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## LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. The Department has, as deemed necessary, modified specific language from the permit application. Additional modifications are prescribed in the permit conditions (Parts I and II), and thereby supersede the language of the Attachments.

Attachment A	Facility Description and On-Site Corrective Action
Attachment B	List and Description of Known On-Site Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)
Attachment C	Off-Site Corrective Action (AOC 4)
Attachment D	Hazardous Constituents Sampling List and Risk-Based Concentration Screening
Attachment E	RCRA Facility Investigation Requirements
Attachment F	Corrective Measures Study Requirements
Attachment G	Interim Measures Requirements
Attachment H	Quality Assurance and Quality Control Requirements
Attachment I	Health and Safety Plan Requirements
Attachment J	Corrective Measures Implementation Scope of Work Requirements

## DEFINITIONS

For the purposes of this Permit, the following definitions shall apply:

- a. The term "Permit" shall mean the Permit issued by the Virginia Department of Environmental Quality, pursuant to Chapter 14, Article 4, Title 10.1, Code of Virginia (1950), as amended, and the Virginia Hazardous Waste Management Regulations (VHWMR) as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 60 (9 VAC 20 60).
- b. The term "Director" shall mean the Director of the Virginia Department of Environmental Quality or his designated representative.
- c. The term "Department" shall mean the Virginia Department of Environmental Quality (DEQ), (with the address as specified in Permit Condition I.I.).
- d. The terms "facility" or "site" shall mean all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. For the purpose of implementing corrective action under 40 CFR § 264.101, "facility" means all contiguous property under the control of the owner or operator under a permit under Subtitle C of RCRA. For purposes of retention of records, reports and all information associated with Corrective Action, "facility" shall mean the offices of the DuPont Corporate Remediation Group in Wilmington, DE.
- e. The term "hazardous waste management unit" is a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.
- f. The term "release" shall mean any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, including abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance, pollutant, or contaminant (40 CFR § 302.2 and CERCLA § 101(22)) .
- g. The term "Area of Concern" shall mean an area at the facility or an off-site area, which is not at this time known to be a solid waste management unit, where hazardous waste and/or hazardous constituents are present or are suspected to be

present as a result of a release from the facility.

- h. The term “Hazardous Constituent” shall mean a constituent that caused the Administrator to list the hazardous waste in 40 CFR 261, Appendix VIII.
- i. The term “Permittee” shall mean the facility to which the Permit is issued.
- j. The term “EPA” shall mean United States Environmental Protection Agency.
- k. The term “Solid Waste Management Unit” shall mean any discernable unit at the facility from which hazardous constituents might migrate, irrespective of whether the units were intended for the management of solid and/or hazardous wastes. Such units include any area at a facility which solid wastes have been routinely and systematically released. The term “unit” refers to containers, container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, underground injection wells, and other physical, chemical, and biological units or treatment units.
- l. The term “Days” shall mean calendar days except as otherwise provided herein.
- m. All definitions contained in 40 CFR Sections 124.2, 260.10, 270.2, 264.141, 264.1031, 264.1051, 264.1081, and 9 VAC 20-60 are hereby incorporated, in their entirety, by reference into this Permit. Any of the definitions used above, (a) through (f), shall supersede any definition of the same term given in 40 CFR Sections 124.2, 260.10, 270.2, 264.141, 264.1031, 264.1051, 264.1081, and 9 VAC 20-60. Where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.
- n. Throughout the Permit, all references to 40 CFR Parts 261-266, 268, 270, 273, 279, are as adopted by reference in the Virginia Hazardous Waste Management Regulations, 9 VAC 20-60.

## **MODULE I STANDARD CONDITIONS**

### **I.A. EFFECT OF PERMIT**

1. This Permit, issued by the Director pursuant to 40 CFR § 270.1(c)(4), authorizes only the management of hazardous waste under corrective action (CA) expressly described in this Permit and in accordance with the conditions of this Permit and with the applicable provisions of the VHWMR under 9 VAC 20-60. Any management of hazardous waste by the Permittee which is not authorized by this Permit or 9 VAC 20-60, and for which a permit is required under Chapter 14, Article 4, Title 10.1, Code of Virginia (1950), as amended, is prohibited. (40 CFR §§ 270.30(g) and 270.4(b) and (c)). Compliance with this Permit generally constitutes compliance, for the purposes of enforcement, with Chapter 14, Article 4, Title 10.1-1426, Code of Virginia (1950), as amended. This Permit does not convey any property rights of any sort, or any exclusive privilege. Possession of a permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of Commonwealth of Virginia or local laws or regulations. Compliance with the terms of this Permit may not constitute a defense to any action brought under Chapter 14, Article 8, Code of Virginia (1950), as amended, or any other Commonwealth law governing protection of the public health or the environment.
  
2. The CA obligations contained in this Permit shall continue regardless of whether the Permittee continues to operate or ceases operation and closes the facility. The Permittee is obligated to complete facility-wide CA under the conditions of a RCRA Permit regardless of the operational status of the facility. The Permittee must submit an application for a new Permit at least 180-days before this Permit expires pursuant to 40 CFR § 270.10(h), unless the Permit has been modified to terminate the CA schedule of compliance and the Permittee has been released from the requirements for financial assurance for corrective action.

### **I.B. PERMIT ACTIONS**

1. This Permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR §§ 124.5, 270.30(f), 270.41, 270.42, and 270.43. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance does not stay the applicability or enforceability of any Permit Condition (40 CFR § 270.30(f)).
  
2. Permit modifications at the request of the Permittee shall be done as specified by 40 CFR § 270.42.

3. This Permit may be renewed as specified in 9 VAC 20-60-270.10 and 40 CFR § 270.10, and Permit Condition I.D.2. Review of any application for a permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations.

#### **I.C. SEVERABILITY**

1. The provisions of this Permit are severable, and if any provision of this Permit or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby. Invalidation of any Commonwealth or federal statutory or regulatory provision which forms the basis for any condition of this Permit does not affect the validity of any other Commonwealth or Federal statutory or regulatory basis for said condition (40 CFR § 124.16(a)(2)).
2. In the event that a condition of this Permit is stayed for any reason, the Permittee shall continue to comply with the related applicable and relevant interim status standards in 40 CFR § 270.10(e) until final resolution of the stayed condition unless the Director determines compliance with the related applicable and relevant interim status standards would be technologically incompatible with compliance with other conditions of this Permit which have not been stayed.

#### **I.D. DUTIES AND REQUIREMENTS**

1. Duty to Comply  
The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit (see 40 Code of Federal Regulations (CFR) § 270.61). Any other Permit noncompliance constitutes a violation of Title 10.1, Code of Virginia (1950), as amended, and regulations promulgated thereunder and is grounds for enforcement action, Permit termination, revocation and reissuance, modification, or denial of a Permit renewal application (40 CFR 270.30(a)).
2. Duty to Reapply  
If the Permittee wishes to or is required to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittee shall apply for and obtain a new Permit as specified below.
  - a. The Permittee shall submit a new and complete application for a new Permit at least 180 days before the Permit expires, unless a later date has been approved by the Director.
  - b. Pursuant to 9 VAC 20-60-270.10.h, the Director shall not grant permission for an application to be submitted later than the existing Permit's

expiration date (40 CFR 270.30(b)).

3. Need to Halt or Reduce Activity Not a Defense  
It shall not be a defense in an enforcement action to argue that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit (40 CFR 270.30(c)).
4. Duty to Mitigate  
In the event of noncompliance with the Permit, the Permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Permit, and shall carry out such measures as are reasonable to prevent significant adverse impacts (40 CFR 270.30(d)).
5. Proper Operation and Maintenance  
The Permittee shall at all times properly operate and maintain all facilities and systems of the treatment and controls (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls; including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facility or similar systems only when necessary to maintain compliance with the conditions of the Permit (40 CFR 270.30(e)).
6. Duty to Provide Information  
The Permittee shall furnish the Director within a reasonable time, any relevant information the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish the Director, upon request, copies of records required by this Permit (40 CFR 270.30(h)).
7. Inspection and Entry  
The Permittee shall allow the Director or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:
  - a. Enter at reasonable times upon the Permittee's premise where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;
  - b. Have access to and copy, at reasonable times, any records kept under conditions of this Permit;

- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
  - d. Sample or monitor, at reasonable times, for the purpose of assuring Permit compliance or as otherwise authorized by VHWMR, any substance or parameters at any location (40 CFR 270.30(i)).
8. Reporting Planned Changes  
The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. This notice shall include a description of all incidents of noncompliance reasonably expected to result from the proposed changes (40 CFR 270.30(1)(1)).
9. Anticipated Noncompliance  
The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with the Permit requirements (40 CFR 270.30(1)(2)).
10. New and Modified Portions of Any Waste Management Unit  
The Permittee shall not store or treat hazardous waste in any new or modified portion of the facility, except as provided in 40 CFR § 270.42, until the Permittee has submitted to the Director, by certified mail or hand delivery, a letter signed by the Permittee and a professional engineer registered by the Commonwealth stating that the facility has been constructed or modified in compliance with the Permit; and:
- a. The Director has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the Permit; or
  - b. Within 15 days of the date of submission of the letter required pursuant to Permit Condition I.D.10, if the Permittee has not received notice from the Director of his intent to inspect, prior inspection is waived and the Permittee may commence treatment of hazardous waste. (40 CFR 270.30(1)(2))
11. Twenty-four Hour Reporting  
The Permittee shall report to the Director any non-compliance which may endanger human health or the environment. In addition, the Permittee shall also report any circumstances which required a contingency plan to be implemented regardless whether a release is on or off-site. Information shall be provided orally within 24-hours of the Permittee becoming aware of the circumstances.



Information specified (a, b, and c) shall be reported orally within 24 hours:

- a. Information concerning the release of any hazardous waste that may endanger public water supplies.
- b. Any information of a release or discharge of hazardous waste, or of a fire or explosion at the facility, which could threaten the environment or human health outside the facility.
- c. The description of the occurrence and its cause shall include at least the following:
  - i. Name, address, and telephone number of owner/operator;
  - ii. Facility name, address, and telephone number;
  - iii. Date, time, and type of incident;
  - iv. Name and quantity of material(s) involved;
  - v. The extent of injuries, if any;
  - vi. Assessment of actual or potential hazard to human health and the environment outside the facility, where this is applicable; and
  - vii. Estimated quantity and disposition of recovered material that resulted from the incident (40 CFR 270.30 (1)(6)).
- d. A written submission shall also be provided to the Director within five (5) days of the Permittee becoming aware of the circumstances. The written submission shall contain at a minimum the following:
  - i. A description of the noncompliance and cause;
  - ii. The periods of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated duration of the noncompliance; and
  - iii. The steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Permittee need not comply with the 5-day written notice requirement only if the

Director waives that requirement following verbal notification and the Permittee submits a written report within fifteen (15) days of the time the Permittee becomes aware of the circumstances (40 CFR 270.30(1)(6)(iii)).

12. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above, at the time monitoring reports are submitted. The reports shall contain at a minimum the information listed in Permit Section I.D.11 (40 CFR 270.30(1)(10)).

13. Other Information

Whenever the Permittee becomes aware that they failed to submit any relevant facts in the Permit application, or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall promptly submit such facts or information to the Director.

**I.E. MONITORING AND RECORDS**

1. Monitoring Reports

Monitoring shall be performed and results shall be reported at the intervals specified in the Permit.

2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method specified in 40 CFR 261, Appendix I, or an equivalent method approved by the EPA. Laboratory methods must be those specified in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846 (3rd ed.; November, 1986, as updated), *Standard Methods of Wastewater Analysis* (16th ed.; 1985, as updated), an equivalent method approved by the EPA.

3. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, all certifications required by 40 CFR 264.73(b)(9), and records of all data used to complete the application for this Permit, for a period of at least 3 years (or longer if specified elsewhere in this Permit) from the date of the sample collection, measurement, report, certification, or application. These retention periods may be extended by the request of the Director at any time and are automatically extended during the course of any unresolved enforcement actions regarding this facility. The Permittee shall maintain records from all ground-water monitoring wells and associated ground-water surface elevations, for the

active life of the facility, and for disposal facilities for the post-closure care period as well. (Also see Permit Condition I.J.)

Records of monitoring information shall include at a minimum:

- a. The date, exact place, and time of sampling or measurements;
- b. The individual(s) who performed the sampling or measurements;
- c. The date(s) analyses were performed;
- d. The individual(s) who performed the analyses;
- e. The analytical techniques or test methods used; and
- f. The results of such analyses (40 CFR § 270.30(j)).

**I.F. COMPLIANCE NOT CONSTITUTING DEFENSE**

Compliance with the terms of this Permit does not constitute a defense to any action brought under Chapter 14, Article 8 of Title 10.1, Code of Virginia (1950) as amended or any other Commonwealth law governing protection of the public or the environment.

**I.G. TRANSFER OF PERMITS**

This Permit is not transferable to any person except after notice to the Director. (40 CFR § 270.30(l)(3)) This Permit may be transferred by the Permittee to a new owner or operator only if the Permit has been modified or revoked and reissued under 40 CFR § 270.40(b) or § 270.42(b)(2) to identify the new Permittee and to incorporate such other requirements as may be necessary under the RCRA. (40 CFR § 270.40) Before transferring ownership or operation of the facility during its operation life, the Permittee shall notify the new owner or operator in writing of the requirements of 9 VAC 20-60-264 and 40 CFR Part 264 and 270 and at the same time shall send a copy of such notice to the Director (40 CFR § 264.12(c)).

**I.H. PERMIT EXPIRATION AND CONTINUATION**

Pursuant to 9 VAC 20-60-270 B 15 this Permit will remain in force until the effective date of a new permit if the Permittee have submitted a timely, complete application pursuant to Permit Condition I.D.2.a. and through no fault of the Permittee, the Director has not issued a new permit with an effective date on or before the expiration date of this Permit. All conditions of the continued Permit shall remain fully effective and enforceable (40 CFR § 270.51).

**II. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DEPARTMENT**

1. Biennial Report

The Permittees shall submit a biennial report to the Department which covers facility activities during odd numbered calendar years, if required by the regulations. At a minimum this report will include:

- a. The generator biennial report pursuant to 40 CFR § 262.41; and
- b. The hazardous waste management facility biennial report pursuant to 40 CFR § 270.30(1)(9) and § 264.75.

2. Duty to Submit Certified Documents

All work plans, reports, notifications or other submissions which are required by this Permit to be sent or given to the Director shall be sent certified mail, sent by certified carrier, or be hand-delivered to:

**Department of Environmental Quality  
Attention: Ms. Jutta Schneider  
Corrective Action/Groundwater Program Manager  
Office of Remediation Programs  
P.O. Box 1105  
Richmond, VA 23218  
(804) 698-4099**

**Street address:  
629 East Main Street  
Richmond, VA 23219**

and one (1) copy of all such correspondence, reports, and submissions shall also be sent to:

**Director, Valley Regional Office  
Department of Environmental Quality  
4411 Early Road, P.O. Box 3000  
Harrisonburg, Virginia 22801  
(540) 574-7800**

**Associate Director, Office of Remediation  
Environmental Protection Agency, Region III  
1650 Arch Street  
Philadelphia, PA 19103-2029  
(3LC20)**

3. Signatory Requirements

All applications, work-plans, reports, and other information submitted shall be signed and certified by the Project Director in the DuPont Corporate Remediation Group assigned to the DuPont Waynesboro site.

**I.J. DOCUMENTS TO BE MAINTAINED AT THE FACILITY SITE**

1. Current copies of the following documents, as amended, revised, and modified, shall be maintained at the DuPont Corporate Remediation Group office in Wilmington, Delaware, and at the South River Science Team office, 508 W. Main Street, Waynesboro, Virginia 22980. The documents shall be made available to VDEQ upon request. These documents shall be maintained until closure and corrective action is completed and certified by the Permittee and by an independent, Virginia-registered professional engineer, unless a lesser time is specified in the Permit.
  - a. The Permit, including all attachments;
  - b. All Part A and B Permit Applications supporting the Permit;
  - c. The facility operating record required by 40 CFR § 264.73;
  - d. Inspection schedules and logs required by 40 CFR § 264.15(b)(2) and § 264.15(d), as applicable;
  - e. Personnel training documents and records required by 40 CFR 264.16 and this Permit;
  - f. Closure Plans, as required by 40 CFR § 264.112(a), as applicable;
  - g. Post-Closure Plans, as required by 40 CFR § 264.118(a), as applicable;
  - h. Groundwater sampling and analysis plan required by 40 CFR 264.101 and this Permit as described in the Operations and Maintenance Plan;
  - i. Groundwater monitoring results required by 40 CFR 264.73(b)(6) and this Permit;
  - j. Corrective Action Work Plans, Reports, and other information and submissions regarding corrective action, as applicable under this Permit.

