



VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

STATEMENT OF BASIS

**INVISTA
Waynesboro Plant
400 DuPont Boulevard**

WAYNESBORO, VIRGINIA

EPA ID NO. VAD003114832

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List of Acronyms

AOC	Areas of Concern
AR	Administrative Record
COC	Contaminants of Concern
EPA	Environmental Protection Agency
EC	Engineering Control
FDRTC	Final Decision Response to Comments
GPRA	Government Performance and Results Act
IC	Institutional Control
MCL	Maximum Contaminant Level
DEQ	Virginia Department of Environmental Quality
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SB	Statement of Basis
TI	Technical Impracticability
UST	Underground Storage Tank
VOC	Volatile Organic Compound
RFI	RCRA Facility Investigation
COPC	Constituent of Potential Concern
HSWA	Hazardous and Solid Waste Amendments
BGS	Below Ground Surface
SWMU	Solid Waste Management Units
SVOC	Semi-volatile Organic Compound
VGS	Virginia Groundwater Standards
HMD	Hexamethylene diamine
DMF	Dimethyl formamide
DMAC	N, N-dimethylacetamide
HHRA	Human Health Risk Assessment

HI	Hazard Index
IM	Interim Measures
PHS	Pump House Sewer
CMS	Corrective Measures Study
CMI	Corrective Measures Implementation

Attachments:

Figure 1: Map of Facility

Figure 2: Map of TI zones

Section 1: Introduction

The Virginia Department of Environmental Quality (DEQ) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for the INVISTA Waynesboro Plant located in Waynesboro, Virginia (hereinafter referred to as the Facility or Site). The facility's current owner is INVISTA, which is an independently managed, wholly owned subsidiary of Koch Industries, Inc. In 2004, subsidiaries of Koch Industries acquired INVISTA from E. I. du Pont de Nemours and Company (DuPont). For the Waynesboro Plant, DuPont sold the plant assets in 2004 to INVISTA, however the land doesn't transfer until completion of the Corrective Action Program. Therefore, DuPont has continued to be responsible for the Corrective Action Investigation. DEQ's proposed remedy for the Facility consists of the following components: 1) excavation and removal of free mercury; 2) capping of contaminated soils; 3) long term groundwater monitoring; and 4) compliance with and maintenance of groundwater and land use restrictions to be implemented through institutional controls (ICs) and engineering controls (ECs). This SB highlights key information relied upon by DEQ in proposing its remedy for the Facility.

The Facility is subject to Environmental Protection Agency's (EPA) 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 (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 waste constituents that have occurred at their property. Information on the Corrective Action program as well as a fact sheet for the Facility can be found by navigating to <https://www.epa.gov/hwcorrectiveaction/hazardous-waste-cleanup-dupont-waynesboro-currently-invista-inc-waynesboro-va>.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which DEQ's proposed remedy is based. See Section 8, Public Participation, for information on how you may review the AR.

Section 2: Facility Background

2.1 Introduction

The Facility is located at 400 DuPont Boulevard, Waynesboro Virginia. The former DuPont Waynesboro site is located on approximately 177 acres of flat lying land along the South River in the southeastern corner of Waynesboro, Virginia (see Figure 1). In 1929, DuPont began operations at the site, which was originally chosen because of the abundant water supply, railroad access, and available workforce. Initial operations included the manufacture

of acetate flake and yarn from 1929-1977. This process included the use of mercury from 1929-1950. In 1958, DuPont began producing Orlon, the plant's second fiber. The flake and yarn process and Orlon process were discontinued in 1977 and 1990, respectively. In the interim, Lycra production had begun in 1962, with Permasep production beginning in 1969 and Bulk Continuous Fiber (BCF) Nylon in 1978. The BCF production facility was idled in early 2009. Lycra is the only fiber currently manufactured at the plant. Orlon, Permasep, and Lycra are registered trademarks of DuPont.

The Site is located in an industrial zoned area. The South River bounds the plant on the northwestern side. Immediately adjacent to the southern boundary of the plant site is a mix of industrial facilities and residential communities. The area to the east of the plant is primarily residential and business and the area to the west is residential. Access to the plant is restricted by an 8-foot fence surrounding the entire property topped with both razor and barbed wire. The Facility is also electronically monitored via a continuous camera and security system.

2.2 Site Physiography

The Site is located along the South River in the southeastern corner of Waynesboro, Virginia. The topography of the area encompassing the City of Waynesboro is characterized by rolling, hilly land with some mountainous terrain. Elevations range from about 1,200 feet above sea level near the South River to roughly 2,800 feet above sea level near the eastern portion of the City. Portions of the City are found to consist of steep hillsides and a floodplain. Severe slopes are encountered in limited areas, predominantly in the terrain to the south and east. Flat slopes are most often found in areas adjacent to the South River. The Site is located adjacent to the South River on a flat terrace.

2.3 Local Hydrogeology

The Site is located within the Valley and Ridge Province of the Appalachian Chain, which consists of Quaternary-aged valley fill and highlands of Precambrian through Pennsylvanian-aged bedrock formations that have been subject to significant folding and deformation.

The uppermost geologic unit at the site is recent alluvium comprised of floodplain and terrace deposits of the South River. This unit consists predominantly of fine to medium grained, silty sand and gravel, as well as sandy silt and sandy clay. The thickness of this unit is typically 12 to 18 feet.

These overburden deposits overlie the residuum of the Waynesboro Formation across the majority of the site at a shallow depth of less than 20 feet below ground surface (bgs). The residuum grades to the bedrock of the Waynesboro formation at depth. The southern section of the facility sits above the upper member of the Shady Formation, which is geologically older than the Waynesboro Formation.

