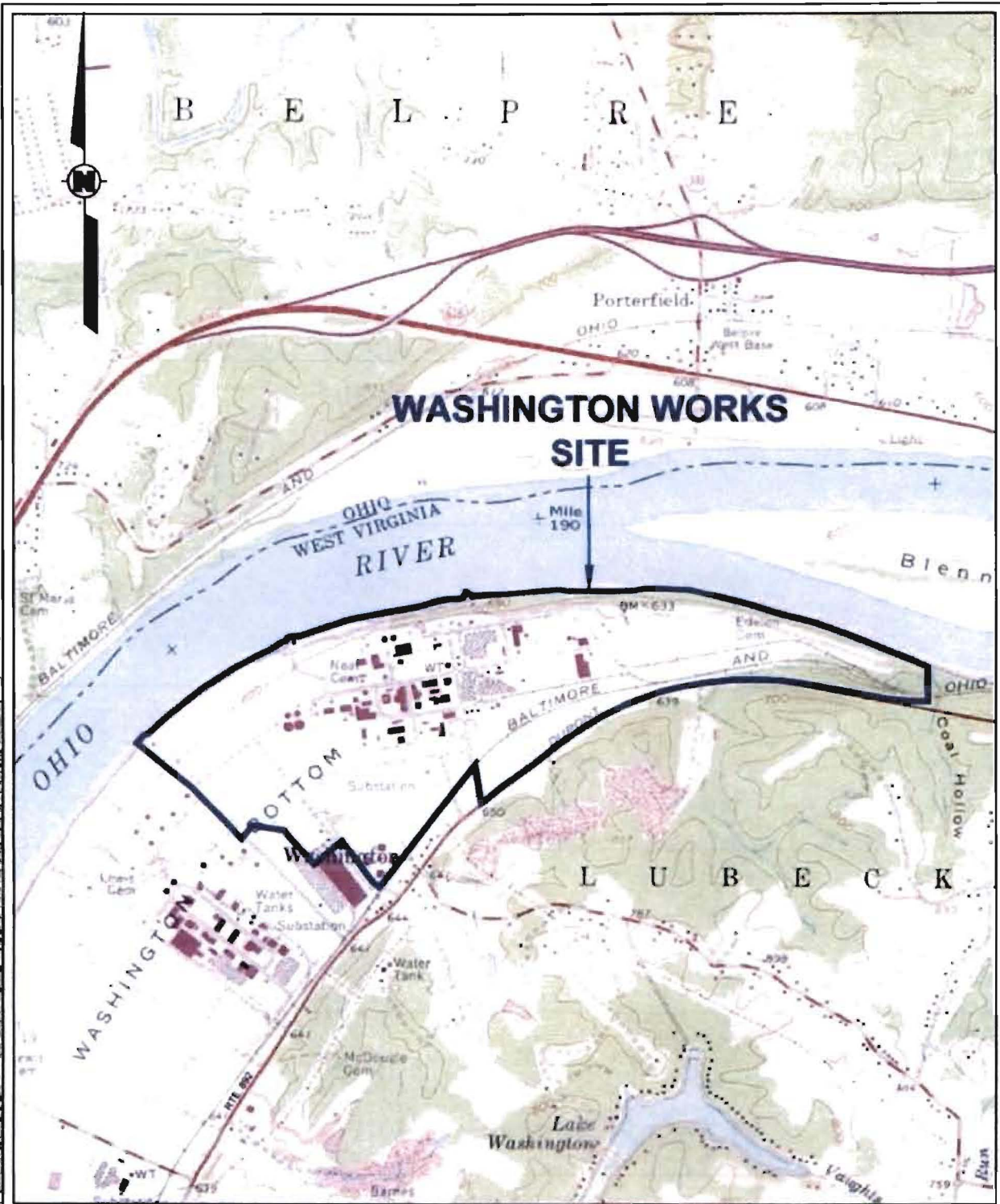
APPENDIX A
PUBLIC COMMENTS AND WVDEP RESPONSES

WVDEP has received no comments during the 30-day public comments period from May 11 through June 10, 2015.

APPENDIX B – FIGURES

Figure 1

Site Location Map



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Source: MAP TAKEN FROM THE LUBECK, WV USGS QUADRANGLE



URS Corporation
 4051 Oglethorpe Road, Suite 300
 Newark, Delaware 19713

SITE LOCATION MAP

DuPont Washington Works
 Washington, West Virginia

Scale	11/5/13	Author	K. Davis	Checker	D. Lister	Drawn	10000-004
Plot to Scale		Author	M. Housley	Checker			
Scale	11/5/13	Author		Checker			
Plot to Scale		Author		Checker			

Figure 2