**I.K. APPROVAL/DISAPPROVAL OF SUBMISSIONS**

1. The DEQ will review the plans, reports, schedules and other documents (hereinafter collectively referred to as "submissions") submitted which require the Director's approval. The DEQ will notify the Permittee in writing of the DEQ's approval, conditional approval, or disapproval of each submission.
2. Each submission required by this Permit, upon approval by the Director, is incorporated into this Permit. Any noncompliance with a DEQ-approved submission shall be deemed as noncompliance with this Permit. A conditionally approved submission, including any terms of such conditional approval set forth in DEQ's decision, shall constitute the DEQ-approved submission and shall be incorporated into this Permit.
3. In the event of the DEQ's conditional approval of submission, the Director shall specify in writing any deficiencies in the submission and the terms upon which approval of the submission is conditioned. If the Permittee disputes any term upon which approval of the submission was conditioned, the Permittee may initiate Dispute Resolution pursuant to Permit Condition I.L.
4. In the event of the DEQ's disapproval of a submission, the Director or the DEQ shall specify the deficiencies in writing. Such disapproval shall not be subject to the Dispute Resolution provision set forth in Permit Condition I.L. The Permittee shall modify the submission to correct/address the specified deficiencies within a reasonable time period established by the Director or the DEQ taking into account the tasks to be performed, and submit the revised submission to the DEQ for approval.
5. If the revised submission is disapproved, the Director or the DEQ will notify the Permittee of the deficiencies in writing and specify a schedule for the Permittee to correct the deficiencies and resubmit the submission to DEQ. The Permittee shall correct the deficiencies as directed by DEQ, and forward the revised submission within the time period specified by DEQ. In the event the Permittee disagrees with the DEQ's disapproval of the revised submission, the Permittee shall notify the DEQ in writing and the disagreement shall be resolved in accordance with the Dispute Resolution provision in Permit Condition I.L. of this Permit.

**I.L. DISPUTE RESOLUTION**

1. Except as otherwise provided in this Permit, in the event the Permittee disagrees, in whole or in part, with Department disapproval of any submission required by this Permit, the Permittee shall notify the Department in writing of its objections, and the basis thereof, within fourteen (14) days of receipt of the Department's disapproval. Such notice shall set forth the specific matters in dispute, the

position(s) the Permittee asserts which should be adopted as consistent with the requirements of the Permit, the basis for the Permittee's position, and supporting documentation considered necessary for the Department's determination.

2. The Department and the Permittee shall have an additional fourteen (14) days from the Department's receipt of the notification to meet or confer to resolve any disagreement/dispute. In the event agreement is reached, the Permittee shall submit the revised submission and implement the same in accordance with such agreement.
3. In the event the Permittee and the DEQ are not able to reach an agreement on the dispute items within the additional 14-day period, the Department will notify the Permittee in writing of its decision on the dispute and the Permittee shall comply with the terms and conditions of the Department's decision in the dispute. The Permittee does not waive its right to assert any and all available defenses in a proceeding to enforce this Permit.
4. In the event the Permittee disagrees with DEQ's disapproval of a submission or revised submission and the DEQ's written decision regarding dispute items, as specified in I.K and I.L, the Permittee may file an appeal with the Director within 30 days of the disapproval (as provided for in Rule 2A:2 of the Supreme Court of Virginia).

## **MODULE II SITE-WIDE CORRECTIVE ACTION**

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

1. Section 3004(u) of RCRA, 42 U.S.C. § 6924(u), and regulations codified at 40 CFR §264.101, provide that all permits issued after November 8, 1984 must require corrective action as necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any solid waste management unit (SWMU), regardless of when waste was placed in the unit.
2. Under Section 3004(v) of RCRA, 42 U.S.C. § 6924(v), and 40 CFR §264.101(c), the Department may require that corrective action at a permitted facility be taken beyond the facility boundary where necessary to protect human health and the environment, unless the owner or operator of the facility concerned demonstrates to the satisfaction of the Department that, despite the owner or operator's best efforts, the owner or operator was unable to obtain the necessary permission to undertake such action.
3. Section 3005(c)(3) of RCRA, 42 U.S.C. § 6925(c)(3), and 40 CFR § 270.32(b) provide that each permit shall contain such terms and conditions as the Department determines necessary to protect human health and the environment.
4. This permit requires the Permittee to conduct a RCRA Facility Investigation (RFI). The RFI will determine the nature and extent of releases of hazardous waste and constituents from regulated units, solid waste management units, and any other area of concern at the Facility and off-site, and to gather all data necessary for DEQ to determine whether interim/stabilization measures are necessary. The RFI includes the collection of site specific data and an evaluation of potential impacts to human health and/or the environment from potential or suspected contamination from the Facility and off-site. The RFI will gather all data necessary for the Department to determine whether a Corrective Measures Study (CMS) is required. If, on the basis of the RFI and any other relevant information, the Department determines that a CMS is necessary, the Permittee will be required to conduct a Corrective Measures Study for those releases from SWMUs or areas of concern (AOCs) which threaten human health or the environment, including off-site areas. AOC-4 has been identified in Attachment C as the off-site Area of Concern.



The Permittee may have completed some of the tasks required by this Permit and may have some of the information and data required by this Permit. Previous work may be used to meet the requirements of this Permit. Unless previously approved by the Department, such previous work must be submitted to and approved by the Department in accordance with Permit Section I.K.

5. The Permittee shall prepare Facility-specific scopes of work and reports relating to Interim Measures, RFI, CMS and any Risk Screening and Risk Assessment in accordance with the relevant attachments. The Permittee shall establish specific and appropriate elements of such scopes of work and reports to the Department's satisfaction under Permit Conditions I.K and I.L. of this Permit.

## **II.B. INTERIM MEASURES**

1. The Permittee may, at any stage of the RFI, if applicable, submit to the Department, in writing, a proposal to perform interim measures for the remediation of any release of hazardous waste or hazardous constituent at or from a SWMU/AOC. Any such proposal shall include a schedule for performance of such interim measures. For any releases to soil, groundwater, sediment and surface water, the Permittee must demonstrate in such proposal, to the Department's satisfaction, that the subsurface conditions and contaminant plume relating to such release have been adequately characterized and that the proposed interim measures will adequately remove, contain, or treat the released hazardous waste or hazardous constituents as necessary to protect human health and the environment. The nature and extent of releases to other media shall likewise be adequately characterized and evaluated by the Permittee in such a proposal. The Department shall review the Interim Measure proposal and determine whether such a proposal will be considered for approval and whether such interim measures are of such scope that they require implementation of the public notice requirements specified under II.E.1., Corrective Measures Remedy Selection.
2. The Department shall notify the Permittee of the approval or disapproval of the interim measures proposal. If the Department approves such a proposal, the Permittee shall be allowed to dispense with certain stages of the investigation, as described in the Department's approval of the interim measures proposal. No term or condition of this Permit, except as otherwise provided for by this Permit, shall be affected by the approval of such proposal until such time as this Permit has been modified to include such proposal. As appropriate, the Department or the Permittee may seek modification of this Permit pursuant to 40 CFR 270.41 or § 270.42 and § 124.5 to include such Interim Measure proposal.
3. If the Department determines, on the basis of information submitted by the Permittee pursuant to Permit Section II.C.(RFI), II.G.(Emergency Response; Release Reporting), or II.I (SWMU Assessment), or any other information, that

corrective action is necessary to protect human health or the environment from a release of hazardous waste or constituents from a SWMU/AOC, the Permittee may be required to implement Interim Measures.

- a. Within sixty (60) calendar days of receipt of the Department's notice to implement corrective action Interim Measures at specified SWMUs/AOCs, the Permittee shall submit to the Department and to EPA Region 3 an Interim Measures Plan (Plan). The Plan must be approved by the Department in accordance with Permit Condition I.K. This Plan shall conform to the requirement of conditions 1 and 2 of Attachment G - Interim Measure Requirements. Should the Permittee believe that any requirements of Conditions 1 and 2, Attachment G are inappropriate for this SWMU/AOC, the Permittee shall identify the particular requirement and explain why the requirement is inappropriate.
- b. According to the approved schedule, the Permittee shall submit to the Department the plans required by the Interim Measure Design Program, condition 2, Attachment G. These plans must be approved by the Department in accordance with Permit Section I.K. (Approval/Disapproval of Submissions) of this Permit.
- c. According to the approved schedule, the Permittee shall submit to the Department for approval the reports required by condition 3, Attachment G.
- d. Nothing in this Permit shall preclude the Permittee from performing Interim Measures at any time either to reduce or eliminate the risk to human health or the environment, or to prevent or reduce the spread of contamination (Permit Section II.B.1). Such measures, (*e.g.*, source removal, capping, groundwater pump and treat) may be taken at any time during the term of this Permit.
- e. Nothing in this Permit shall limit the Department's authority to undertake or require any person to undertake response action or corrective action under any law, including but not limited to, Sections 10.1-1402.19 and 1455 of the Virginia Waste Management Act (1950), as amended. Nothing in this Permit shall relieve the Permittee of any obligation it may have under any Federal or State law, including, but not limited to, Section 103 of CERCLA, to report releases of hazardous waste, hazardous constituents or hazardous substances to, at, or from the Facility.

## **II.C. RCRA FACILITY INVESTIGATION**

### **1. RCRA Facility Investigation Plan Submission**

Within ninety (90) days of the effective date of this permit the Permittee shall submit to EPA Region 3 and the VDEQ a RCRA Facility Investigation (RFI) plan for SWMU/AOCs listed in Attachment B.

The plan must be approved by the Department in accordance with Permit Condition I.K (Approval/Disapproval of Submissions). This plan shall meet the objectives and requirements specified below:

The RFI objectives are to:

- a. Characterize the presence, magnitude, extent, direction, concentration and rate of migration of releases of hazardous waste or hazardous constituents from each SWMU/AOC into air, soil, sediments, surface water, and/or groundwater;
- b. Identify actual or potential human and/or ecological receptors;
- c. Provide a detailed geologic and hydrogeologic characterization of the area surrounding and underlying each SWMU/AOC;
- d. Determine the need for and scope of corrective action interim measures (see Permit Condition II.B); and
- e. Identify and characterize releases of hazardous waste or hazardous constituents and hazardous constituents degradation by-products from each SWMU/AOC.
- f. Determine the need for and scope of corrective measures (see Permit Condition II.D).

### **2. RCRA Facility Investigation Plan requirements:**

- a. The RFI Plan shall include a listing and general descriptions of the SWMUs/AOCs, Project Management Plan, Community Relations Plan and proposed schedule conforming to the requirements of Attachment E, RCRA Facility Investigation Requirements.

Should the Permittee believe that any of the requirements of Attachment E are not appropriate, the Permittee may submit a complete justification of the inappropriateness for the Department's approval within 60 days of the effective date of this Permit. Such a submittal shall not stay the requirements of this Permit until and unless the submittal has been

approved by the Director.

b. RFI Sampling and Analysis Plan

- (1) The Permittee shall submit a RFI Sampling and Analysis Plan. The plan shall provide for analysis of hazardous waste and/or hazardous constituents released from each SWMU/AOC. (See Attachment D for analytical requirements) All aqueous samples shall also be tested for pH. Also, any hazardous constituent not listed in Attachment D, that is known or suspected by the Permittee to have been treated, stored, disposed or contained in the unit, shall also be included for analysis.

The Permittee may combine individual SWMUs/AOCs into study areas.

- (2) The RFI Sampling and Analysis Plan shall provide the rationale for the selection of sample locations and number of samples. The Permittee shall identify the specific sampling locations for each SWMU/AOC and for each affected environmental media.
- (3) The RFI Sampling and Analysis Plan shall include a Sample Collection Methods and Procedures Plan and a Quality Assurance Project Plan (Attachment H), which conform to the analytical requirements set forth in Attachment D. The Permittee shall also furnish to the Director the Laboratory Data Package as specified in Attachment H.
- (4) The Director reserves the right to require the Permittee to furnish the Director with split samples for any samples taken by the Permittee pursuant to this Permit. Where split samples are taken and analyzed, the Director will provide the results to the Permittee for evaluation in the RCRA Facility Investigation Report. The Permittee shall identify a procedure in the Sampling Plan for notifying the Director of any planned sampling dates.
- (5) The RFI Sampling Plan must identify the management and disposition of any wastes generated as a result of the investigation. If any of the SWMUs/AOCs contain hazardous wastes, whether the hazardous wastes are regulated or not by federal or state regulations, the Permittee shall comply with applicable regulations including the Land Disposal Restrictions as contained in 40 CFR Part 268.

- (6) The Sampling Plan shall provide for the analyses of samples from any existing groundwater wells at the Facility which are used to obtain potable water. The analyses shall include, at a minimum, an evaluation of volatile, semivolatile and inorganic hazardous constituent concentrations, plus pH. See Attachment D for analytical requirements.
      - c. Concurrent with submission of an RFI Plan, the Permittee shall include a Health and Safety Plan in accordance with Attachment I of this Permit. (A RCRA Facility Investigation Work Plan was submitted in June 2000 by the Permittee and approved by EPA/VDEQ – see Attachment A, Table A-1 for a comprehensive list of Corrective Action Submittals).
3. RCRA Facility Investigation
  - a. The Permittee shall conduct the investigations specified in Attachment E, RCRA Facility Investigation Requirements, which are necessary to characterize the Facility (Environmental Setting), define the source of any release of hazardous waste or hazardous constituents (Source Characterization), define the degree and extent of contamination (Contamination Characterization) and identify actual or potential receptors.
  - b. The investigations must result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative(s) during the Corrective Measures Study. The Permittee shall implement the plan requirements described in Permit Condition II.C.2.
4. RCRA Facility Reporting Requirements
  - a. The Permittee shall fulfill the requirements of the approved RFI Plan in accordance with the terms and schedule set forth in such plan, including the submission of an RFI Report for the Director's approval. The Permittee shall submit a copy of the RFI Report to the Department and the EPA Region 3.
  - b. The Permittee shall also submit quarterly progress reports to the Department and the EPA beginning the first full quarter after the Director's approval of the plan and continuing until the RFI Report is submitted. The quarterly reporting shall include, at a minimum: activities completed within the reporting period, any deviations from the RFI Plan, and the identification and schedule of remaining activities. The Department shall include any other specifications in its approval of the RFI Plan.

The Permittee shall submit in writing justification requesting an alternate progress-reporting schedule for the Department's approval. This alternate progress-reporting schedule may be approved by the Department without requiring a permit modification to Permit Condition II.C.4.

5. RCRA Facility Investigation Report

- a. The Permittee shall submit a RCRA Facility Investigation Report which shall include an analysis, summary and results of all investigations performed pursuant to the RFI Plan. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and scope (quantity) to characterize the nature and extent of contamination, potential threat to human health and the environment, and to support the Corrective Measures Study. The RFI Report shall conform to the requirements of Attachment E.
- b. The RCRA Facility Investigation Report shall include a discussion of the feasibility of implementing interim measures immediately; see Permit Conditions II.B and II.G. (Interim Measures; Emergency Response; Release Reporting).

**II.D. CORRECTIVE MEASURES STUDY**

1. If the Department determines, on the basis of the RFI or any other information, that corrective measures for releases of hazardous waste or hazardous constituents are necessary to protect human health or the environment, the Department will advise the Permittee of this determination, and the reasons therefore, in writing.
2. The Permittee shall submit to the Department for approval a Corrective Measures Study (CMS) Plan within ninety (90) days of receipt of notification of such determination. Copies of the CMS Plan shall also be submitted to the DEQ and EPA Region 3. The CMS Plan shall include a schedule for expeditious performance of the study. The plan shall fulfill the requirements of Attachment F, Corrective Measures Study Requirements, and must be approved by the Department, in accordance with Permit Section I.K.
3. Within ninety (90) days of receipt of the Department's written approval of the CMS Plan, the Permittee shall begin implementation of the approved CMS Plan. In accordance with the terms and schedules in the approved CMS Plan, the Permittee shall submit for the Department's approval, a CMS Report which recommends a Corrective Measure(s) in accordance with the requirements set

forth in Attachment J of this Permit. Copies of the CMS Report shall also be submitted to the DEQ and EPA Region 3.