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Three primary saturated zones exist within the overburden at the site. These zones are designated as the Shallow Flow Zone, Deep Flow Zone, and Deep Water Table Zone. A secondary Perched Water Table Zone is present above the Deep Water Table Zone. Beneath the overburden water-bearing units is the bedrock aquifer of the Waynesboro Formation.

The Shallow Flow Zone occurs within the recent alluvial sand and gravel deposits. This water-table aquifer is unconfined and typically occurs at depths ranging from 3 feet bgs in the center of the plant, to 14 feet bgs along the South River. The principle direction of groundwater flow within the Shallow Flow Zone is north-northwest toward the South River, which is the main point of discharge for groundwater. However, in the eastern portion of the site, groundwater flow in the Shallow Flow Zone is toward the area of deep clastic deposits of the Northeast Area.

The Deep Flow Zone is limited to the northwestern portion of the site along the South River. The Deep Flow Zone, which is confined or semi-confined, consists of a thin (5 feet to 9 feet thick) zone of saturated sandy and gravelly clays within the silt and clay residuum. Available information indicates that the Deep Flow Zone is not hydraulically connected to the overlying Shallow Flow Zone.

An area of deep clastic deposits in the Northeast Area contains a deeper, unconfined saturated zone, which is referred to as the Deep Water Table Zone. This saturated zone is associated with an area of deeper granular sediments that underlie the site in this area. A fluctuating groundwater depression is present in this area. This groundwater depression reflects a structural depression in the underlying bedrock, which is interpreted to represent an ancient karst collapse feature (sinkhole). This groundwater depression is of special interest because it coincides with an area that has been impacted by mercury (SWMU 1 – Mercury Recovery Area). During the RCRA Facility Investigation (RFI), no evidence of vertical migration of dissolved mercury in the overburden sediments to the bedrock zone was found. Further discussion of the Northeast Area Groundwater Depression is provided in the *Comprehensive RFI Report*.

The site is also characterized by numerous springs. Baker Spring is adjacent to South River at the southwestern (most upstream) end of the site. Loth Spring is northeast and across the river from Baker Spring.. Coyner Spring (the City of Waynesboro's drinking-water source) is west of the site and numerous other cold water springs are located upstream (west southwest) of the site.

Section 3: Summary of Environmental Investigations

3.1 Environmental Investigations

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Multiple environmental investigations and remedial actions have been completed at the Facility since the Corrective Action Permit was first issued in 1998 by EPA. Many of these environmental actions were taken in response to conditions that were discovered during the investigation of plant areas where mercury was historically used. Most significantly among these was the discovery of mercury in the sewers around the Chemical Building. When EPA issued the Corrective Action Permit, there were 20 potential Solid Waste Management Units (SWMUs) identified in the Permit for investigation. The following is the list of SWMUs:

- SWMU 1 (Mercury Recovery Area, Chemical Building and a portion of the mercury impacted storm sewer) Note: This SWMU was originally just the Mercury Recovery Area, but expanded during the RFI)
- SWMU 2 (Ash Disposal Area)
- SWMU 3 (Ash Ponds)
- SWMU 4 (Incineration Area)
- SWMU 5 (Trade Waste Pond)
- SWMU 6 (Wastewater Treatment)
- SWMU 7 (Sludge Pond)
- SWMU 8 (Empty/Used Drum Storage)
- SWMU 9 (Co-Treatment Facility and Liquid Vortex Incinerator)
- SWMU 10 (Hazardous Waste Storage Pad) (A/B)
- SWMU 11 (Lime Ponds)
- SWMU 12 (Waste Loading Dock/Hazardous Waste Pad C)
- SWMU 13 (Oil/Water Separator System)
- SWMU 14 (Maintenance Shop Sump)
- SWMU 15 (BCF Nylon Sump)
- SWMU 16 (Lycra Sump)
- SWMU 17 (Orlon Sump)
- SWMU 18 (Acetation Waste Tank)
- SWMU 19 (Salvage Yard)
- SWMU 20 (Process Sewer Line) (Nylon Sewer)

The following two Areas of Concern (AOC) were added during the RFI, when drums containing mercury contaminated soil were stored on two separate concrete pads without containment.

- AOC 1 (Drum Storage Pad)
- AOC 2 (Drum Storage Pad)

The Corrective Action Permit was modified in 2014, by adding AOC 3 (Storm Sewer System) and AOC 4 (South River). Because of the scale and complexity of AOC 4, that unit is undergoing its own separate investigation. AOC 3 is included in this proposed remedy.

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3.1.1. RCRA Investigation

The RCRA Facility Investigation (RFI) was conducted in three Phases. The Phase I investigation conducted in 2000-2001 consisted of soil and groundwater sampling at 11 SWMUs. Eighty-six soil samples and 40 groundwater samples were collected and analyzed for Appendix IX volatile organic constituents (VOCs), semi-volatile organic constituents (SVOCs), metals, methyl mercury, hexamethylene diamine (HMD), dimethyl formamide (DMF), and N,N-dimethylacetamide (DMAC). This investigation also included hydrogeologic testing (soil borings and slug testing) to determine the groundwater flow regime and migration pathways.

For all environmental investigations, groundwater concentrations were screened against the lower of the 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 or Virginia groundwater standards (VGS). Soil concentrations were screened against EPA RSLs for residential soil and industrial soil. EPA also has RSLs to protect groundwater, so soil concentrations were also screened against these RSLs.

Based on a review of existing information, generator knowledge, interviews with plant personnel, and observations made during a site visit, DuPont recommended that no further action was warranted for the following SWMUs: SWMU 8 (Empty/Used Drum Storage), SWMU 9 (Co-Treatment Facility and Liquid Vortex Incinerator), SWMU 11 (Lime Ponds), and SWMU 19 (Salvage Yard).

The Phase I report concluded that SWMU 1 (Mercury Recovery Area) and SWMU 4 (Incineration Area) had been impacted with mercury and required further delineation and evaluation. No evidence of significant release was observed at any of the following eight SWMUs: SWMU 2 (Ash Disposal Area), SWMU 3 (Ash Ponds), SWMU 5 (Trade Waste Pond), SWMU 14 (Maintenance Shop Sump), SWMU 15 (BCF Nylon Sump), SWMU 16 (Lycra Sump), SWMU 17 (Orlon Sump), SWMU 18 (Acetation Waste Tank).

The Phase II investigation was conducted between June 2004 and April 2005. A total of 48 soil borings were made as part of the Phase II investigation, with 13 borings related to SWMU 1, while the remaining 35 were related to individual SWMUs. Two soil samples were collected from a majority of the borings.

The results of the Phase II investigation revealed that SWMU 4 required additional delineation of mercury. Additionally, the groundwater downgradient of SWMU 6 and SWMU 7 was found to be impacted by benzene and mercury indicating that a release had occurred in this area. Therefore additional investigation was recommended for SWMUs 4, 6, and 7 as well as additional characterization at SWMU 1. No further investigation was

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recommended for SWMUs 10, 12, 13, and 20 as well as AOC 1 and AOC 2.

The Phase III investigation was completed in July 2007. This investigation built upon the findings and recommendations of Phases I and II. This Phase III focused on delineation of mercury in soil at SWMU 1 and SWMU 4, as well as initial soil characterization at SWMU 6 and 7. Groundwater was also investigated at SWMU 6 and 7. An additional Phase IIIA was conducted in late 2008 to complete the RFI investigation activities. Investigation work included SWMU 1 and 4 as well as SWMU 7. Also, Well #1 in the Northeast Area was investigated for potential impact to groundwater.

Over the three phases of investigation, the SWMUs and AOCs have been investigated for releases and potential impact to the environment. The intended use of the property is industrial use for both current and future use scenarios. Based on the findings of the investigations the following SWMUs and AOCs were recommended for the Corrective Measures Study (CMS):

- SWMU 1 (Mercury Recovery Area, including the former Chemical Building)
- SWMU 4 (Incineration Area)
- SWMU 7 (Sludge Pond)
- SWMU 2 (Ash Disposal Area)
- SWMU 6 (Wastewater Treatment)
- SWMU 17 (Orlon Sump)
- AOC 1 (Drum Storage Pad)

- AOC 3 – Storm Sewer System – was investigated separately, but included in the CMS.

3.1.2 AOC 3 - Storm Sewer System Investigation

After the first Phase of the RFI, DuPont recommended an assessment of the plant outfall discharges to determine if mercury had impacted the storm sewer water. There were four phases of investigation of the stormwater outfalls as a source of mercury loading to the South River. The results from the monitoring indicated that low levels of mercury are present in outfall discharges, originating from SWMU 1.

To address the presence of mercury in the site sewers, an investigation was conducted. The first phase concentrated on identifying the system using a geographic information system (GIS) database. The Phase III Sewer Investigation was performed in conjunction with the Interim Measures, where sewer lines were cleaned out and mercury contaminated sediment was removed. In 2010, DuPont submitted the Sewer Investigation Report which concluded that mercury sources have impacted the Pump House Sewer and Chemical sewer in the area of SWMU 1. DuPont recommended developing and implementing a plan to reduce mercury inputs to sewer system.

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At the request of EPA and DEQ, DuPont completed additional Interim Measures to the sewer system in summer of 2014. See Section 3.4. Summary of Remedial Activities Completed.

3.2 Groundwater Investigation

Site-wide groundwater sampling was performed in the Phase I RFI investigation to screen for all constituents that may be impacting groundwater. Mercury was identified as the main Constituent of Potential Concern (COPC) for groundwater. In 2004, a routine groundwater program was implemented to monitor mercury. In 2015, there were sixty groundwater monitoring wells included in the monitoring program.

Shallow Groundwater

Mercury was found to be the chief constituent of interest in shallow groundwater at the site. A number of metals other than mercury exceeded the on-site drinking water screening levels (SL); however, these metals are not considered to be a significant concern, especially considering the dissolved-phase results, which are more representative of potential leaching from soil to groundwater. Dissolved-phase metals that exceeded SLs are localized to certain wells near current or former operational areas or appear to be naturally occurring. Mercury in shallow groundwater is directly associated with the former Mercury Recovery Area (SWMU 1) and the former Incineration Area (SWMU 4). To a smaller and limited extent, the former Sludge Pond (SWMU 7) also contributes to groundwater contaminated with mercury.

Deep Groundwater and Bedrock Groundwater

While there are exceedances of some metals in the deep groundwater zone, the main COPC mercury is only detected in the trace levels, well below the MCL. The bedrock groundwater is monitored using the active production wells. Mercury was not found in the active production wells above the SL.

3.3 Human Health Risk Assessment and Evaluation of Exposure Pathways

The Human Health and Ecological Risk Assessment evaluated the significance of the potential exposure of human and ecological receptors to constituents detected in environmental media at SWMUs and AOCs. The objectives of the risk assessment were (1) to determine whether releases of chemical constituents in on-site environmental media pose unacceptable risks to human health and the environment under site-specific current and potential future exposure conditions and (2) to provide risk information to support remedial decisions consistent with the DEQ requirements. Since there are no on-site ecological receptors, there are no complete pathways; therefore, there is no potential for ecological risk on-site. Consistent with EPA guidance, the technical approach for the human health portion of the risk assessment (HHRA) consisted of the following basic steps: data review and identification of constituents of potential concern (COPCs), human exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. The HHRA risk

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characterization evaluated potential risk from exposure to soil at individual SWMUs and AOCs. Potential risk from exposure to groundwater was evaluated as part of four individual exposure areas (SWMUs 1, 4, and 7 and perimeter groundwater). Risk characterization results were compared to DEQ's acceptable risk range of one in one million (1×10^{-6}) to one in ten thousand (1×10^{-4}) cumulative excess cancer risk and a hazard index (HI) of 1 for groups of toxicants that affect the same target organ.