## **II. E. CORRECTIVE MEASURES IMPLEMENTATION**

1. Corrective Measures Remedy Selection
  - a. Based on reports and information submitted by the Permittee during the RCRA Facility Investigation, Corrective Measures Study, and other relevant information, the Department may require the Permittee to evaluate further, and report upon, one or more additional remedies or develop particular elements of one or more proposed remedies. Such further requirements will, if necessary, be incorporated into this Permit pursuant to the 40 CFR § 270.41 or 270.42 as a Class 3 Permit Modification in accordance with the draft permit and public participation procedures of 40 CFR 124. The Permittee must follow all steps detailed in Attachment F and Attachment J of this permit, if such additional evaluations and reports are needed to select a remedy.
  - b. All public comments shall be considered prior to selection and approval of the final Corrective Measures Remedy by the Department.
2. Corrective Measures Implementation
  - a. Within ninety (90) days of receipt of the Department's written approval of the Corrective Measures Remedy, the Permittee shall submit a Corrective Measure Implementation (CMI) Work Plan for the Department's approval in accordance with the requirements set forth in Attachment J of this Permit. Upon approval of the CMI Work Plan, the Permittee shall submit the Corrective Measure Design Reports to the Department in accordance with the requirements set forth in Attachment J of this Permit.
  - b. The Corrective Measures Implementation Final Design Report shall be submitted to the Department as a Class 2 Permit Modification request in accordance with the requirements of 40 CFR § 270.42. Upon completion of the public notice and public meeting requirements and upon the Department's approval of the CMI Final Design Report, the Permittee shall develop and implement construction in accordance with procedures, specifications, and schedules in the approved Final CMI Design Report and CMI Work Plan in accordance with the requirements set forth in Attachment J of this Permit.

Copies of all CMI Plans and CMI Design Reports and other CMI Reports shall be sent to the Department and EPA Region 3.

- c. Upon completion of construction and upon an initial period of performance of monitoring the corrective measure(s), the Permittee shall prepare and submit copies of the final CMI Report to the Department and the EPA Region 3 which delineates the implemented corrective measures, design, operation and maintenance, and performance of the constructed system(s) and complies with the requirements delineated in Attachment J. Final "as built" plans and specifications of the corrective measures systems shall be certified by a Professional Engineer registered with the Commonwealth of Virginia and shall be submitted to the Department and the EPA Region 3 with the final CMI Report.
- d. CMI Progress Reports shall be provided on a quarterly and annual basis to the Department and the EPA Region 3 as delineated in accordance with Attachment J.

#### **II.F. EVALUATION OF THE SELECTED REMEDY**

Commencing one year from the submittal date of the final CMI Report, the Permittee shall submit an annual progress report on the remedy performance. If the Department determines that the selected remedy will not comply with the media clean-up requirements, the Department may require the Permittee to perform additional studies and/or perform modifications to the existing Corrective Action remedy. If necessary, the Department or the Permittee may seek modification of this Permit pursuant to 40 CFR § 270.41 or § 270.42 and § 124.5 to implement modifications to the existing Corrective Measures Remedy.

#### **II.G. EMERGENCY RESPONSE; RELEASE REPORTING**

##### **1. Emergencies**

If, at any time during the term of this Permit, the Permittee discovers that a release of hazardous waste or hazardous constituents at or from the Facility is presenting or may present an imminent and substantial endangerment to human health or the environment, the Permittee shall:

- a. Notify the Department as soon as practicable of the source, nature, extent, location and amount of such release, the endangerment posed by such release and the actions taken and/or to be taken, to the extent known, to address such release. Such notification shall be confirmed in writing within five (5) days of discovery of such release (see Permit Condition I.D.II).
- b. Unless otherwise directed by the Department, immediately take such actions as are necessary and appropriate to address such release.



2. **Releases**  
The Permittee shall notify the Department in writing of the nature, source, extent, location of a release of hazardous waste or hazardous constituents at or from the Facility within five (5) days of discovery if such release:
  - a. Is not being addressed by corrective measures at the time of such discovery.
  - b. Is not being addressed pursuant to Permit Conditions II.B., Interim Measures, or II.G., Emergency Response; Release Reporting.
3. If, based on the information submitted in Permit Condition II.G.2, a release has not been adequately remediated to be protective of human health and the environment, the Department may require the SWMU and/or AOC to be included in an RCRA Facility Investigation (Permit Section II.C.) or may require Interim Measures (see Permit Section II.B).
4. Nothing in this Permit shall limit the Department's authority to undertake or require any person to undertake response action or corrective action under any law, including but not limited to, Sections 104 or 106 of CERCLA, 42 USC § 9604 or 9606, and Section 7003 of RCRA, 42 USC § 6973. Nothing in this Permit shall relieve the Permittee of any obligation it may have under any law, including, but not limited to, Section 103 of CERCLA, to report releases of hazardous waste, hazardous constituents or hazardous substances to, at or from the Facility.

## **II.H. GUIDANCE DOCUMENTS**

Any corrective action performed at the facility shall be in accordance with applicable EPA Corrective Action Guidance.

## **II.I. SOLID WASTE MANAGEMENT UNIT (SWMU) ASSESSMENT**

1. The Permittee shall notify the Department and the EPA Region 3, in writing, of any newly identified SWMU at the Facility, no later than thirty (30) days after the date of discovery. The notification shall include, but is not limited to, the following known information:
  - a. A description of the SWMUs type, function, dates of operation, location (including a map), design criteria, dimensions, materials of construction, capacity, ancillary systems (e.g., piping), release controls, alterations made to the unit, engineering drawings, and all closure and post-closure information available, particularly whether wastes were left in place.
  - b. A description of the composition and quantities of solid wastes processed

- by the units with emphasis on hazardous wastes and hazardous constituents.
- c. A description of any release (or suspected release) of hazardous waste or hazardous constituents originating from the unit. Include information on the date of release, type of hazardous waste or hazardous constituents, quantity released, nature of the release, extent of release migration, and cause of release (e.g., overflow, broken pipe, tank leak, etc.). Also, provide any available data that quantifies the nature and extent of environmental contamination, including the results of soil and/or groundwater sampling and analysis efforts. Likewise, submit any existing monitoring information that indicates releases of hazardous waste or hazardous constituents has not occurred or is not occurring. The Permittee may refer to information regarding releases previously submitted to the Department under Permit Conditions II.B., Interim Measures, and II.G. Emergency Response; Release Reporting.
  - d. A discussion of the need for and feasibility of implementing interim measures immediately, see Permit Section II.B.
2. Upon receipt of the notification of any newly identified SWMU, the Department will determine the need for corrective action at such SWMU. If corrective action is necessary to protect human health or the environment, the Department will determine whether a RCRA Facility Investigation will be performed and the need for and scope of any Interim Measures.
  3. A RCRA Facility Investigation is required by the Department and the EPA Region 3 within ninety (90) days after the Department's approval of the RFI Work Plan and/or as specified in the Work Plan Approval.

The Department's determination shall either specify the media and/or parameters to be investigated or shall require the Permittee to propose and justify the selection of media and/or parameters.
  4. Within the time specified in the approved RCRA Facility Investigation Work Plan, the Permittee shall submit the RCRA Facility Investigation Report fulfilling the requirements of Permit Conditions II.C.3 through II.C.5.
  5. In lieu of a separate RCRA Facility Investigation, the Permittee may propose either to incorporate any newly identified SWMU into an ongoing RCRA Facility Investigation or to submit a proposal for the performance of corrective measures at such newly identified SWMU in accordance with the provisions of Permit Condition II.A. Any such proposal shall be submitted to the Department 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 Department prior to initiation of the related RFI work.

## **II.J. FINANCIAL ASSURANCE**

### **1. Interim Financial Assurance Demonstration**

Assurances of financial responsibility for corrective action must be provided in accordance with conditions herein. Within sixty (60) calendar days of the effective date of the permit modification to incorporate AOC-4 into this Permit, the Permittee shall demonstrate compliance with interim financial assurance in the amount of \$1 million to the Department in accordance with 40 CFR 264.143. The interim financial assurance demonstration shall remain in place until all remedies required by this permit have been approved by the Department. Additional financial assurance demonstration may be required upon selection of any final remedy(ies). Permit Conditions II.J.2, II.J.3, and II.J.4 below shall apply upon the Department's approval of any final remedy(ies).

### **2. Initial Cost Estimate**

Within ninety (90) calendar days of receipt of the Department's written approval of a Corrective Measures Remedy, the Permittee shall submit an initial cost estimate for completing the approved remedy(ies). The initial estimate may be based on the Corrective Measure Study, the approved remedy(ies), or any other available information.

### **3. Cost Estimate Updates**

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

### **4. Financial Assurance Demonstration**

Within thirty (30) calendar days of approval of the initial cost estimate for financial assurance (see Permit Condition II.J.1.), the Permittee shall demonstrate compliance with financial assurance to the Department in accordance with 40 CFR 264.143 for completing the approved remedies in accordance with 40 CFR § 264.101(b). Within thirty (30) calendar days of approval of any revised cost estimate (see Permit Condition II.J.2.), the Permittee shall demonstrate to the Department financial assurance for the updated cost estimates.

## **II.K. 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.

**II.L. ACCESS FOR CORRECTIVE ACTION OVERSIGHT**

The Department and its authorized representatives shall have access to the Facility and site at all reasonable times for the purpose of monitoring compliance with the provisions of this Permit. The Permittee shall use its best efforts to obtain access to property beyond the boundaries of the Facility at which corrective action is required by this Permit (see Section 3004(v) of RCRA, 42 USC § 6924(v) and 40 CFR § 264.101(c)); (1) for itself and any contractor of the Permittee for the purpose of taking corrective action required by this Permit, and (2) for Department/EPA and its authorized representatives for the purposes described in this paragraph.

**II.M. COMPLETION OF REMEDY**

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

**II.N. ATTACHMENTS TO PERMIT MODULE II**

Table C-1 in Attachment C lists the deliverables required for the off-site AOC 4. The list may be modified with the approval of the Department. To modify the list, the Permittee shall submit in writing justification requesting a schedule change for the Department's approval. This alternate schedule may be approved by the Department without requiring a permit modification.

All activities, workplans, reports, and/or other deliverables required by Permit Module II, shall be conducted, and/or prepared in accordance with the applicable parts of the relevant Attachments D through J. The Permittee may propose to the Director for approval, alternatives to Attachments D through J pursuant to 40 CFR § 270.41 or § 270.42 and § 124.5, as applicable.

**ATTACHMENT A**  
**FACILITY DESCRIPTION**  
**AND ON-SITE CORRECTIVE ACTION**

**ATTACHMENT A**  
**FACILITY DESCRIPTION AND ON-SITE CORRECTIVE ACTION**

**Facility Description**

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. The location of the plant is shown on Figure A-1. In 1929 DuPont began operations at the Waynesboro site which was originally chosen because of the abundant water supply, railroad access, and an 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 2009 and the buildings have been demolished. Lycra is the only fiber currently manufactured at the site. In 2004, the plant assets were sold to subsidiaries of Koch Industries (INVISTA S. a r. l. or "INVISTA"). Upon the completion of the Corrective Action Program, the land will be transferred to INVISTA. DuPont intends to maintain a consistent presence in the community due to its long manufacturing history at the Site.

The physical address and facility contact information is provided below and in the Part A Permit Application:

Facility Address

Invista Plant  
400 Dupont Boulevard  
Waynesboro, VA 22980

Facility Contact

Mr. Mike Liberati  
DuPont Corporate Remediation Group  
133 Blakiston Lane  
Warkwick, MD 21912  
Phone: (302) 598-9936

The DuPont Company corporate office is located in Wilmington Delaware, at the following mailing address:

Owner Address

E.I. du Pont de Nemours and Company  
1007 Market Street  
Wilmington, DE 19898

## Summary of On-Site Corrective Action

Investigations have been conducted to characterize solid waste management units (SWMUs) where hazardous substances may have impacted the environment. The RCRA Facility Investigation (RFI) was completed in three phases:

- Phase I - June 2000 to February 2001
- Phase II – June 2004 to April 2005
- Phase III – January to July 2007

After the first phase of the RFI, it was determined that the groundwater and plant outfall discharges should be monitored on a recurring basis. In addition, a separate investigation of the plant sewer system was initiated. These programs are conducted simultaneously along with the SWMU investigations of the RFI. These focused programs address specific media and pathways and will culminate in the Corrective Measures Study. A figure depicting the overall corrective action at the facility is shown in Figure A-2. A summary list of all Work Plans and Reports submitted under RCRA Corrective Action is provided in Table A-1.

### **Constituents of Concern**

The data available for the Dupont Waynesboro site indicates that mercury is the primary Constituent of Concern (COC) in the site's soil and groundwater.

### **RFI Investigations**

The Phase I investigation conducted in 2000-2001 consisted of soil and groundwater sampling at 10 SWMUs. Eighty-six soil samples and forty groundwater samples were collected for VOCs, SVOCs, metals, methyl mercury, HMD, DMF, and DMAC. This included water level measurements and slug testing for hydrogeologic evaluations. The Phase I concluded that SWMU 1 (Mercury Recovery Area) and SWMU 4 (Incineration Area) required further evaluation and that the Northeast Area water level depression should be investigated.

During the Phase II investigation (2004-2005) eight SWMUs and two areas of concern (AOCs) were evaluated. This included the collection of 68 soil samples and 65 groundwater samples for the same constituents as in the Phase I. Also in this investigation were a soil gas sampling program SWMU 1 for the presence of mercury vapor and a geologic investigation at the Northeast Area. The Phase II Investigation concluded that groundwater in the deep clastic zone present in Northeast Area was impacted with mercury. Mercury was further characterized at SWMU 1 and SWMU 4 and benzene and mercury were detected downgradient of SWMU 6/7.

In a February 2006 (revised September 2006) Phase II Investigation Report, no further investigation was recommended for SWMUs 10, 13, 20 and AOCs 1 and 2, however additional investigation was recommended at SWMUs 1, 4, 6/7 and the Northeast Area.

The Phase III Investigation, completed in July 2007, included the collection of 76 soil samples and 5 groundwater samples at three SWMUs for the same constituents as in previous

investigations. Soil samples were collected at SWMU 1 to confirm previous soil gas results and the former process ditches at the Chemical Building were sampled for mercury. Geoprobe soil sampling was performed at SWMU 4 for further delineation of mercury and at SWMU 6/7 (former Sludge Pond) for initial characterization of soils. Two new wells were drilled to assess potential migration of constituents from SWMU 6/7. The Northeast Area was investigated by locating and logging plant Well #1 and conducting a long term water level study. The results of the Phase III investigation were reported in the Phase III RFI Summary Report in March 2008. A summary list of documents submitted for the RFI is presented in Table A-2.

The final phase of RFI investigations, Phase IIIA, was completed in the winter of 2008. That phase of investigation focused on delineation of source areas at SWMUs 1, 4 and 7. During Phase IIIA, test pits and soil borings were conducted to delineate mercury source areas. In addition, a long term water level study was conducted to assess the relationship between the pumping of deep bedrock wells and the groundwater in the overburden. The final Comprehensive RFI Investigation Report was submitted in November 2009 and revised in August 2012 and October 2013.

### **Groundwater**

Following the Phase I RFI investigation, a semiannual groundwater monitoring program was initiated. The monitoring plan submitted in 2004 included the monitoring of 38 wells and 55 water level measurements. Findings from three and a half years of sampling (7 events) show that mercury concentrations are localized at SWMU 1, SWMU 4 and SWMU 6/7 and that downgradient perimeter wells are below VGS criteria. However, water level measurements indicate the Deep Water Table Zone water levels (Northeast Area) fluctuate significantly. A summary list of documents submitted pertaining to the groundwater monitoring program is presented in Table A-1.

### **Outfall Monitoring**

Four phases of outfall monitoring have been performed to assess the loading of mercury under base flow and storm flow conditions. The first phase conducted in 2003 sampled one storm and one base flow event at 8 outfalls and 10 upstream locations. No significant mercury was detected in baseflow or first flush storm samples, however mercury was detected in flow weighted composites (up to 1.7 µg/l) during the storm event. Estimated loading rates were low relative to the mass observed in the South River. During the Phase II monitoring in 2004-2005, 10 locations were sampled during 3 base flows and one storm flow event. Also sampled were sediments and water in upstream portions of the sewer. This investigation concluded that the amount of mercury that is bioavailable was 20-29% under base flow conditions and 32-33% for storm flow conditions. The highest concentrations of Hg in sewer sediments and water occurred upstream of 001D near the Chemical Building and SWMU-1.

The Phase III program conducted from 2005-2007 included the sampling of 10 locations over an 18 month program to support the TMDL program. Fifteen base flow and 6 storm events were sampled. The data shows that the highest concentrations occur at outfall 011 but it is in diversion to WWTP and does not discharge to the river. The outfall with the highest loading rate to the river is outfall 001.



The Phase IV program, initiated in June 2007, monitored 10 outfall locations and was completed in December 2008. The program consisted of monthly base flow events and 2 storm events per year. The Phase IV Outfall Monitoring Report was submitted in July 2009. Additional baseflow monitoring will be conducted quarterly and storm events will be monitored semiannually. A summary of documents submitted for the outfall monitoring program is presented in Table A-1.