The HHRA supports the following conclusions:

- The total HI for exposure to soil (ingestion, dermal contact, and inhalation) by potential on-site workers (industrial workers and construction/excavation workers) at three SWMUs (SWMUs 1, 4, and 7) were above DEQ's target noncancer effects level. Total HI is greater than 1. Total HIs ranged between 3 and 80 at the SWMUs, and the primary hazard driver in soil was mercury.

Potential total cumulative cancer risk levels were within or below DEQ's acceptable risk range (1×10^{-6} to 1×10^{-4}). The maximum total cumulative cancer risk level was 3×10^{-6} .

- No unacceptable potential health risks for exposure to soil were identified for onsite youth trespassers or hypothetical future on-site recreational users at the units evaluated or at the on-site former recreational area.

- There is little or no potential for human exposure to groundwater under current land use and reasonably anticipated future land-use exposure scenarios. Groundwater is not currently used on or adjacent to the site for potable uses, and groundwater to surface-water migration is not a significant fate and transport pathway. No unacceptable potential health risks for direct contact with and inhalation of volatile organic compounds (VOCs) released from groundwater to trench air were identified for on-site construction/excavation workers.

- However, concentrations of COPCs in groundwater are higher than levels that would permit hypothetical long-term use as drinking water. Mercury is the primary COPC in site-wide groundwater. Total HIs for hypothetical future residential (domestic use) pathways of shallow groundwater were above DEQ's target noncancer effects level. Total HIs for mercury were 8 for SWMU 1, 3 for SWMU 4, and 9 for SWMU 7. The total HI for mercury was less than 1 at the site perimeter. The exposure route of concern for mercury was the inhalation pathway. Other COPCs that contribute risk to the drinking-water pathway include total antimony, arsenic, cadmium, cobalt, thallium, and vanadium.

- Based on current conditions, vapor intrusion pathways are not considered to be significant at this time. However, potentially complete future land use scenario vapor intrusion pathways were evaluated for SWMUs 1 and 7. Inhalation of mercury vapor volatilized to indoor air was above DEQ's target noncancer effects level near SWMU 7 (a total HI of 2). No unacceptable potential health risks for vapor intrusion were identified at SWMU 1.

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3.4. Summary of Remedial Activities Completed

To expedite the implementation of remedial actions during the RFI, two rounds of Interim Measures (IM) were conducted on-site. The first IM was conducted in 2010 in conjunction with the sewer investigation and focused on the removing and isolating known sources of mercury to the Pump House Sewer (PHS) line. The second IM was completed in the fall of 2014 and included cleaning and lining impacted sections of sewer to seal off mercury inputs to the sewer. In addition, sediment was removed from the PHS, roof drains and subsurface piping were re-routed away from impacted areas near the Chemical Building, and interior walls of manholes were sealed to prevent infiltration of mercury.

3.5 Environmental Indicators

Under the Government Performance and Results Act (“GPRA”), EPA has set national goals to address RCRA corrective action facilities. Under GPRA, EPA and DEQ evaluate two key environmental clean-up indicators for each facility: (1) Current Human Exposures Under Control, and (2) Migration of Contaminated Groundwater Under Control. The Facility met the Human Exposures Under Control on October 1, 2003 and the Migration of Contaminated Groundwater Under Control on September 19, 2005.

Section 4: Corrective Action Objectives

Soils

DuPont performed a site specific Risk Assessment for the Facility, and determined that for an on-site industrial worker, mercury concentrations at 40 mg/kg in surface soil was protective of human health. The DuPont Risk assessment also looked at on-site construction workers, and came up with a higher mercury concentration that would be protective for on-site construction workers. However, DEQ has determined that 40 mg/kg of mercury is protective for direct contact with soils for both industrial workers and on-site construction workers, provided that the Facility is not used for residential purposes. Therefore, EPA’s Corrective Action Objective for Facility soils is to attain 40 mg/kg for Industrial Soils and to control exposure to the hazardous constituents remaining in soils by requiring engineering controls and compliance with and maintenance of land use restrictions. Because mercury will remain in Facility soils above levels appropriate for residential uses, under this proposed remedy, Institutional Controls (ICs) are required to restrict the Facility to non-residential uses. ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination and/or protect the integrity of the remedy by limiting land or resource use.

This restriction will be imposed by the Facility’s Hazardous Waste Management Permit for Site-Wide Corrective Action.

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Groundwater and Technical Impracticability

DEQ expects final remedies to return usable groundwater to its maximum beneficial use, where practicable, within a timeframe that is reasonable. Where returning contaminated groundwater to its maximum beneficial use is not technically practicable, DEQ generally expects facilities to prevent or minimize the further migration of a plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction. Technical impracticability (TI) for contaminated groundwater refers to a situation where achieving groundwater cleanup standards associated with final cleanup standards is not practicable from an engineering perspective. The term “engineering perspective” refers to factors such as feasibility, reliability, scale or magnitude of a project, and safety.

DEQ has determined that restoration of groundwater to drinking water standards known as Maximum Contaminant Levels (MCLs), promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1, at the Facility is technically impracticable in the mercury contaminated groundwater areas associated with SWMU 1, SWMU 4 and SWMU 7 for the following reasons:

1. Sources of mercury impacts to groundwater include former building foundations, sumps, pits, and abandoned pipelines in the shallow subsurface that contain free mercury.
2. Groundwater monitoring conducted at the site over a ten-year period has shown that areas of impacted groundwater are localized and are limited in extent to the areas around the identified sources.
3. The proposed remedial actions for SWMUs 1, 4, and 7 involve excavation and removal of free mercury sources along with capping. The removal of these sources will eliminate the majority of mercury that is currently impacting groundwater.
4. Capping of residual soils with mercury at concentrations above the cleanup level will further reduce the impact on groundwater through surface infiltration. The caps will be installed across broad areas of mercury-impacted soils at SWMUs 1, 4, and 7 and will reduce significantly the impact to groundwater pathway.
5. Mercury in groundwater above the MCL will remain and will be difficult to remove, primarily due to the affinity for mercury to adsorb onto clays in the soil matrix of the shallow groundwater zone.

Therefore, DEQ’s Corrective Action Objectives for Facility groundwater are to control exposure to the hazardous constituents remaining in the groundwater; protect the current existing receptors, namely bedrock and the South River, from unacceptable concentrations from contaminants of concern (COC) impacts; and ensure that no groundwater discharge concentrations would result in surface water concentrations that are above the DEQ surface water criteria.

Section 5: Proposed Remedy

1. Soils

Mercury contaminated soil was found in the surface and subsurface at SWMU 1 and in the subsurface at SWMU 4 and SWMU 7. Elemental or free mercury was found at SWMU 1 and SWMU 4. Therefore, DEQ has determined that the following is required to protect human health and the environment via the soil direct contact or inhalation exposure pathway for the present and anticipated industrial use of the Facility property:

SWMU 1: Soil – excavation and off-site disposal of free mercury sources, combined with capping and Institutional Controls;

SWMU 4: Soil – excavation and off-site disposal of free mercury sources, combined with capping and Institutional Controls;

SWMU 7: Soil – capping and Institutional Controls;

Mercury was found in soils below the industrial screening level at SWMU 2, SWMU 6, SWMU 17 and AOC 1, but above the Residential Screening Level. Therefore DEQ is proposing that Institutional Controls be required for these units.

Engineering Controls for the Facility are required and are in-place and operating. They include maintaining the security fence, security cameras and signs.

2. Groundwater

DEQ has concluded that it is technically impracticable to attain MCLs in mercury contaminated groundwater associated with SWMU 1, SWMU 4 and SWMU 7. Each of these SWMUs has its own defined TI zone detailed in the Corrective Measures Study (CMS). (See Figure 2). While source control will be implemented at the 3 SWMUs, including removal of free mercury at SWMU 1 and SWMU 4, residual mercury will remain in the subsurface.

DEQ is proposing groundwater monitoring in all three TI zones to continually verify that groundwater which exceeds the MCL is contained within the TI zone. The establishment of three Technical Impracticability Zones (TI Zones) will be the most practical and economical remedy that will continue to be protective of human health and the environment. Each TI zone will define the area that will ensure groundwater contamination stability within the Facility property. A monitoring plan is proposed to require long-term monitoring through performance sampling and gauging of the proposed TI Boundary monitoring well network.

For SWMU 1, the proposed TI zone will need to be re-evaluated if current production wells are halted. The monitoring plan will include a contingency for increased monitoring at

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SWMU 1 if production well pumping is halted. This monitoring would include the wells in and around the northeast area groundwater depression at SWMU 1 and selected downgradient wells to evaluate whether the spatial extent or magnitude of detected mercury concentrations increase.

3. AOC 3: Sewers

DEQ is proposing for AOC 3 a combination of cleaning and lining impacted sewers of the 001 Outfall system and abandoning sections of sewer in place. The majority of this work has been completed under Interim Measures. Continual monitoring of the sewer system and outfalls is required to assess the mercury reduction and effectiveness of the sewer remedial work.

4. Operation, Maintenance and Monitoring of Engineering Controls

DEQ's proposed final remedy includes requirements to operate, maintain and monitor the impervious capped areas (SWMU 1, SWMU 4 and SWMU 7), the existing security fence, signs, and security cameras.

5. Institutional Controls

Because some contaminants remain in the soil and groundwater at the Facility at levels which exceed residential use for soils and drinking water standards for groundwater, DEQ's proposed remedy requires the compliance with and maintenance of land and groundwater use restrictions. DEQ is proposing the following land and groundwater use restrictions be implemented and maintained at the Facility:

1. Groundwater at the Facility shall not be used for any purpose other than to conduct the operation, maintenance, and monitoring activities required by DEQ and/or EPA, unless it is demonstrated to DEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy and DEQ provides prior written approval for such use (Current Facility production wells located in the Bedrock Zone are exempt from this provision) ;
2. No new wells will be installed on Facility property unless it is demonstrated to DEQ that such wells are necessary to implement the final remedy and DEQ provides prior written approval to install such wells.
3. The Facility property shall not be used for residential purposes unless it is demonstrated to DEQ that such use will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy, and DEQ provides prior written approval for such use;

4. All earth moving activities, including excavation, drilling and construction activities, in the areas at the Facility where any contaminants remain in soils shall be prohibited unless such activity will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy, and DEQ is notified prior to implementation. The Materials Management Plan required under Section 5 – Additional Requirements will be followed when conducting such activity;
5. A mercury vapor intrusion protection plan to address buildings near SWMU 7 area and anywhere potential vapor intrusion pathways may exist. Vapor intrusion should be addressed for all media containing mercury. The mercury vapor intrusion protection plan will include procedures to assess the potential for vapor intrusion (collection of additional data) to determine whether institutional or engineering controls are necessary. DEQ will provide written approval that no vapor intrusion control system is needed.