### ***Sewer Investigation***

The first phase of the sewer investigation was completed in January 2007. This program consisted of mapping and verifying sewer locations and structures including the identification of structures and confirmation of flow directions. Conventions for the naming of structures were established and a database was developed for the structures and piping sections, including sizes and materials of construction. Key storm sewer sections were identified and recommendations were made for the Phase II investigation which was completed in the summer of 2008. Phase II included closed circuit televiewer inspection of sewer lines that are in proximity to source areas of mercury and which ultimately discharge at the 001 outfall. Phase III of the sewer investigation focused on source area contributions to and characterization of the 001 outfall system. During the Phase III work, sewers located in the former mercury area were cleaned and inspected by CCTV resulting in the removal of significant amounts of free mercury from the system. Phase III was completed in December 2010. A summary list of documents submitted for the Sewer Investigation is presented in Table A-1.

### ***Interim Measures***

Interim measures (IMs) were conducted in fall and winter 2010 in conjunction with the Phase III Sewer Investigation. The objective of the IMs was to reduce the impact from the SWMU 1 source area to the site sewer system. To achieve this objective, the IMs included the following:

- Re-directing roof drains from the source area in the vicinity of the L-50 Building
- Cleaning out the steam trap in the vicinity of L-50 Building
- Cleaning out PHS pipe lines and catch basins along Railroad Avenue
- Cleaning out and filling in the former solids collection pit

The IMs were successfully implemented during the fall of 2010, and were described in the Interim Measures implementation Report (2011).

### ***Mercury Inspection and Abatement***

In October 2007, DuPont implemented a program to inspect drainage structures near the former Chemical Building for the presence of mercury. Inspections have been conducted on a biweekly basis. Small pellet sized amounts of free mercury that were visible at a drainage box along Rail Road Ave were removed and disposed of in October using hand tools. In December, a mercury vacuum was purchased that is more effective at cleanup. The residual mercury was cleaned up using the vacuum in December. Since removal, no free mercury has been observed. The inspections will continue as described in the workplan. A summary list of documents submitted for the inspection program is presented in Table A-1.

### **Corrective Measures Study**

In the winter of 2009, DuPont began the initial steps of the Corrective Measures Study (CMS) by screening available technologies that may be implemented at the Waynesboro Plant. Final recommendations for preferred remedial options will be made once the RFI Investigation has been approved.

Figure A-1  
SITE LOCATION MAP

Figure A-2  
FLOW DIAGRAM  
ON-SITE CORRECTIVE ACTION

Table A-1

SUMMARY OF DOCUMENT SUBMITTALS  
FOR ON-SITE CORRECTIVE ACTION

<b>Corrective Action Program</b>	<b>Document Title</b>	<b>Date</b>
RFI	<i>Waynesboro Release Assessments/RCRA Facility Investigation Workplan (Revision 02)</i>	June 2000
RFI	<i>Phase I RA/RFI Data Summary Report, DuPont Textiles and Interiors</i>	April 2003
RFI	<i>Phase II RFI Geologic and Hydrogeologic Investigation Workplan</i>	March 2004
RFI	<i>Phase II RA/RFI Workplan, Invista Waynesboro Plant, Waynesboro</i>	August 2004
RFI	<i>Phase II RA/RFI Data Summary Report</i>	February 2006 (rev September 2007)
RFI	<i>Phase III RFI Work Plan, Invista Waynesboro Plant, Waynesboro, Virginia</i>	March 2006 (rev October 2006)
RFI	<i>Supplemental Work Plan for the Inspection and Abatement of Free Mercury, Waynesboro Invista Plant</i>	October 2007
RFI	<i>Supplemental Work Plan for the Investigation of Mercury at the Former Chemical Building, Invista Waynesboro Plant</i>	November 2007
RFI	<i>Phase III RA/RFI Data Summary Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	March 2008
RFI	<i>Phase IIIA RFI Workplan, Waynesboro Invista Plant</i>	August 2008
RFI	<i>Comprehensive RFI Report</i>	November 2009 (rev August 2012, October 2013)
Outfall Monitoring	<i>Stormwater Monitoring Plan, DuPont Textiles and Interiors (DTI), Waynesboro Plant</i>	April 2003
Outfall Monitoring	<i>Storm Water Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	December 2003 (rev 01)
Outfall Monitoring	<i>Addendum I – Phase II Monitoring, Storm Water Monitoring Plan, Invista Waynesboro Plant</i>	September 2004
Outfall Monitoring	<i>Addendum II – Phase III Monitoring, Storm Water Monitoring Plan, Invista Waynesboro Plant</i>	December 2005
Outfall Monitoring	<i>Phase II Storm Water Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	June 2006
Outfall Monitoring	<i>Addendum III, Phase IV Storm Water Monitoring Plan, Invista Waynesboro Plant</i>	July 2007
Outfall Monitoring	<i>Phase III Stormwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	December 2007
Outfall Monitoring	<i>Phase IV Outfall Monitoring Report</i>	July 2009
Groundwater	<i>RCRA Routine Groundwater Monitoring Plan, Invista Waynesboro Plant, Waynesboro, Virginia</i>	March 2004
Groundwater	<i>2004 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	May 2005

<b>Corrective Action Program</b>	<b>Document Title</b>	<b>Date</b>
Groundwater	<i>2005 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	March 2006 (rev December 2006)
Groundwater	<i>2006 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	May 2007
Groundwater	<i>2007 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	March 2008
Groundwater	<i>2008 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	May 2009
Groundwater	<i>2009 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	April 2010
Groundwater	<i>2010 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	May 2011
Groundwater	<i>2011 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	April 2012
Groundwater	<i>2012 Annual Groundwater Monitoring Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	April 2013
Sewer Investigation	<i>Storm Sewer Investigation Work Plan, Invista Waynesboro Plant, Waynesboro, Virginia</i>	August 2006
Sewer Investigation	<i>Sewer Investigation, Phase II Work Plan for Invista Waynesboro Plant</i>	May 2008
Sewer Investigation	<i>Storm Sewer Investigation Phase III Work Plan</i>	July 2010
Sewer Investigation	<i>Sewer Investigation Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	August 2011
Remediation	<i>Interim Measures Workplan, Invista Waynesboro Plant, Waynesboro, Virginia</i>	July 2009
Remediation	<i>Interim Measures Implementation Report, Invista Waynesboro Plant, Waynesboro, Virginia</i>	August 2011

## **ATTACHMENT B**

### **LIST AND DESCRIPTION OF KNOWN ON-SITE SOLID WASTE MANAGEMENT UNITS (SWMUs) AND AREAS OF CONCERN (AOCs)**



## **ATTACHMENT B**

### **LIST AND DESCRIPTION OF KNOWN ON-SITE SOLID WASTE MANAGEMENT UNITS (SWMUs) AND AREAS OF CONCERN (AOCs)**

Tables B-1 and B-2 list and describe the identified on-site Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that have been investigated. Additionally the tables contain operational information and current status as pertains to RCRA Corrective Action. A map showing the location of the SWMUs and AOCs is included as Figure B-1.

The Phase I investigation conducted in 2000-2001 consisted of soil and groundwater sampling at 10 SWMUs. The Phase I concluded that SWMU 1 (Mercury Recovery Area) and SWMU 4 (Incineration Area) required further evaluation and that the Northeast Area water level depression should be investigated. During the Phase II investigation (2004-2005) eight SWMUs and two areas of concern (AOCs) were evaluated. Also in this investigation were a soil gas sampling program SWMU 1 for the presence of mercury vapor and a geologic investigation at the Northeast Area. The Phase II Investigation concluded that groundwater in the deep clastic zone present in Northeast Area was impacted with mercury. Mercury was further characterized at SWMU 1 and SWMU 4 and benzene and mercury were detected downgradient of SWMU 6/7.

In a February 2006 (revised September 2006) Phase II Investigation Report no further investigation was recommended for SWMUs 10, 13, 20 and AOCs 1 and 2, however additional investigation was recommended at SWMUs 1, 4, 6/7 and the Northeast Area.

The Phase III Investigation, completed in July 2007, included the collection of 76 soil samples and 5 groundwater samples at three SWMUs for the same constituents as in previous investigations. Soil samples were collected at SWMU 1 to confirm previous soil gas results and the former process ditches at the Chemical Building were sampled for mercury. Geoprobe soil sampling was performed at SWMU 4 for further delineation of mercury and at SWMU 6/7 (former Sludge Pond) for initial characterization of soils. Two new wells were drilled to assess potential migration of constituents from SWMU 6/7. The Northeast Area was investigated by locating and logging plant Well #1 and conducting a long term water level study. The results of the Phase III investigation were reported in the Phase III Summary Report, which was submitted in 2008.

Table B-1

OPERATIONAL ON-SITE  
SWMU SUMMARY

SWMU	Unit Name	Description of Operation	Type of Operation <sup>1</sup>	Dates of Operation
1	Mercury Recovery Area	Mercury-containing sludge was generated during the acetic anhydride process from 1929 to 1950. The sludge was decanted in the Chemical Building and transported in buggies to the mercury recovery area, where it was heated in furnaces until the mercury was evaporated, condensed, and collected in flasks. The mercury recovery area included two buildings, Sludge Recovery and Mercury Recovery, and two adjacent pits.	Other Industrial Furnaces (Closed)	1929-1950
2	Ash Disposal Area	Earthen diked containment area to handle liquid ash slurry from the coal-fired boilers in the Power House. Water from the slurry drained through an outlet manhole into a ditch shared with the neighboring Lime Ponds (SWMU 11). During Closure, the ash was excavated and dewatered, then the area was filled with borrow. The area is currently partially covered. A diked containment system and electrical substation currently exist in this area.	Closed Surface Impoundment Storage	1929-1974
3	Ash Ponds	Used for storage and settling capacity for the liquid ash slurry generated from the Power House. Around 1960, the ash pond was divided into two ponds. In 1974, the ash ponds were dewatered, dredged, and the surrounding soil stabilized for the construction of BCF Nylon Facilities.	Closed Surface Impoundment Storage	1939-1974
4	Incineration Area	Consisted of three operations: the burning grounds, waste byproducts incineration, and the oil burning pits. A variety of trash and wastes were burned in burning pits which were replaced by two teepee incinerators. Prior to incineration, waste byproducts from the anhydride and acid recovery area were pumped to a 1,200-gallon storage tank located inside a 2-foot tall earthen dike. Three oil-burning pits were used for fire training purposes. The surficial ground cover at this SWMU is asphalt and gravel.	Closed Incinerator	1929-1971
5	Trade Waste Pond	The triangular shaped pond had an original capacity of 200,000 gallons. Low pH wastewaters consisting primarily of sulfuric and acetic acid were the main wastes stored in the pond. Ether tail waters and clean-out solvents also were retained in the pond. Its contents were pumped to the Wastewater Treatment Plant and the pond was emptied, dredged and backfilled. The area was then graded and stabilized with crushed stone and paved for additional parking.	Closed Surface Impoundment Storage	1955-1966
6	Wastewater Treatment	The wastewater treatment facility was built to manage wastes from Nylon, Lycra, Permasep, Orlon processes. All tanks were installed aboveground. Presently, wastewater from manufacturing is generated at a rate of 200-300 gpm. The wastes are pumped through an above ground line to Waste Treatment. Incoming waste streams are blended in blend tanks (3,000,000 gallon capacity each), and then mixed with the sludge to increase biological activity. Three aeration tanks (250,000 gallon capacity each) are used for aerobic digestion of the wastewater which is sent to a clarifier, treated, and sent to the 10,000,000 gallon tank. The treated water receives a final filtration before being discharged to the South River.  Wastes managed at this unit include process wastewaters containing dimethylformamide (DMF) dimethylacetamide (DMAC), hexamethylene diamine (HMO) and acrylonitrile.	Tank Treatment	1956-present

<sup>1</sup> As defined in the EPA RCRA Hazardous Waste Part A Permit Application, March 2005

7	Sludge Pond	The pond had a concrete liner and drainage ditches that ran along three sides of the pond. The waste managed at this SWMU was limited to excess centrifuge bio-sludge generated from the Wastewater Treatment Plant. The sludge pond was dismantled in 1973, when the fifth clarifier was constructed at Waste Treatment. The concrete liner was also removed, but the sump tank foundation was buried in place.	Closed Surface Impoundment Storage	1956-1973
8	Empty/Used Drum Storage	This unit was originally used for the storage of scrap metal and salvage. Soon after, empty or used drums (which formerly contained residual finish oils, diethanolamine, ethylidene diacetate, and other chemicals) were stored in a partially fenced in area. The drums, which were periodically sold to a drum reconditioner, were stored on an asphalt pad with bungs in place and tightened. A minor spill from an empty amine drum occurred in the mid-1980s but was estimated to be less than a liter in volume. The spill was contained entirely on the asphalt surface of the storage pad. As a precaution, the asphalt and immediately underlying soil were removed in the area of the spill and incinerated. The area is currently paved, but not in use.	Closed Other Storage	1959-1991
9	Co-treatment facility and Liquid Vortex Incinerator	In 1960, co-treatment facilities for retention and analysis of liquid wastes were built. After analysis, liquid wastes were released to Waste Treatment. Two 10,000-gallon retention tanks were constructed on compacted crushed stone and 12" macadam. Wastes, not acceptable to waste treatment, were sent to the Liquid Vortex Incinerator. Wastes managed at these units included polytera methylene ether glycol, isocyanate, titanium dioxide, DMF, caustic, acid, oils, amines, deionization regeneration wastes, tar still purses, solvent column waste heads, DMAC, dimethyl amine, cellulose acetate, cellulosic sugars, iron, calcium, sodium ions, nitrate, sulfate, and acetate ions.	Closed Incinerator	1960-1988
10	Hazardous Waste Storage Pad (A/B)	The storage pad consisted of a concrete slab covered with a protective corrosion and crack-resistant coating. Leaks and spills, collected in two 540 gallon in-ground stainless steel sumps were pumped to drums using a portable pump. Concrete curbing around the pad enhanced containment and prevention of surface cracking. The drums were stored on wooden skids to facilitate loading, unloading and inspection for drum leakage. Materials stored on the pad included: DMAC, DMF, dimethylsulfoxide, toluene, formic acid, acetone, menol, chlorobenzene, paint thinners, methylene chloride, and trichloroethylene. This RCRA permitted drum storage pad was certified clean closed by the VADEQ in 2004.	Closed Drip Pad	?-2004
11	Lime Ponds	Lime sludge was piped from the Generator House to a diked containment area across the Norfolk & Western Railroad tracks. When the original ponds became full, an additional lime storage area was located in the southwestern corner of the plant property. By 1946, the original ponds held approximately 90,000 cubic yards, while the remote western pond held 30,000 cubic yards. After the acetic anhydride process was phased out in 1950, lime was no longer produced. After most of the lime had been removed, the area was graded and seeded to prevent erosion.	Closed Surface Impoundment Disposal	1929-1950
12	Waste Loading Dock/Hazardous Waste Pad C	The Waste Loading Dock was built on an existing concrete pad for temporary 90-day storage of wastes prior to shipment offsite for disposal. Wastes from various sources across the plant are brought to the loading dock by WNI Services. These wastes are generated from various sources across the plant including process wastes, laboratory	Drip Pad	1988-?

		analysis waste, and maintenance waste. The COCs associated with these wastes include DMAC, spandex polymer resin, methanol, ethanol, chlorobenzene, paint residues, oil, and cleaning solvents (hydrocarbon based). The hazardous drum storage building (Waste Pad C) was constructed with a concrete floor that has an 8-inch curb around the perimeter. All joints in the concrete have a water seal and a silicone sealant. A trench runs through the center of the building which drains to a double walled 1500 gallon above ground tank located outside of the building on a concrete curbed pad. Waste Pad C is a RCRA less than 90-day hazardous waste accumulation pad subject to regulation under 40 CFR part 262.		
13	Oil/Water Separator System	The oil/water separation system is located on the first floor of the Chemical Building next to DM water storage. It consists of a 6000 gallon fiberglass tank and spill collection pans for the hose connections, pumps, filters, etc. The tank is located on a concrete foundation. Sources of waste oil sent to this facility include: Nylon sump, Orlon sump, any oil released into plant sewers, and all used oil from plant maintenance shops.	Other Subpart X	?-present
14	Maintenance Shop Sump	The sump is constructed of reinforced concrete, collects waste oils and greases.	Other Subpart X	1957-present
15	BCF Nylon Sump	The sump is constructed of reinforced concrete and collects finish oils, formaldehyde, and HMD wastes.	Other Subpart X	1957-present
16	Lycra Sump	This sump is constructed of reinforced concrete and collected finish oils and DMAC. This sump is no longer in service	Other Subpart X	1957-?
17	Orlon Sump	This sump (currently called the aqueous waste sump) is constructed of reinforced concrete and collects all of the waste streams before pumping them to Waste Treatment.	Other Subpart X	1957-present
18	Acetation Waste Tank	The acetation waste tank was utilized for the impoundment of acidic wastes from acetate manufacture in the Chemical Building. This waste contained dilute acetic acid. Three sumps were constructed as in-ground concrete vaults with walls and floors approximately 8-inches thick. The vaults were lined with acid brick. Waste flowed from these sumps into the retention tank pump pit, which was also constructed of concrete with acid brick lining. The tank foundation consisted of compacted earth base covered with two layers of crushed stone. A compacted earthen dike was built to retain the crushed stone base. The tank, which consisted of coated steel construction, was placed directly on top of the crushed stone.	Closed Tank Storage	1950's-1997
19	Salvage Yard	The salvage yard is surrounded by security fence and is used for the temporary storage of salvage materials. These materials include sheet metal, lamps, scrap wood, boxes, fiber, and tubing. This unit is currently operational and has been paved.	Other Storage	?-present
20	Process Sewer Line	The nylon process sewer is a buried active sewer line that is pressurized. The pressurized portion of this line spans from the process pump station to the Orlon sump. This line is constructed of 8-inch diameter Grade B cement lined iron pipe that is butt welded (and meets ASTM A 53, and code SP640U). A release occurred in 1997, which resulted in a few hundred gallons of wastewater release. Remedial activities following the leak included the removal of all free liquid from the street and the removal of approximately 5 to 6 yd <sup>3</sup> of clay fill and soil surrounding the sewer line. The excavation was back-filled with clean fill materials. Upstream of the process pump station, the Nylon process sewer	Plant Process Sewer	?-present

		is constructed of vitrified clay. There is no record of a release from this section of the process sewer.		
AOC 1 and 2	Drum Storage Pads	The Drum Storage Pads consists of concrete slabs located on the eastern boundary of the plant. The slabs are the remnant of former buildings at the site. After removal of the building structures, the remaining concrete slabs were used for long term storage of containerized wastes. In conjunction with the removal of mercury impacted soils from an area within the plant, soils and concrete along with personal protective gear were drummed for disposal and stored on the pads.	Other Storage	1990's-2000's
AOC 3	Sewer System	The storm sewer system is utilized to convey stormwater in a controlled manner from the facility.	Storm Sewer	?-present

Table B-2

**SWMU SUMMARY  
ON-SITE CORRECTIVE ACTION**

<b>SWMU</b>	<b>Unit Description</b>	<b>Status</b>	<b>Justification</b>	<b>Reference</b>
1	Mercury Recovery Area	NFI – Recommended for CMS	Mercury in this SWMU is identified as a source that impacts groundwater and storm sewer water quality. Because of the presence of free mercury in the subsurface in this area and the potential for mobilization of mercury via the sewer system, SWMU 1 is recommended for inclusion in the CMS.	Comprehensive RFI Report, revised 2012
2	Ash Disposal Area	NFI	Soil samples collected in the Phase I RFI delineated COCs in this unit. However, no significant release was indicated.	Phase I RA/RFI Report, 2003
3	Ash Ponds	NFI	Soil borings conducted during the Phase I RFI concluded that there was insignificant impact from the former ash ponds.	Phase I RA/RFI Report, 2003
4	Incineration Area	NFI – Recommended for CMS	Because of the presence of free mercury in the subsurface, the impact of mercury to groundwater and impact to surface-water drainage, this SWMU is recommended to be carried forward to the CMS.	Comprehensive RFI Report, revised 2012
5	Trade Waste Pond	NFI	Soil samples collected in the Phase I RFI were adequate for delineation of COC's. This unit is covered by asphalt and no significant exposure or migration pathways were identified at this SWMU.	Phase I RA/RFI Report, 2003
6	Wastewater Treatment	NFI	Soil samples collected in the Phase I RFI were adequate for delineation of COC's.	Phase III RFI Report, 2008
7	Sludge Pond	NFI – Recommended for CMS	The source of mercury impact to groundwater has been delineated at this SWMU. Impacted groundwater is limited in extent and is not reaching potential receptors; however, this SWMU is recommended for inclusion in the CMS.	Comprehensive RFI Report, revised 2012
8	Empty/Used Drum Storage	NFA	Empty drums are not subject to regulation	RI/RFA Workplan, 2000



SWMU	Unit Description	Status	Justification	Reference
			under 40 CFR parts 261 through 265 or part 268, 270 or 124 (ref. 40 CFR 261.7 (a) (1)).	
9	Co-treatment facility and Liquid Vortex Incinerator	NFA	The co-treatment facility included secondary containment and the liquid vortex incinerator was completely enclosed. The units were decommissioned in 1988 and 1970, respectively. There is no record of a release from either of these units.	RI/RFA Workplan, 2000
10	Hazardous Waste Storage Pad (A/B)	NFI	The drum storage pad was clean closed per the RCRA approved closure plan and approved by VADEO in 2004.	Phase II RFI Report, 2007
11	Lime Ponds	NFA	No hazardous waste constituents were placed in this unit.	RI/RFA Workplan, 2000
12	Waste Loading Dock/Hazardous Waste Pad C	NFI	A spill of Lycra polymer in 1996 was contained within the pad and cleaned up. No release to the environment occurred.	Phase IIIA RFI Workplan, 2008
13	Oil/Water Separator System	NFI	Soil samples during the Phase II RFI collected in this unit indicate that there was no release at this unit.	Phase II RFI Report, 2007
14	Maintenance Shop Sump	NFI	Soil samples indicate no release from this unit and that no exposure or migration pathways are associated with this unit.	Phase I RA/RFI Report, 2003
15	BCF Nylon Sump	NFI	Soil samples indicate no release from this unit and that no exposure or migration pathways are associated with this unit.	Phase I RA/RFI Report, 2003
16	Lycra Sump	NFI	Soil samples collected in the Phase I RFI indicate no release from this unit and that no exposure or migration pathways are associated with this unit.	Phase I RA/RFI Report, 2003
17	Orlon Sump	NFI	Phase I soil samples indicate no release from this unit and that no exposure or	Phase I RA/RFI Report, 2003

SWMU	Unit Description	Status	Justification	Reference
			migration pathways are associated with this unit.	
18	Acetation Waste Tank	NFI	Phase I soil samples indicate no release from this unit and that no exposure or migration pathways are associated with this unit.	Phase I RA/RFI Report, 2003
19	Salvage Yard	NFA	The salvage yard is paved and there is no record of a release from this area. Scrap metal staged in the yard is excluded from the requirements of 40 CFR Part 262 through 266, 268, 270 and 124 (ref. 40 CFR 261.6 (a) (3) (iv)).	Phase I RA/RFI Report, 2003
20	Process Sewer Line	NFI	Soil cleanup and removal activities performed after the sewer leaks were shown to be effective. Soil sampling conducted in the Phase II RFI indicates that remaining soils are not impacted.	Phase II RFI Report, 2007
AOC 1 and 2	Drum Storage Pads	NFI	Soil samples collected in the Phase II RFI indicate no release from this unit and that no exposure or migration pathways are associated with this unit.	Phase II RFI Report, 2007
AOC 3	Sewer System	Pending Further Investigation	Phase I of the sewer investigation was completed in January 2007. Key storm sewer sections were identified and recommendations were made for the Phase II investigation.	Storm Sewer Investigation Workplan, 2006

NFI = No further investigation  
 NFA = No further action  
 COCs = Constituents of Concern

Figure B-1  
ON-SITE SWMU LOCATION MAP

## **ATTACHMENT C**

### **OFF-SITE CORRECTIVE ACTION (AOC 4)**

## **ATTACHMENT C OFF-SITE CORRECTIVE ACTION (AOC 4)**

### **Off-Site Corrective Action (AOC 4)**

In addition to on-site Corrective Action at the former DuPont-Waynesboro facility, DuPont is implementing a corrective action program to address off-site mercury (Hg) issues in accordance with the requirements of this permit. The off-site impacts have been identified as Area of Concern 4 (AOC 4).

Figure C-1 shows the location of AOC 4, which includes the aquatic and riparian terrestrial systems (including the floodplain) of parts of the South River downstream of the former DuPont-Waynesboro facility and parts of the South Fork Shenandoah River. Table C-1 outlines currently identified document submittals to be required for AOC 4. All submittals shall be subject to approval by the Department, and additional submittals may be identified as needed. A schedule for the off-site corrective action program has been developed and the initial submittal dates are included in Table C-1.

The off-site corrective action program is based in part on the ongoing investigations performed by the South River Science Team (SRST) which was established in 2001. The SRST is made up of a team of scientists with representatives from DuPont, local, state and federal governments, several academic institutions, and local environmental and stakeholder groups. The SRST conducts studies to understand the nature and extent of Hg contamination in the South River and South Fork Shenandoah River.

Much of the work completed by DuPont and the SRST may be useful in the development of required submittals for AOC 4. Two existing documents, “Ecological Study of the South River and a Segment of South Fork Shenandoah River, Virginia” (Sept 2012) and “Remediation Proposal-South River and a Segment of the South Fork Shenandoah River, Virginia” (Oct 2013), may contain information relevant to the development of AOC 4 submittals. Table C-2 summarizes the Corrective Action status of AOC 4.

#### **Ecological Study**

The extent of Hg impact to floodplain soils, bank soils, surface-water, and sediment was described in the Ecological Study. These impacts are summarized as follows:

#### **Floodplain Soils**

In 2008, a comprehensive sampling of the South River floodplain soils was conducted to evaluate Total Mercury (THg) concentration distributions as a function of river mile, floodplain inundation frequency, and land use. The results may be summarized as follows:

- THg concentrations in floodplain soil samples decrease with distance from the river and distance downstream from the Source
- THg concentrations are highest in the 2-year and 5-year (flood recurrence interval) floodplains
- The highest THg concentrations tend to be in forested areas

- THg concentrations in floodplain wetland samples were similar to concentrations in surrounding floodplain soils

Tributary loading studies conducted as part of the Ecological Study show that the floodplain is not a significant source of Hg to the South River.

### **Bank Soils**

207 river bank transects have been sampled from relative river miles (RRM) 0.1 to 23.5 downstream from the Source. Bank soils include soils and sediments of various Hg concentrations that have been deposited on the riverbank and Hg-release age deposits (HRADs), which are areas of higher Hg concentration. Approximately 47 HRADs have been delineated between RRM 0.1 and 23.5, with 83% located between RRM 0 and 11.6.

### **Surface-Water**

Under baseline, or non-storm, conditions, the particulate concentration of inorganic Hg in surface-water increases immediately downstream of the historical outfall at RRM 0 and reaches a maximum at RRM 5.2. Particulate concentrations of inorganic Hg remain relatively constant until approximately RRM 12, then decrease.

The areas with the highest surface-water methylmercury (MeHg) concentrations are more widely dispersed. In general, surface-water MeHg concentrations are highest between RRM 10 and 12 and exhibit strong seasonality, increasing when surface-water temperatures reach approximately 12 degrees Celcius.

### **In-Channel Sediments**

Fine-grained sediment in the South River occurs primarily as channel margin deposits and as interstitial sediment within the coarser substrates of the stream bed. THg concentrations are highly variable in the channel margin deposits. Higher concentrations are found at depth, buried below fine sediment with more moderate concentrations. THg concentrations in interstitial sediment increase rapidly between RRM 0 and 8.7 and decline further downstream.

### **Conclusion and Follow-up**

The ecological study concluded that the majority of the Hg loading in the South River and South Fork Shenandoah River begins at the former DuPont facility in Waynesboro and subsides approximately 10 to 12 relative river miles downstream. Following submittal of the ecological study, DuPont completed a Remediation Proposal in October 2013 to build on the characterization of the nature and extent of mercury contamination in the South River and the South Fork Shenandoah River, develop site-specific objectives, and identify and evaluate remedial alternatives for achieving the objectives. The Remediation Proposal will form the basis for more detailed work plans for design, construction, monitoring, and adaptive management to be performed under VDEQ oversight.

Table C-1

SUMMARY OF DOCUMENTS TO BE SUBMITTED FOR AOC

<b>Document Title</b>	<b>Anticipated Submittal Schedule</b>
<i>AOC 4 Phase I Interim Measures Design, Implementation, and Monitoring Work Plan</i>	<i>4 months from effective date of permit modification to incorporate AOC 4</i>
<i>Community Relations Plan</i>	<i>5 months from effective date of permit modification to incorporate AOC 4</i>
<i>AOC 4 Phase I Interim Measures Preliminary Design Report</i>	<i>To be determined</i>
<i>AOC 4 Phase I Interim Measures Final Design Report</i>	<i>To be determined</i>
<i>AOC 4 Phase I Interim Measures Implementation Report</i>	<i>To be determined</i>
<i>AOC 4 RCRA Facility Investigation and Human and Ecological Risk Assessments</i>	<i>6 months from effective date of permit modification to incorporate AOC 4</i>
<i>AOC 4 Corrective Measures Study</i>	<i>To be determined</i>
<i>AOC 4 Corrective Action Design and Implementation Work Plan (may be multiple phases)</i>	<i>To be determined</i>
<i>AOC 4 Corrective Action Preliminary Design Report (may be multiple phases)</i>	<i>To be determined</i>
<i>AOC 4 Corrective Action Final Design Report (may be multiple phases)</i>	<i>To be determined</i>
<i>AOC 4 Corrective Action Construction Report</i>	<i>To be determined</i>
<i>AOC 4 Annual Progress and Monitoring Reports</i>	<i>To be determined</i>



Table C-2  
AOC 4 STATUS

AOC	Unit Description	Status	Justification	Reference
AOC 4	South River and South Fork Shenandoah River	Pending Interim Measures planning for upper reach of South River (Phase I) and RFI report	Based on the findings of a six year ecological study, a remediation proposal was completed that identifies a phased remediation approach starting with the first two river miles downstream of the former DuPont-Waynesboro facility.	Ecological Study for the South River and a Segment of the South Fork Shenandoah River, Virginia, Sept 2012  Remediation Proposal- South River and a Segment of the South Fork Shenandoah River, Virginia, Oct 2013

Figure C-1  
AOC 4 LOCATION MAP

**ATTACHMENT D**

**HAZARDOUS CONSTITUENT SAMPLING LIST  
AND  
RISK BASED CONCENTRATION SCREENING**

**ATTACHMENT D**  
**HAZARDOUS CONSTITUENT SAMPLING LIST AND**  
**RISK BASED CONCENTRATION SCREENING**

1. The Permittee shall analyze media for constituents listed in 40 CFR Part 261, Appendix VIII, Hazardous Constituents, and 40 CFR Part 264, Appendix IX, Groundwater Monitoring List, which have been adopted by reference in the Virginia Hazardous Waste Management Regulations (VHWMR), as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 60 (9 VAC 20-60). Based on site-specific considerations (e.g., the contaminated media, sampling and analysis of waste from the unit, or facility-specific information), the Permittee may propose to the Department for approval of a reduced list of constituents for analyses. Likewise, the above list shall not preclude the Permittee from analyzing constituents, chemical parameters or physical parameters not otherwise specified.
  
2. The Permittee shall either screen analytical data against Risk-Based Screening Levels (RBSLs) or, in lieu of screening, carry forward a SWMU/AOC, constituent, media and/or exposure pathway through the RFI. By use of a risk-based concentration screen, the corrective action process (including any risk assessment) can be made more efficient by focusing on media, significant units, dominant contaminants and routes of exposure at the earliest feasible stage. The levels specified below represent screening levels, which are intended to guide the Permittee in recommending further action (e.g., conducting a RFI/CMS). These values are not intended to be remedial cleanup levels.
  - A. The RBSLs will be developed from the following sources as appropriate:
    - i. *U.S. EPA Region III Technical Guidance Manual, Risk Assessment, "Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening,"* U.S. EPA/903/r-93-001, January 1993.
    - ii. U.S. EPA Region III Risk-Based Concentration (RBC) Table (most recent update)
    - iii. Current Federal Primary Drinking Water Standards
    - iv. *Soil Screening Guidance,* U.S. EPA/540/R-95/128, May 1996.
    - v. Ambient Water Quality Criteria (AWQC).
    - vi. Other guidance documents as appropriate and approved by the Department.

- B. For a given medium containing a constituent with more than one risk-based concentration (i.e., one based on carcinogenic risk, one based on noncarcinogenic effects), the lower concentration shall be used. RBSLs for noncarcinogenic constituents will be based on a hazard quotient of 0.1. RBSLs for carcinogenic constituents will be based on a risk level of  $1 \times 10^{-6}$ .
  - C. If health-based criteria are not available for a constituent detected at the site, the Department may require that provisional RBSLs be proposed based conservatively on toxicity data reported in literature and/or health-based criteria for similar constituents. As additional toxicological data of adequate quality becomes available, the Permittee may incorporate such data into the RBSLs, subject to the Department's approval.
3. The Permittee may use existing data (i.e. data collected prior to the effective date of the permit) or data collected during the RFI to characterize the nature and extent of contamination for a SWMU/AOC, constituent, media and/or exposure pathway. Data collected prior to the Department's approval of a Quality Assurance Project Plan must have documentation supporting its quality. For either existing data or data collected during the RFI, the detection limits for the analytical methods used must meet the various screening criteria outlined below. Standard SW-846 method detection limits will not meet the various screening criteria outlined below for all constituents. For those constituents, the Permittee may choose to carry them forward through the RFI at one-half the detection limit, or use a more sensitive method, which can meet the screening criteria.
4. The requirement to implement Corrective Measures at the Facility is not contingent upon exceedances of these screening levels. That is, if the Department determines that a constituent(s) present in a concentration below screening levels may pose a threat to human health or the environment, given site-specific exposure conditions, and there is reason to believe that the constituent(s) has been released from the facility, the Department may require Corrective Measures. Likewise, the Department may deem no further action is necessary despite exceedances of these screening levels, with appropriate rationale.
5. The Permittee shall screen each pathway described below. A SWMU/AOC, constituent, and/or medium with sufficient quantity and quality of data, that does not exceed screening concentrations for any of the pathways may generally be eliminated from further investigation. A SWMU/AOC, constituent or medium for which analytical data exceeds screening levels for a given pathway shall require further investigation or evaluation under the RFI. Based upon all the available information (e.g. number of samples, nature of contamination, location of SWMU/AOC), the Permittee shall recommend a course of action.