The Facility property will not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy selected by DEQ in the Final Decision and Response to Comments (FDRTC);

Access to the Facility property will be restricted through the use and maintenance of fencing and controlled access (security gate).

EPA, DEQ, and/or their authorized agents and representatives, shall have access to the Facility 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 selected in the FDRTC.

DEQ proposes to implement the remedy through the Facility's Hazardous Waste Management Permit Renewal for Site-Wide Corrective Action. Therefore, DEQ does not anticipate any regulatory constraints in implementing its remedy. In addition, the Facility's Corrective Measures Implementation (CMI) Plan provides the basis for continued remedy implementation, remedy operations and maintenance, groundwater monitoring, evaluation of remedy effectiveness, and compliance with institutional controls. The use of an Environmental Covenant pursuant to the Virginia Uniform Environmental Covenants Act (UECA), Title 10.1, Chapter 12.2, §§10.1-1238 - 10.1-1250 of the Code of Virginia may also be used for compliance with institutional controls.

In addition, the Commonwealth of Virginia State Board of Health Private Well Regulations, 12 VAC 5-630-10 et seq. (Regulations) and its implementing statute set forth at the Code of Virginia, Title 32.1 (Health), Chapter 6 (Environmental Health Services), Va. Code §32.1, is an institutional control mechanism that will reduce potential human exposure to contaminated

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groundwater attributable to the Facility. Pursuant to Section 12 VAC 5-630-30, the purpose of these Regulations is to “ensure that all private wells are located, constructed and maintained in a manner which does not adversely affect ground water resources, or the public welfare, safety and health.”

Accordingly, Section 12 VAC 5-630-230 through 12 VAC 5-630-270 of the Regulations prescribes the process by which construction permits for the installation of private wells are received and issued. Pursuant to the Regulations, if a private well is installed or modified without a permit, Section 12 VAC 5-630-150 sets forth an enforcement mechanism which provides for the notification of violations of the Regulations, the issuance of orders requiring cessation and correction of violations, appropriate remedial action to ensure that the violation does not recur, and any appropriate corrective action to ensure compliance with the Regulations.

6. Additional Requirements

1. At least once every five years after initially certified and whenever requested by DEQ or EPA, the then current owner shall submit to DEQ and EPA a written certification stating whether the groundwater and land use restrictions are in place and being complied with.

2. Within one month after any of the following events, the then current owner of the Facility shall submit, to DEQ and EPA written documentation describing the following: observed noncompliance with the land and/or groundwater use restrictions; transfer of the Facility; changes in use of the Facility; or filing of applications for building permits for the Facility and any proposals for any Site work, if such building or proposed Site work will affect the contamination at the Facility.

3. In addition, the Facility owner shall provide DEQ and EPA with a coordinate survey as well as a metes and bounds survey, of the Facility boundary, the TI zones, and all capped areas (Engineering Controls). Mapping the extent of the land use restrictions will allow for presentation in publicly accessible Web pages.

4. A Materials Management Plan for areas known to contain COCs shall be submitted for review and written approval. The Materials Management Plan will detail how contaminated soil and groundwater will be managed during any future subsurface activities conducted at the Facility. The Materials Management Plan will detail how all excavated soils will be handled and disposed. All soils that are to be disposed of shall be sampled and disposed of in accordance with applicable State and Federal regulations.

Soil remediation cleanup standards will be EPA’s RSL for industrial soil, except for mercury which is 40 mg/kg. In addition, the Materials Management Plan will include soil stabilization requirements to minimize contact between storm water runoff and the parcel soils. Soil

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stabilization measures may include the construction of berms to prevent storm water from flowing onto certain areas as well as the construction of sumps with pumps to remove ponded water from low lying areas.

Section 6: Evaluation of Proposed Remedy

This section provides a description of the criteria DEQ used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, DEQ evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, DEQ then evaluates seven balancing criteria.

Threshold Criteria	Evaluation
1) Protect human health and the environment	<p>DEQ's proposed remedies for the Facility protect human health and the environment by eliminating, reducing, or controlling potential unacceptable risk through mercury removal, soil capping and implementation and maintenance of ICs and ECs. DEQ is proposing ICs to restrict land use to commercial or industrial purposes at the Facility. Engineering Controls include maintaining the security fence around the industrial portion of the property and maintaining the impervious caps.</p> <p>With respect to groundwater, while low levels of contaminants remain in the groundwater beneath the Facility, the contaminants are contained in the aquifer as shown by the groundwater monitoring. In addition, groundwater monitoring will continue to monitor the groundwater contamination stability in the TI zones. With respect to future uses, the proposed remedy requires groundwater use restrictions to minimize the potential for human exposure to contamination and protect the integrity of the remedy.</p>
2) Achieve media cleanup objectives	<p>DEQ's proposed remedies meet the media cleanup objectives based on assumptions regarding current and reasonably anticipated land use as commercial or industrial.</p> <p>Free mercury will be removed in the known source areas and the remaining soils that exceed 40 mg/kg will be capped.</p>

	<p>Groundwater monitoring has demonstrated that mercury is stable and not migrating from the TI zones. A groundwater monitoring program already in place will continue to monitor the groundwater contamination stability in the TI zones and verify that all groundwater which exceeds the MCL remains within the TI zone.</p>
3) Remediating the Source of Releases	<p>In all proposed remedies, DEQ seeks to eliminate or reduce further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment and to confirm the Facility has met this objective.</p> <p>In SWMU 1 and SWMU 4, free mercury and soil contaminated with mercury will be excavated and removed.</p> <p>Under the Interim Measures, sections of the PHS were replaced or lined. Completion of the sewer work will serve to minimize mercury release through the main plant Outfall 001.</p>

Balancing Criteria	Evaluation
1) Long-term effectiveness	<p>The capping of SWMU1, SWMU 4 and SWMU 7 will provide long-term protectiveness of mercury remaining in soils from human contact. Along with the maintenance of the security fence around the Facility, which provides an additional layer of protection from trespassers.</p> <p>Groundwater is not used on the Facility for drinking water, and no down gradient users of off-site groundwater exist. Therefore, the proposed long term effectiveness of the remedy for the Facility will be maintained by the continuation of the groundwater monitoring program and implementation of land use controls (institutional controls).</p>
2) Reduction of toxicity, mobility, or volume of the Hazardous Constituents	<p>The reduction of toxicity, mobility and volume of hazardous constituents will continue by removing free mercury from the source areas and by capping the remaining portions of the source areas. Reduction has already been achieved through the Interim Measures work associated with the sewers.</p> <p>Groundwater will continue to be monitored to assure stability of mercury TI zones.</p>

3) Short-term effectiveness	DEQ's proposed remedy requires excavation of free mercury from SWMU 1 and SWMU 4. The Facility has protective plans in place for dealing with free mercury removal that were used during the Interim Measures work with the sewers.
4) Implementability	DEQ's proposed decision is readily implementable. The groundwater monitoring is already in place and operational. DEQ does not anticipate any regulatory constraints in implementing its proposed remedy. DEQ proposes to implement the institutional controls through the Permit and an enforceable mechanism such as an Environmental Covenant
5) Cost	<p>Because DEQ has determined that TI applies to groundwater in three Areas, the cost associated with implementing this proposed remedy are the most cost effective.</p> <p>A combination of source removal and capping is cost effective for dealing with known source areas of mercury in soils.</p>
6) Community Acceptance	The public will be notified during the public comment period for the renewal of the Facility's Hazardous Waste Management Permit for Site-Wide Corrective Action, which will last sixty (60) calendar days. DEQ's final decision will be described in the Facility's Permit which will be modified to include facets of the final remedy.
7) Support Agency Acceptance	EPA has reviewed and concurred with the proposed remedy for the Facility.

Section 7: Financial Assurance

The Facility had not been providing financial assurance during the site investigation and groundwater monitoring activities under the Facility's initial permit. However, updated cost estimates for DEQ's final decision are required by the Permit and will be the basis for financial responsibility of the implementation and operation and maintenance of the final remedy.

Section 8: Public Participation

Interested persons are invited to comment on DEQ's proposed decision during the comment period for the renewal of the Facility's Hazardous Waste Permit, which will incorporate the

remedy. The public comment period will last sixty (60) calendar days from the date the notice is published in a local newspaper.

The Administrative Record contains all the information considered by VDEQ for its proposed remedy for the Facility. To receive a copy of the Administrative Record or for additional information regarding the proposed remedy, please contact Mr. Vincent Maiden at (804) 698-4064 or Vincent.Maiden@deq.virginia.gov.

The public comment period will last sixty (60) calendar days from the date the notice is published in a local newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Ms. Angela Alonso at the address listed below.

Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 1105
Richmond, VA 23219
Contact: Vincent Maiden
Phone: (804) 698-4064
Email: Vincent.Maiden@deq.virginia.gov

DEQ will make a final decision after considering all comments, consistent with the applicable RCRA requirements and regulations. If the decision is substantially unchanged from the one in this Statement of Basis, DEQ will issue a final decision through issuance of the Corrective Action Permit and inform all persons who submitted written comments or requested notice of DEQ's final determination. If the final decision is significantly different from the one proposed, DEQ will issue a public notice explaining the new decision and will reopen the comment period.

Section 9: Index to Administrative Record

This index includes documents that the Virginia Department of Environmental Quality (DEQ) relied upon to develop and propose the final remedy selection determination described in the Statement of Basis. These documents were prepared for the INVISTA Waynesboro facility and are listed chronologically by document date.

	Program	Title	Date
1.	RFI	Permit for Corrective Action and Waste Minimization. Permit Number VAD003114832	October 1998
2.	RFI	Release Assessment/ RCRA Facility Investigation Work Plan DuPont Waynesboro	June 2, 2000
3.	RFI	Phase I Release Assessment/RFI Data Summary Report, DuPont Textiles and Interiors Waynesboro	April 2003