- A. Soil screening concentrations shall be developed for each of the following exposure pathways; direct contact, inhalation, migration to groundwater, and ecological receptors.
- i. For direct contact, RBSLs shall be developed so that contaminants remaining in soil would be safe for incidental ingestion assuming residential exposure. If the Permittee has submitted documentation supporting industrial (or other non-residential) future land use scenarios (See Condition 6 of this Attachment), the Permittee may also develop RBSLs for soils in accordance with the scenario under the Department's consideration. The Permittee may conduct the industrial screening prior to the residential screening so that, if contaminant concentrations at the unit exceed the industrial RBSLs, further investigation or evaluation is required, and the residential screening is not required. If a unit does not exceed the industrial RBSLs, then the residential screening must be conducted, so that soils at the site can be classified for direct contact exposure as follows:
    - a. Below Residential - A SWMU/AOC or constituent for which analytical data is below residential RBSLs can generally be eliminated from further investigation for the direct contact pathway.
    - b. Above Industrial - A SWMU/AOC or constituent for which analytical data is above industrial RBSLs shall be carried forward for additional investigation or evaluation under the RFI or CMS.
    - c. Between Residential and Industrial - For a SWMU/AOC or constituent for which analytical data is below industrial and above residential RBSLs, the Permittee shall recommend whether further investigation or evaluation is warranted under the RFI or CMS for the direct contact pathway, based upon all available information (e.g., data quality, number of samples, nature of contamination, location of the SWMU/AOC, location and nature of actual/potential pathways and receptors, and potential for exposure).
  - ii. For inhalation, RBSLs shall be developed so that contaminants remaining in soil would be safe for inhalation of volatilized constituents or of soil-bound contaminants suspended in the air.

- iii. For migration to groundwater, RBSLs shall be developed so that contaminants remaining in soil would not; (1) increase contamination in groundwater to concentrations that exceed RBSLs (see Condition 5.B. below); and (2) increase contamination in surface water to concentrations that exceed RBSLs (see Condition 5.C. below).
  - iv. For ecological receptors, if ecological exposure has occurred or is potentially occurring, the Permittee shall quantitatively screen analytical data against the appropriate ecological screening criteria below. If it is not known if ecological exposure has occurred or is potentially occurring, the Permittee must collect sufficient biotic survey data to make such a determination.
    - a. Toxicological Benchmarks for Wildlife: 1996 Revision. Sample, B.E., D.M. Opresko, and G.W. Suter II, Oak Ridge National Laboratory, Oak Ridge, TN, 1996.
    - b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Efrogmson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten, Oak Ridge National Laboratory, Oak Ridge, TN, 1997.
    - c. Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. Will, M.E. and G.W. Suter II, Oak Ridge National Laboratory, Oak Ridge, TN, 1995.
    - d. Ecological Soil Screening Level (Eco-SSL) Guidance and Documents. Available at EPA website:  
<http://www.epa.gov/oswer/riskassessment/ecorisk/ecossl.htm>
    - e. DEQ Hierarchy of Ecological Screening Criteria  
[http://www.deq.virginia.gov/Portals/0/DEQ/Land/RemediationPrograms/VRPRisk/RCRA\\_CA\\_Ecological\\_Screening\\_Criteria.pdf](http://www.deq.virginia.gov/Portals/0/DEQ/Land/RemediationPrograms/VRPRisk/RCRA_CA_Ecological_Screening_Criteria.pdf)
- B. Groundwater screening shall be conducted both for potential human health exposure and for protection of surface water considering the nature of the groundwater/surface water interaction.
- i. For the protection of human health, groundwater samples shall be screened based on the current or potential use of the aquifer as follows: In Virginia, the aquifer is assumed to be used for drinking water in all



cases, therefore, the Permittee shall screen groundwater against the lower of the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act, Region III RBCs or similarly derived RBSLs.

- ii. For the protection of surface water, groundwater, which discharges to surface water, shall also be screened against the surface water criteria listed below in Condition 5.C.
- C. Surface water screening shall be conducted both for human health exposure and for protection of aquatic life. Surface water screening for human health will be based on the surface water body use, as designated by the applicable state. For drainage systems (e.g. storm water channels), the designation shall be based on the designation of the surface water body which ultimately receives the discharge. Screening for the protection of aquatic life shall also include screening of sediment.
- i. For the protection of human health, surface water samples will be screened based on the state designation as follows:
    - a. If the state surface water designation includes use as drinking water, the Permittee shall use the available human health Ambient Water Quality Criteria (AWQC) for ingestion of water and organisms. Where AWQC are not available, the Permittee shall screen against the lower of MCLs, Region III RBCs or similarly derived RBSLs.
    - b. If the state surface water designation does not include use as drinking water, the Permittee shall use the available human health AWQC for ingestion of organisms. Where AWQC are not available, the Permittee may develop similarly derived RBSLs.
  - ii. For protection of aquatic life, surface water and sediment shall be screened as follows:
    - a. Surface water samples shall be screened against Chronic AWQC for the protection of aquatic organisms, or, if not available, the screening values in *Toxicological Benchmarks for Screening of Potential Contaminants of Concern for Effects on Aquatic Biota on Oak Ridge Reservation: 1996 Revision* (Suter, G.W. II and C.L. Tsao, Oak Ridge National Laboratory, Oak Ridge, TN, 1996).
    - b. Sediment samples shall be screened against the screening values in

Toxicological Benchmarks for Screening Contaminants of  
Potential Concern for Effects on Sediment-Associated Biota: 1997  
Revision (Jones, D.S., G.W. Suter II, and R.N. Hull, Oak Ridge  
National Laboratory, Oak Ridge, TN, 1997).

6. If the Permittee believes that a future industrial land-use scenario is applicable to the Facility, the Permittee must submit the land use information specified in the OSWER Directive No. 9355.7-04 Land Use in the CERCLA Remedy Selection Process. The Department will make a final land use determination after review of the Permittee's submittal and consultation with state and local land use planning authorities, elected officials, and the public. This determination will be independent of the screening procedures specified above.

**ATTACHMENT E**  
**RCRA FACILITY INVESTIGATION REQUIREMENTS**

## **ATTACHMENT E**

### **RCRA FACILITY INVESTIGATION REQUIREMENTS**

1. RCRA Facility Investigation (RFI) Plan requirements:

a. General Description of Current Conditions Section

The Permittee shall provide background information pertinent to the facility, contamination, and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data that shall be included.

(1) Facility Background

The Permittee shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage, or disposal of solid and hazardous waste. The Permittee shall include in this section the following:

Map(s) depicting the following:

- (a) General geographic location:
  - (i) Property lines, with the owners of all adjacent property clearly indicated.
  - (ii) The location of all known past solid or hazardous waste treatment, storage, or disposal areas and the site of all known spills, fires or other accidental or intentional release locations, including the approximate locations of any groundwater contamination plumes presently identified.
  - (iii) All known past and presently operating product and hazardous or solid waste underground tanks or piping.
  - (iv) The location of all production and groundwater monitoring wells, whether or not they are associated with the particular SWMU under investigation. These wells shall be clearly labeled. Ground, top of casing and screened-interval elevations shall also be provided.
  - (v) Topography (with a contour interval of 10 feet and a scale

of 1 inch = 100 feet), waterways, all wetlands, floodplains, water features, drainage patterns.

- (vi) All tanks, buildings, utilities, paved areas, easements, right-of-way, and other features.
- (vii) Surrounding land uses (residential, commercial, agricultural, and recreational).

All maps shall be consistent with the requirements set forth in 40 CFR § 270.14(b)(19) and be of sufficient detail and accuracy to locate and report all current and future work performed at the site.

- (b) A history and description of ownership and operation, solid and hazardous waste generation, and treatment, storage, and disposal activities at the facility.
- (c) Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location of the spills, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.
- (d) A summary of past permits requested and/or received any enforcement actions and their subsequent responses.

(2) Nature and Extent of Contamination

The Permittee shall submit information in this section, describing the existing nature and extent of contamination.

- (a) The Permittee shall summarize all possible source areas of contamination. This, at a minimum, should include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Respondent shall identify the following:
  - (i) Location of unit/area (which shall be depicted on a facility map).
  - (ii) Quantities of solid and hazardous wastes.

- (iii) Hazardous waste or hazardous constituents, to the extent known.
    - (iv) Identification of areas where additional information is necessary.
  - (b) The Permittee shall prepare an assessment and description of the existing degree and extent of contamination. This should include:
    - (i) Available monitoring data and qualitative information on locations and levels of contamination at the facility.
    - (ii) All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality.
    - (iii) The potential impact(s) on human health and the environment, including demography, groundwater and surface water use, and land use.
- (3) Implementation of Interim Measures  
The Permittee shall provide information documenting interim measures, which were or are being undertaken at the facility. This shall include:
  - (a) Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility.
  - (b) Design, construction, operation, and maintenance requirements.
  - (c) Schedules for design, construction, and monitoring.
  - (d) Schedule for progress reports.
- b. Potential Corrective Measure Technologies Section

Based on existing information, the Permittee shall identify:

- (1) The potential corrective measure technologies that may be used at the Facility or beyond the boundaries of the Facility to respond to releases of hazardous waste or hazardous constituents at or from the Facility.

- (2) Any field, laboratory, bench-scale or pilot-scale data that needs to be collected in the RFI to facilitate the evaluation and selection of the final corrective measure(s), if any, for releases at or from the Facility (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

c. Project Management Plan Section

The Permittee shall submit a Project Management Plan to the Department and the EPA Region 3, which shall include a discussion of the technical strategy, schedules, budget, and personnel that will be used for the study. The plan shall also include a description of the qualifications of personnel performing or directing the RFI, including contractor personnel, and document the overall management approach to the RFI.

d. Community Relations Plan Section

- (1) The Permittee shall prepare a community relations plan for the RFI. The Permittee shall prepare a fact sheet which describes the scope and objectives of the RFI and submit to the Department and the EPA Region 3 for comment. The community relations plan shall include a public notice and public meeting that announces and describes the forthcoming RFI to the community. The Permittee shall publish this notice in major local newspaper of general circulation. The public notice shall include the name and telephone numbers of the contact person of the Permittee and the Department. The public notice shall include the announcement of the availability of a fact sheet which describes the scope and objectives of the RFI. The fact sheet shall be mailed by the Permittee to all persons on the Facility mailing list compiled under 40 C.F.R. § 124.10(c)(1)(ix) and 9 VAC 20-60-1200.C, to the appropriate units of State and local governments, to all individuals who own or reside on the land that are contiguous to the Facility, and to individuals who own or reside on land in the other nearby areas to be investigated under the RFI. The mailing to the aforementioned individuals is to be made at least thirty (30) business days prior to start of the RFI field activities. The meeting shall be held to the extent practicable in the vicinity of the permitted facility. The public meeting shall be held no sooner than fifteen days after the date of the public notice announcement in the local paper. The Permittee shall provide sufficient copies of the fact sheet to the public at the Public Meeting and shall have a copy of the RFI Plan available for review and comment.
- (2) An executive summary shall be included with the RFI Report. Within ten

(10) business days of receipt of the Department's approval of the RFI Report, the executive summary report shall be mailed to all individuals on the facility mailing list compiled under 40 CFR §124.10(c)(1)(ix) and 9 VAC 20-60-1200.C, to the appropriate units of State and local governments, to all individuals who own or reside on the land that are contiguous to the Facility, and to individuals who own or reside on land in the other nearby areas to be investigated under the RFI.

(3) Notification of groundwater contamination.

If at any time the Permittee discovers that hazardous constituents, which may have been released from a SWMU or AOC at the Facility, in groundwater, or by surface water, have migrated beyond the Facility boundary in concentrations that exceed health-based levels specified in Attachment D, the Permittee shall, within fifteen (15) calendar days of such discovery:

- (a) Provide written notice to the Department and the EPA Region 3.
- (b) Provide notice to all individuals who own or reside on the land which overlies the contaminated groundwater.

(4) Notification of soil or sediment contamination. If at any time the Permittee discovers that hazardous constituents, which may have been released from a SWMU or AOC at the Facility, in air have migrated or are migrating to areas beyond the facility boundary and have resulted in soil or sediment concentrations that exceed health-based levels<sup>2</sup>, and that residences or other places at which continuous, long-term exposure to such constituents might occur are located within such areas, the Permittee shall, within fifteen (15) calendar days of such discovery:

- (a) Provide written notification to the Department and the EPA Region 3.
- (b) Provide notice to all individuals who own or reside on the land have or who may have been subject to such exposure.

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<sup>2</sup> The health-based levels for such hazardous waste or hazardous constituents as derived in a manner consistent with EPA guidelines set forth in 51 Federal Register 33992, 34006, 34014, and 34028. The health-based level for carcinogens represents a concentration associated with an excess upper bound lifetime risk of  $1 \times 10^{-6}$  due to continuous constant lifetime exposure, and for systemic toxicants represents a concentration to which the human population, exposed to on a daily basis, is not likely to suffer an appreciable risk of deleterious effect during a lifetime. Any list prepared by EPA according to these procedures may be used. As these lists may be revised at any time based on new information, contact the VADEQ for guidance.



(5) Notification of air contamination. If at any time the Permittee discovers that hazardous waste or hazardous constituents, which may have been released from a SWMU or AOC at the Facility, in air have migrated or are migrating to areas beyond the facility boundary in concentrations that exceed risk-based concentrations, and that residences or other places at which continuous, long-term exposure to such constituents might occur are located within such areas, the Permittee shall, within fifteen (15) calendar days of such discovery:

- (a) Provide written notification to the Department.
- (b) Provide notice to all individuals who have or may have been subject to such exposure.

e. Schedule

The Permittee shall provide a schedule for performance of the RFI tasks and the submission of an RFI Report, within the RFI Plan.

2. RCRA Facility Investigations

a. Environmental Setting Investigation

The Permittee shall collect information to supplement and verify existing information on the environmental setting at the Facility. The Permittee shall characterize the following:

(1) Geology and Hydrogeology

The Permittee shall conduct a program to evaluate the hydrogeologic conditions at the Facility. The program shall provide:

- (a) A description of the regional and site-specific geologic units underlying the Facility, including:
  - (i) Stratigraphy: strike and dip, and identification of stratigraphic contacts.
  - (ii) Structural features: folding, fracturing, channeling, faulting, jointing.
  - (iii) Soil: classification, description of appearance, and consistency.

- (b) A description of regional and site-specific hydrogeologic characteristics, including:
  - (i) Regional and Facility specific groundwater flow patterns.
  - (ii) A characterization of seasonal variations in the groundwater flow regime, including any perched groundwater zones.
  - (iii) Identification and characterization of areas of recharge and discharge.
  - (iv) An analysis of any topographic or geomorphic features that might influence the groundwater flow system.
  - (v) A description of the stratigraphic units including:
    - (a) Hydraulic conductivity.
    - (b) An interpretation of hydraulic interconnections between saturated zones, including any perched zones.
    - (c) Attenuation capacity and mechanisms of the soils (e.g., ion exchange capacity, organic carbon content, mineral content, redox potential, etc.).
- (c) Using a topographic map as a base, and at least two, approximately perpendicular geologic cross-sections for each SWMU/AOC and the surrounding area, provide a description of the extent (depth, thickness, lateral extent) of each geologic unit including:
  - (i) Generalized soil (based on testing, grain size, water content, Atterburg limits, etc.) and rock profiles.
  - (ii) Encountered features such as faults, fractures, voids, stratum changes, lenses, pinch out zones, karst features, etc.
  - (iii) Location and type of sampling including blow counts, percent recovery, etc.
  - (iv) Location and type of in-situ testing performed (pressure

meter, packer permeability testing, slug tests, pump tests, etc.).

(v) Groundwater elevation and/or potentiometric elevation.

(d) A description of the Facility site flow system including:

(i) Water level contour and/or potentiometric maps.

(ii) The vertical and horizontal components of flow.