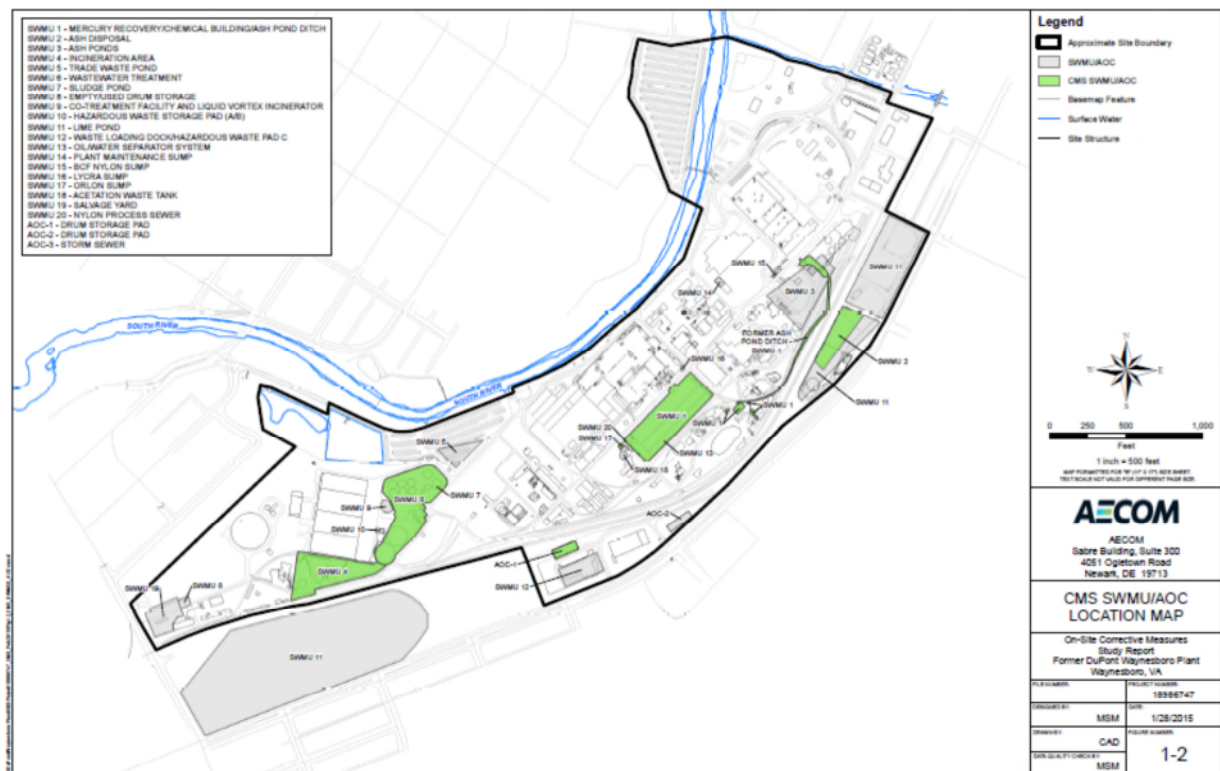
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		Plant	
4.	RFI	Phase II RFI Geologic and Hydrogeologic Investigation Work Plan	March 2004
5.	RFI	Phase II Release Assessment/RFI Data Summary Report, Invista Waynesboro Plant, Waynesboro, Virginia.	September 2007
6.	RFI	Supplemental Work Plan for the Inspection and Abatement of Free Mercury, Waynesboro Invista Plant	October 2007
7.	RFI	Supplemental Work Plan for the Investigation of Mercury at the former Chemical Building	November 2007
8.	RFI	Phase III RA/RFI Data Summary Report. Invista Waynesboro Plant, Waynesboro, Virginia.	March 2008
9.	RFI	Interim Measures Work Plan , Invista Waynesboro Plant, Waynesboro, Virginia	July 2009
10.	RFI	Interim Measures Implementation Report , Invista Waynesboro Plant, Waynesboro, Virginia	August 2011
11.	RFI	Sewer Investigation Report Former DuPont Waynesboro Plant, Waynesboro, Virginia	August 2011
12.	RFI	Railroad Avenue Interim Measures Work Plan , Invista Waynesboro Plant, Waynesboro, Virginia	April 2013
13.	RFI	Railroad Avenue Interim Measures Work Plan, Supplemental Work Plan, Invista Waynesboro Plant, Waynesboro, Virginia	May 2014
14.	RFI	Interim Measures Implementation Report, Railroad Avenue IM, Invista Waynesboro Plant, Waynesboro, Virginia	June 2015
15.	RFI	Comprehensive RFI Report	May 2015
16.	RFI	EPA Letter to Mr. Liberati (DuPont) approving RFI Report	May 27, 2015
17.	RFI	On-Site Corrective Measures Study Report Former DuPont Waynesboro Plant, Waynesboro, Virginia	June 2016
	Program	Title	Date
1	Outfall Monitoring	Storm Water Monitoring Report, Invista Waynesboro Plant Waynesboro, Virginia	December 2003
2	Outfall Monitoring	Addendum I Phase II Storm Water Monitoring Plan	September 2004
3	Outfall Monitoring	Phase II Storm Water Monitoring Report	June 2006

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4	Outfall Monitoring	Phase III Stormwater Monitoring Report Invista Waynesboro Plant Waynesboro, Virginia	December 2007
5	Outfall Monitoring	Phase IV Stormwater Monitoring Report Invista Waynesboro Plant Waynesboro, Virginia	October 2009
	Program	Title	Date
1	Groundwater	RCRA Routine Groundwater Monitoring Plan. Invista Waynesboro Plant, Waynesboro, Virginia.	July 2004
2	Groundwater	Routine Groundwater Monitoring Annual Report 2004	May 2005
3	Groundwater	2005 Annual Groundwater Monitoring Report, Invista Waynesboro	December 2006
4	Groundwater	2006 Annual Groundwater Monitoring Report	May 2007
5	Groundwater	2007 Annual Groundwater Monitoring Report	March 2008
6	Groundwater	2008 Annual Groundwater Monitoring Report	June 2009
7	Groundwater	2009 Groundwater Monitoring Report	September 2010
8	Groundwater	2010 Annual Groundwater Monitoring Report	May 6, 2011
9	Groundwater	2011 Annual Groundwater Monitoring Report	May 2012
10	Groundwater	2012 Annual Groundwater Monitoring Report	April 2013
11	Groundwater	2013 Annual Groundwater Monitoring Report	April 2014
12	Groundwater	2014 Annual Groundwater Monitoring Report	March 2015
13	Groundwater	2015 Annual Groundwater Monitoring Report	March 2016

Figure 1
Map of Facility



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Figure 2
Map of TI zones