(iii) Any temporal changes in water levels or hydraulic gradients, for example, due to tidal or seasonal influences.

(iv) Active and inactive local water supply and production wells with an approximate schedule of pumping.

(v) Man-made hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention ponds, etc.).

(2) Soils

The Permittee shall conduct a program to evaluate the soil conditions at the Facility. The program shall provide the following information:

(a) Where remediation by removal of soils is the only corrective measures option, provide map(s) and perpendicular cross sections showing:

(i) The extent of contamination.

(ii) Depth to groundwater.

(iii) The consistency and distribution of soils using the Unified Soil Classification System (USCS) (ASTM D 2487).

(b) Where remediation by removal is the likely option but it is necessary to determine the extent of migration (for example, to assess the mobility of wastes from an unlined surface impoundment or landfill) provide the following in addition to the requirements immediately above:

(i) Depth to bedrock and the characteristics of the bedrock

including lithologic variations, discontinuities such as faults, fissures, joints, fractures, sinkholes, and karst features, etc.

- (ii) A detailed soil survey conducted according to USDA Soil Conservation Service (SCS) procedures including:
  - (a) USDA Textural Soil Classification and soil profiles showing stratifications or zones, which may affect or direct the subsurface flow.
  - (b) Hydraulic conductivity and the SCS hydrologic group classification, A, B, C or D.
  - (c) Relative permeability (only if the waste may have changed the soil's hydraulic conductivity, such as concentrated organics).
  - (d) Storage capacity.
  - (e) Shrink-swell potential (where extreme dry weather could lead to the formation of cracks).
  - (f) Potential for contaminant transport via erosion, using the Universal Soil Loss Equation.
  - (g) Soil sorptive capacity.
  - (h) Cation exchange capacity.
  - (i) Soil organic content.
  - (j) Soil pH.
- (iii) The following contaminant characteristics must be included (where properties have been estimated, include the basis for such estimations):
  - (a) Physical state.
  - (b) Viscosity.
  - (c) pH.

- (d) pKa.
  - (e) Density.
  - (f) Water solubility.
  - (g) Henry's Law Constant.
  - (h) Kow.
  - (i) Biodegradability.
  - (j) Rates of hydrolysis, photolysis and oxidation.
- (c) When in-situ soil treatment will likely be the remediation, the following additional information must be provided:
- (i) Bulk density.
  - (ii) Porosity.
  - (iii) Grain size distribution.
  - (iv) Mineral content.
  - (v) Soil moisture profile.
  - (vi) Unsaturated hydraulic conductivity.
  - (vii) Effect of stratification on unsaturated flow.
  - (viii) Infiltration and evapotranspiration.
- (3) Surface Water and Sediment

The Permittee shall conduct a program to characterize the surface water bodies in the vicinity of the Facility. Such characterization shall include, but not be limited to:

- (a) Description of the temporal and permanent surface water bodies including:

- (i) For lakes: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume.
  - (ii) For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment.
  - (iii) For streams, ditches, and channels: location, elevation, flow, velocity, depth, width, tidal and seasonal fluctuations, and flooding tendencies (i.e., 100-year event).
  - (iv) Drainage patterns.
  - (v) Evaporation rate.
- (b) Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (ammonia, nitrate/nitrite nitrogen, and phosphate), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.
- (c) Description of sediment characteristics including:
- (i) Deposition area.
  - (ii) Thickness profile.
  - (iv) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.).
- (4) Air

If the Department requires an RFI for air releases from a SWMU/AOC, the Permittee shall provide information characterizing the climate in the vicinity of the Facility. Such information shall include, but not be limited to:

- (a) A description of the following parameters: Annual and monthly rainfall averages; monthly temperature averages and extremes; wind speed and direction; relative humidity/dew point; atmospheric pressure; evaporation data; development of inversions; and climate extremes that have been known to occur in the vicinity of the Facility, including frequency of occurrence.

- (b) A description of topographic and manmade features which affect air flow and emission patterns, including: ridges, hills, or mountain areas; canyons or valleys; surface water bodies (e.g., rivers, lakes, bays, etc.); wind breaks and forests; and buildings.

b. Source Characterization Investigation

The Permittee shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, including type; quantity; physical form; disposition (containment or nature of deposits); and Facility characteristics affecting release (e.g., Facility security, and engineered barriers). This shall include quantification of the following specific characteristics at each source area:

- (1) Unit/Disposal Area Characteristics:
  - (a) Location of unit/disposal area.
  - (b) Type of unit/disposal area.
  - (c) Design features.
  - (d) Operating practices (past and present).
  - (e) Period of operation.
  - (f) Age of unit/disposal area.
  - (g) General physical conditions.
  - (h) Method used to close the unit/disposal area.
- (2) Waste Characteristics:
  - (a) Type of waste placed in the unit, including but not limited to: Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing, or reducing agent); quantity; and chemical composition.
  - (b) Physical and chemical characteristics, including but not limited to: Physical form (solid, liquid, gas); physical description (e.g., powder, oily sludge); temperature; pH; general chemical class (e.g., acid, base, solvent); molecular weight; density; boiling point; viscosity; solubility in water; cohesiveness of the waste; and vapor

pressure.

- (c) Migration and dispersal characteristics of the waste, including but not limited to biodegradability, bioconcentration, biotransformation; photodegradation rates; hydrolysis rates; sorption; and chemical transformations.

The Permittee shall document the procedures used in making the above characterizations.

c. Contamination Characterization Investigation

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the Facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found conditions during sampling, and the identity of the individuals performing the sampling and analysis. The data must include the analyses of hazardous constituents as specified in Attachment D, at a minimum, unless otherwise approved by the Department prior to sampling. The Permittee shall address the following types of contamination at the Facility:

(1) Groundwater Contamination

The Permittee shall conduct a groundwater investigation to characterize any plumes of contamination at the Facility. This investigation shall provide, at a minimum, the following information:

- (a) A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility.
- (b) The horizontal and vertical direction of contamination movement.
- (c) The velocity of contaminant movement.
- (d) The horizontal and vertical concentration profiles of hazardous constituents in the plume(s).
- (e) An evaluation of factors influencing the plume movement.
- (f) An extrapolation of future contaminant movement.
- (g) Each RFI Plan shall include the locations, design and installation



procedures for any additional groundwater monitoring wells required to complete the monitoring well network at each area as necessary to meet the RFI objectives. These wells may be used in conjunction with existing wells in the area. All information required of the new wells shall also be required of the existing wells. The monitoring well network shall meet the following requirements:

- (i) The upgradient wells must be capable of yielding samples that are representative of background water quality in the uppermost aquifer and are not affected by any solid waste management unit. The number and location of the wells must be sufficient to characterize the spatial variability of background water.
- (ii) The downgradient wells must be capable of immediately detecting any statistically significant amounts of hazardous waste or hazardous constituents that migrate from each solid waste management unit into the groundwater.
- (iii) The monitoring system shall be designed to operate for a period of long-term duration.

When developing this information, the Permittee shall refer to the "Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells," EPA/600/4-89/034, 1989 to determine methods and materials that are acceptable to the Department.

- (h) Each RFI Plan shall provide a description of the groundwater monitoring wells including the following information:
  - (i) A description and map of well locations, including a survey of each well's surface reference point and the elevation of the top of its casing.
  - (ii) Size and depth of each well.
  - (iii) Description of well intake design, including screen slot size and length, filter pack materials and method of filter pack emplacement.
  - (iv) Type of well casing and screen materials. The choice of

well materials shall consider the parameters to be monitored and the nature of the leachate that could potentially migrate from the facility. The well materials shall: (1) minimize the potential of absorption of constituents from the samples; and (2) maintain their integrity for the life of the system.

- (v) Description of methods used to seal the well from the surface and prevent downward migration of contaminants through the well annulus.
- (vi) Description of the methods and procedures used to develop the well.
- (i) The Permittee shall select a sampling regime and conduct sampling and analysis activities capable of yielding representative samples. The sampling program shall include, at a minimum, the following elements:
  - (i) The list of analytes as specified in Attachment D of this Permit (or as modified with prior approval by the Department).
  - (ii) If the groundwater investigation is phased (i.e., conducted based on the results of a soil investigation), a list of parameters capable of detecting releases of hazardous waste or hazardous constituents into groundwater. The parameters shall be representative of hazardous constituents at least as mobile as the most mobile hazardous constituent that may be present after considering:
    - (a) The types, quantities, and concentrations of hazardous constituents in wastes managed at the SWMU/AOC. Incidental constituents which may be released into the unit area from process areas shall be included in this list of analyses.
    - (b) The mobility, stability, and persistence of hazardous waste constituents or their reaction products in the unsaturated zone beneath the waste management area.
    - (c) The detection ability of the indicator parameters,

waste constituents of reactive products in groundwater.

- (d) The concentration of and the natural variation (known or suspected) of the proposed monitoring parameters in background media.
- (e) The list must include the basis for selecting each proposed indicator parameter, including any analysis or calculations performed. The basis for selection shall, where possible, include chemical analysis of the unit's waste and/or leachate as appropriate. The list shall also include parameters to characterize the site-specific chemistry of groundwater at the site including, but not limited to, the major anions and cations that make up the bulk of dissolved solids in water (i.e., Cl<sup>-</sup>, Fe<sup>3+</sup>, Mn<sup>2+</sup>, Na<sup>+</sup>, (SO<sub>4</sub>)<sup>2-</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, K<sup>+</sup>, NO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>, silicate, and ammonium).
- (j) The Permittee shall document in the RFI Report the procedures used to characterize contaminant plume(s), for example, geophysics, modeling, pump tests, slug tests, nested piezometers, etc.

(2) Soil Contamination

The Permittee shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The soil contamination investigation shall include:

- (a) A description of the vertical and horizontal extent of contamination.
- (b) A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, cation exchange capacity, biodegradability, hydrolysis, photolysis, oxidation, and other factors that might affect contaminant migration and transformation.
- (c) Specific contaminant concentrations according to the analyte list

(or as modified with prior approval by the Department).

- (d) The velocity and direction of contaminant movement.
- (e) An extrapolation of future contaminant movement.

The Permittee shall document in the RFI Report the procedures used in making the above characterizations and determinations of future contaminant movement.

(3) Surface Water and Sediment Contamination

The Permittee shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the Facility.

The investigation shall generate, at a minimum, the following information:

- (a) A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility, and the extent of contamination in underlying sediments.
- (b) The horizontal and vertical direction of contaminant movement.
- (c) The contaminant velocity.
- (d) An evaluation of the physical, biological, and chemical factors influencing contaminant movement.
- (e) An extrapolation of future contaminant movement.
- (f) A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

The Permittee shall document in the Phase II RFI Report the procedures used in making the above characterizations.

(4) Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste or hazardous constituents. This investigation shall generate, at a minimum the following information:

- (a) A description of the horizontal and vertical extent of subsurface gases migration.
- (b) The chemical composition of the gases being emitted.
- (c) The rate, amount, and density of the gases being emitted.
- (d) Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Permittee shall document in the RFI Report the procedures used in making the above characterizations.

(5) Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall generate, at a minimum, the following information:

- (a) A description of the horizontal and vertical dispersion of contaminants (vapors and particulates).
- (b) The rate, chemical and physical concentrations, and loadings of the contaminants(s) released in both vapors and particulates.
- (c) The rate, chemical and physical concentrations, and loadings of contaminants in the vapor and particulate phases at the points of exposure. This includes the development of contaminant concentration profiles for the gaseous and particulate phases and includes development of deposition profiles of contaminants.

The Permittee shall document in the RFI Report the procedures, models and methods used in making the above characterizations. All assumptions and factors used in the models and methods shall be documented.

d. Potential Receptors Investigation

The Permittee shall collect data describing the human populations and environmental systems that may be exposed to releases of hazardous waste or hazardous constituents from the Facility. Chemical analysis of biological samples may be required. Data on observable effects in ecosystems may also be required. The following characteristics shall be identified:

- (1) Local uses and possible future uses of groundwater:
  - (a) Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial).
  - (b) Location of groundwater users, including wells and discharge areas.
- (2) Local uses and possible future uses of surface waters draining the Facility:
  - (a) Domestic and municipal (e.g., potable and lawn/garden watering).
  - (b) Recreational (e.g., swimming, fishing).
  - (c) Agricultural.
  - (d) Industrial.
  - (e) Environmental (e.g., fish and wildlife propagation).
- (3) Human use of or access to the Facility and adjacent lands, including, but not limited to:
  - (a) Recreation.
  - (b) Hunting.
  - (c) Residential.
  - (d) Commercial.
  - (e) Zoning.
  - (f) Relationship between population locations and prevailing wind direction.
- (4) A demographic profile of the people who use or have access to the Facility and adjacent land, including, but not limited to: age, sex, and sensitive subgroups.
- (5) A description of the biota in surface water bodies or wetlands on, adjacent to, or affected by the Facility. An evaluation of the pollutant impacts on the ecosystems/populations potentially exposed to contamination. This

evaluation may be accomplished through the use of toxicity test (acute and chronic) population surveys and literature reviews.

- (6) A description of the ecology overlying and adjacent to the Facility must include:
  - (a) The location and size of each identified habitat e.g. stream reaches, roads, wetlands of forested area, within the physical boundaries defined for the assessment.
  - (b) A listing and physical assessment of the ecosystems and population potentially exposed to contamination.
  - (c) A description of any endangered or threatened species near the Facility.

e. Laboratory and Bench Scale Studies

If specifically required by the Department at any time during the RFI, the Permittee shall conduct laboratory and/or bench scale studies to determine the applicability of corrective measure technology or technologies to facility conditions. The Permittee shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Permittee shall develop a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Permittee shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan. The Permittee shall prepare a report summarizing the testing program and its results, both positive and negative.

f. Risk Assessment

The baseline risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases (under the assumption of no action).

The baseline risk assessment contributes to the site characterization and subsequent development, evaluation, and selection of appropriate response alternatives. There are four steps in the risk assessment process:

- (1) Determine contaminants of concern: Data collection and evaluation involves the gathering and analyzing the site data relevant to the human health evaluation and identifying the substances present at the site that are the focus of the risk assessment process.
- (2) Exposure assessment: Using the procedure outline in Section 2.d for determining potential receptors, estimate the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed. In the exposure assessment, reasonable maximum estimates of exposure are developed for both current and future land-use assumptions.
- (3) Toxicity assessment: This component of the risk assessment considers the types of adverse health effects associated with chemical exposures and the relationship between the magnitude of exposure and adverse effects.
- (4) Risk Characterization: This summarizes and combines outputs of the exposure and toxicity assessments to characterize baseline risk, both in quantitative expressions and qualitative statements.

### 3. RCRA Facility Investigation Report

The RFI Report shall be submitted to for the Department's approval. A copy of the RFI Report shall be submitted to the EPA Region 3. The RFI Report shall include an analysis and summary of all Facility investigations and the results of such investigations.

#### a. Data Analysis

The Permittee shall analyze all Facility investigation data outlined in permit section II.C, RCRA Facility Investigation, and prepare a report on the type and extent of contamination at the Facility, including sources and migration pathways. The report shall describe the extent of contamination (qualitative and quantitative) in relation to screening levels specified in Attachment D and background levels indicative of the area.

#### b. Media Cleanup Standards

The Permittee shall identify the following cleanup standards:

##### (1) Groundwater Cleanup Standards

The Permittee shall provide information to support selection/development



of Groundwater Cleanup Standards for all of the hazardous constituents found in the groundwater during the RCRA Facility Investigation.

- (a) The Groundwater Cleanup Standards shall consist of:
  - (i) The Maximum Contaminant Level (MCL) for any constituents with an EPA promulgated Maximum Contaminant Level (MCL), if the background level of the constituent is below the value of the EPA approved MCL.
  - (ii) The background level of that constituent in the groundwater.
  - (iii) A standard established according to the criteria for Other Media Cleanup Standards.

(2) Other Media Cleanup Standards

The Permittee shall identify concentration levels in the affected media, which protect human health and the environment.

Unless a lower concentration level is deemed necessary to protect environmental receptors, cleanup standards shall be established as follows:

- (a) For any known or suspected carcinogens classified by EPA's weight of evidence classification as an A, B1 or B2 carcinogen, cleanup standards shall be established at concentration levels such that the cumulative (total) excess upper bound lifetime risk from chemicals falls within the risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .
- (b) For systemic toxicants, cleanup standards shall represent concentration levels to which the human population (including sensitive subgroups) could be exposed on a daily basis without appreciable risk of deleterious effect during a lifetime.
- (c) The Permittee shall recommend which SWMUs, or groups of SWMUs/AOCs, require a Corrective Measures Study. The Permittee shall also identify those corrective action alternative(s) the Permittee intends to investigate further. The Permittee may either investigate several alternatives or focus on a limited number of alternatives.

**ATTACHMENT F**  
**CORRECTIVE MEASURES STUDY REQUIREMENTS**

## ATTACHMENT F CORRECTIVE MEASURES STUDY REQUIREMENTS

The purpose of a Corrective Measures Study (CMS) is to develop and evaluate remedial alternative(s) and to recommend the remedy(ies) to be taken (refer to Permit Section II.C.). The Permittee may elect either to screen a number of potential remedies prior to evaluating a smaller number of potential remedies or delete the screening step and proceed with evaluation of the expected remedy(ies), including any specified by the Department.

The Corrective Measures Study shall consist of:

1. Screening of Potential Remedies:

Should the Permittee elect to screen a number of potential remedies, any potential remedy specified in the Department's approval of the RFI Report shall also be screened. The Permittee shall document the reasons for eliminating any technology.

a. The characteristics which shall be used to screen inapplicable remedies or technologies include, but are not limited to:

(1) Site and Media Characteristics.

Site and media data shall be reviewed to identify conditions that may limit or promote the use of certain technologies. The use of technologies, which are clearly precluded by site or media characteristics, shall be eliminated from further consideration.

(2) Waste Characteristics.

Potential remedies clearly limited by the waste characteristics should be eliminated from consideration.

(3) Technology Limitations.

During the screening process, the level of technological development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process.

b. The Permittee shall select remedy(ies) based on the above screening, together with any remedy(ies) specified by the Department, for further evaluation. Should

potential remedy(ies) specified by the Department prove infeasible based on the above screening, the Permittee may request that the alternative(s) be dropped from further investigation. However, until approved, the request shall not stay the conditions of this Permit.

## 2. Evaluation of Potential Remedies

The Permittee shall evaluate the selected potential remedy(ies), including any specified by the Department.

The CMS shall evaluate the feasibility of reaching the action levels determined in accordance with Attachment C and to estimate the time frames of remediation based upon both a hydro geochemical and engineering analyses. Various alternatives to address the contamination problems shall be presented and evaluated in the CMS. The proposed alternatives and evaluations in the CMS should be based upon similar case histories of contaminated sites, and/or findings by academia, research, etc.

The evaluation shall include a description of each potential remedy, which shall include, but is not limited to: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. Each potential remedy shall be evaluated with respect to the following criteria:

- a. Evaluations of alternative final remedial measures shall address the following considerations in the order that is presented below:
  - (1) Control of the sources of releases so to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment.
  - (2) Overall protection of human health and the environment.
  - (3) Compliance with standards and criteria for all media (i.e., for soils, subsoils, groundwater, sediment, surface water, and air) based upon State and Federal regulations, requirements, and guidance.

Compliance with State and Federal standards and criteria may be established by risk-based assessment of human health and the environment and the establishment of risk-based action levels. The risk-based action levels are to be established by a comprehensive risk assessment of the contaminants released and detected, in conjunction with modeling of fate and transport of the HCOCs at the site. A detailed evaluation and summary of findings associated with the toxicity, mobility, and volume of HCOCs needs to be provided.

Compliance with State standards for the restoration of state waters to such quality which allows for their most "Beneficial Use" shall be addressed in the evaluations of alternative final remedial measures. Restoration of groundwater to the most "Beneficial Use" shall be considered restoration of groundwater to conditions suitable for public water supply use for human consumption in accordance with State standards.

- (4) The long term effectiveness and permanence of the remedial measure. This includes an evaluation of the persistence, toxicity, and mobility of the hazardous substances and constituents, and their propensity to bioaccumulate.
- (5) Short-term effectiveness and potential for human exposure.
- (6) Feasibility of using the technology.
- (7) Capital costs and the operation and maintenance costs using the technology. The evaluation also needs to consider the potential for future remedial action costs (based upon present worth costs) if the alternative remedial corrective action in question were to fail.
- (8) State, EPA, and community acceptance.

b. Technical

- (1) Assessment of the effectiveness of potential remedies in achieving adequate control of source and cleanup of the hazardous waste (including hazardous constituents) released from solid waste management units.
- (2) Evaluation of the performance, reliability, ease of implementation, and potential impacts of the remedy, including safety impacts, cross media impacts, and control of exposure to any residual contamination.
- (3) Assessment of the time required to begin and complete the remedy.
- (4) Estimation of the costs of remedy implementation.
- (5) Assessment of institutional requirements, such as state or local permits requirements, or other environmental or public health requirements which may substantially affect implementation of the remedy(ies).

c. Human health risk exposure and assessment: The potential remedy(ies) shall be

evaluated with respect to mitigation of short- and long-term potential exposure to any residual contamination and protection of human health, both during and after implementation.

- d. Environmental risk exposure and assessment: An evaluation of the facility conditions and pathways of contamination actually addressed by each potential remedy. The evaluation shall include the short-term and long-term beneficial and adverse effects, any adverse effects on environmentally sensitive areas, and an analysis of measures to mitigate such adverse effects.
- e. Institutional Factors: The Permittee shall evaluate the effects of federal, State, and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations, including the requirements for construction and operating permits on the design, operation, and timing of the remedy(ies).

3. Cost Estimate

The Permittee shall develop a cost estimate for the remedy(ies) and for each phase or segment of the remedy(ies) including:

- a. Capital costs consisting of direct (construction) and indirect (non-construction and overhead) costs.
- b. Post-construction costs, including operation and maintenance) necessary to ensure continued effectiveness of the alternative(s).

4. Interim Reporting

The Permittee shall submit bi-monthly or alternate progress reports containing:

- a. A description and estimate of the percentage of the CMS completed.
- b. Summaries of all findings.
- c. Summaries of all contacts with representatives of the local community, public interest groups, or State government during the reporting period.
- d. Summaries of all problems or potential problems encountered during the reporting period.
- e. Actions being taken to rectify problems.
- f. Changes in personnel during the reporting period.

- g. Projected work for the next reporting period.

## 5. Final Report

According to the approved schedule, the Permittee shall submit to the Department for approval a Corrective Measures Study Report. A copy of the CMS Report shall be submitted to the EPA Region 3. The report shall include:

- a. An updated description of conditions at the Facility and the nature and extent of the contamination as documented by the RCRA Facility Investigation Report. The Permittee shall update the information with respect to any response activities or interim measures which have been implemented or are being implemented at the Facility.
- b. Recommended objectives for corrective action for each SWMU, AOC, or group of SWMUs/AOCs. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable state and federal statutes or regulations.
- c. The Permittee shall justify and recommend a remedy(ies) using technical, human health, and environmental standards and criteria. These recommendations shall include summary tables, which allow the alternative(s) to be understood easily. Trade-offs among health risks, environmental effects, and other pertinent factors among the alternatives evaluated shall be highlighted. Information on all evaluated potential remedy(ies) shall be presented.
- d. The Report shall, at a minimum, include:
  - (1) A description of the facility, site topographic map(s) and preliminary layouts.
  - (2) For the selected remedy(ies) include:
    - (a) Performance expectations, i.e., the selected remedy is expected to achieve the Media Cleanup Standards based upon the human health risk assessment action levels and other applicable environmental criteria and standards in the approved RCRA Facility Investigation Report.
    - (b) Preliminary design criteria and rationale.
    - (c) General operation and maintenance requirements.

- (d) Long-term monitoring requirements.
  - (e) Design and Implementation Precautions:
    - (i) Special technical problems.
    - (ii) Additional engineering data required.
    - (iii) Permits and regulatory requirements.
    - (iv) Access, easements, right-of-way.
    - (v) Health and safety requirements.
    - (vi) Community relations activities.
  - (f) Cost Estimates and Schedules:
    - (i) Capital cost estimate.
    - (ii) Operation and maintenance cost estimate.
    - (iii) Project schedule (design, construction, and operation).  
including estimated operating time required to achieve the  
performance expectation.
- e. Upon review of the Corrective Measures Study Report, the Department may require the Permittee to evaluate further, and report upon, one or more additional remedies, or develop particular elements of one or more proposed remedies. Such further requirements will, if necessary, be incorporated into this Permit with 40 CFR § 270.41 or § 270.42.



**ATTACHMENT G**  
**INTERIM MEASURES REQUIREMENTS**

## **ATTACHMENT G INTERIM MEASURES REQUIREMENTS**

The purpose of Interim Measures is to implement corrective actions during the term of this Permit to control, abate or remove any known on-site or off-site contamination, and/or prevent the migration of contamination on, or beyond, the Facility boundary and to the extent practicable to protect human health and the environment. Interim Measures (IM) are to be consistent with, and integrated into any long-term remediation at the Facility.

### 1. Interim Measures Workplan

The Permittee shall prepare and submit to the Department and the EPA Region 3 an Interim Measures Workplan that includes the development of several plans, which shall be prepared concurrently. Upon the Department's approval, the Permittee shall implement the Workplan according to the schedules contained therein.

#### a. Interim Measures Project Management Plan

The Interim Measures Project Management Plan (IMPMP) shall document the overall management approach to the Interim Measures. The IMPMP shall include, but not be limited to:

- (1) Background information including a discussion of historical facility operations, the current conditions at the facility, including any interim measures which have, or are being implemented at the facility, pertinent geology, and the known nature and extent of contamination.
- (2) A discussion of Interim Measures objectives, the technical approach to meet those objectives, and an explanation of how the interim measures will control, abate or eliminate releases and, to the extent possible, be consistent and integrated with any long-term solution at the facility.
- (3) A description of the qualifications of personnel directing or performing the Interim Measures, including contractor and subcontractor personnel.
- (4) A project schedule identifying dates for the anticipated completion of the project and the submission of all documents referenced in this Attachment, including, but not limited to an Interim Measures Design Program containing Design Plans and Specifications, an Operations and Maintenance Plan, a Sampling and Analysis Plan (if necessary), progress reporting, and an Interim Measures Implementation Report.

b. Community Relations Plan

The Permittee shall prepare a fact sheet describing the scope and objectives of the Interim Measures to be performed under the Interim Measures Workplan as approved by the Department. The Community Relations fact sheet shall be submitted to the Department and the EPA Region 3. The Permittee shall mail this fact sheet to all persons on the Facility mailing list compiled under 40 C.F.R. § 124.10(c)(1)(ix) and to the appropriate units of State and local governments, to all individuals who own or reside on the land that are contiguous to the Facility, and to individuals who own or reside on land in the other nearby areas to be investigated under the RFI. The mailing of the fact sheet regarding Interim Measures should be at least ten (10) business days prior to the start of field activities for Interim Measures, unless immediate measures are needed to address an imminent threat to human health or the environment in accordance with Permit Section II.G., Emergency Response; Release Reporting.

c. Health and Safety Plan

The Permittee shall develop a Health and Safety Plan in accordance with Attachment H to this Permit. The Health and Safety Plan shall be submitted to the Department and the EPA Region 3. If the Department deems it appropriate, Permittee may reference or amend a previous Health and Safety Plan submitted pursuant to this Permit.

2. Interim Measures Design Program

a. Design Documentation and Specifications. The Permittee shall submit to the Department and the EPA Region 3 the Interim Measures design documentation and specifications, which include, but are not limited to:

- (1) The design strategy and the design basis, including measures of compliance with all applicable or relevant environmental and public health standards.
- (2) The technical factors of importance, including but not limited to materials, equipment and specifications.
- (3) The assumptions made and detailed justification of these assumptions.
- (4) The possible sources of error, references to possible operation and maintenance problems and anticipated remedies.

- (5) Detailed drawings including: facility layout, utility locations, engineering controls which aid in the safe operation of the IM, sample calculations, derivations of equations essential to understanding the report and results of laboratory or field tests.

b. Operation and Maintenance Plan

Permittee shall prepare an Operation and Maintenance Plan to cover both implementation and long-term maintenance of the Interim Measure(s). The Operations and Maintenance Plan shall be submitted to the Department and the EPA Region 3. The plan shall be composed of:

- (1) Description of the equipment and its normal operation and maintenance (O&M), including a schedule showing frequency of each O&M task, if applicable.
- (2) Description of routine monitoring and laboratory testing, the required QA/QC, and a schedule of monitoring frequency and equipment replacement, if applicable.
- (3) Records and reporting mechanisms required, including daily operating logs, laboratory records, mechanism for reporting equipment breakdown, failure and emergencies related to the implementation of the interim measure, personnel and maintenance records and monthly/annual reports to Federal/state agencies, if applicable.

c. Sampling and Analysis Plan

If any sampling and analysis is required to implement the interim measures, Permittee must include in the Interim Measure Workplan a Data Collection Quality Assurance Plan and a Data Management Plan. These two plans shall be submitted in accordance with the requirements of Attachment G to the Department and the EPA Region 3.

If the Department has previously approved a Sampling and Analysis Plan pursuant to a RFI or previous IM, and if the Department deems it appropriate, Permittee may reference or amend the relevant portions of the approved Plan. The Sampling and Analysis Plan shall describe the methods and frequency for collecting and analyzing samples for monitoring the effectiveness and efficiency of the ongoing Interim Measures. At a minimum it shall describe the number of samples collected, including QA/QC samples, the location of the samples collected the method of collection, frequency of sampling activities,

decontamination procedures, and a constituent analysis list.

3. Reports

a. Interim Measures Workplan

Permittee shall submit an Interim Measures Workplan as described in this Attachment to the Department and the EPA Region 3.

b. Progress Reports

Permittee shall submit IM Progress Reports to the Department and the EPA Region 3 in accordance with an approved schedule described in the IMPMP of Section 1.a. of this Attachment. The progress reports shall contain:

- (1) A description and estimate of the percentage of the interim measures completed.
- (2) Summaries of all findings.
- (3) Summaries of all changes made in the Interim Measures during the reporting period.
- (4) Summaries of all contacts with representative of the local community, public interest groups, or state government during the reporting period.
- (5) Summaries of all problems or potential problems encountered during the reporting period.
- (6) Actions being taken to rectify problems.
- (7) Changes in personnel during the reporting period.
- (8) Projected work for the next reporting period.
- (9) Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

c. Interim Measures Implementation Report

At the "completion" of the construction of the project, Permittee shall finalize the Interim Measures Workplan, and submit for the Department's approval a Draft

Interim Measures Implementation Report (IMIR) in accordance with the schedule described in Section 1.a.(4) of this Attachment. A copy of the IMIR shall be submitted to the EPA Region 3. The IMIR shall document that the project is consistent with the design specifications and that the interim measures are performing adequately. The IMIR shall include, but not be limited to:

- (1) Synopsis of the interim measures and certification of the design and construction.
- (2) Explanation of any modifications to the plans and why these were necessary for the project.
- (3) Listing of the criteria, established before the interim measures were initiated, for judging the functioning of the interim measures and also for explaining any modification to these criteria.
- (4) Results of facility monitoring, indicating that the interim measures will meet or exceed the performance criteria.
- (5) Summary of the operation and maintenance (including monitoring) to be undertaken at the facility.

In addition to the above information, the IMIR shall include the inspection summary reports, inspection data sheets, problem identification and corrective reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation), and as-built drawings.

- (6) The Permittee shall respond to any comments received from the Department on the draft IMIR submission.

**ATTACHMENT H**  
**QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS**

## **ATTACHMENT H**

### **QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS**

The Permittee shall submit a Sample Collection Methods and Procedures Plan(s), Quality Assurance Project Plan(s), Laboratory Data Package(s), and Data Management Plan as specified in this Attachment to the Department and the EPA Region 3. These plans must be approved by the Department in accordance with conditions I.K. (Approval/Disapproval of Submissions) of this Permit.

1. Sample Collection Methods and Procedures Plan - The Permittee shall:
  - a. Describe the samplers or sampling equipment for each environmental media and/or waste matrix to be sampled at each SWMU.
  - b. Describe the sampling procedure for each environmental media and/or waste matrix in explicit detail. Include, but not be limited to, procedures and methods for work such as bailing, drilling holes, etc.:
    - (1) Describe the sequence to be followed in conducting the field activities.
    - (2) Include quality assurance samples for analysis at the rate specified:
      - (a) Equipment Blank - One with each sampling event for each matrix type.
      - (b) Trip Blank - One with each analytical volatile batch for each matrix type.
      - (c) Field Blank - One with each analytical batch or every 20 samples, whichever is greater.
      - (d) Replicates (see Figure H-1) - One with each analytical batch or every 20 samples, whichever is greater.
    - (3). Identify the type and source of the sample containers to be used for each analytical parameter.
    - (4) Detail the sample preservation methods to be utilized and state the maximum permissible holding times to be allowed for each analytical parameter prior to analysis.
    - (5) Describe the sample custody procedures starting with the cleaning of sample containers to be used, and provide an example "chain-of-custody" form.
    - (6) Detail the sampling equipment decontamination procedures to be utilized.
    - (7) Describe what will be done with disposable equipment contaminated on



site and how contaminated materials will be disposed of, including contaminated environmental media.

- c. Identify the analytical laboratory to be used, which has a documented Quality Assurance Program, to be used.
  - d. Identify in the Quality Assurance Project Plan all sample preparation, cleanup (if any) and analytical methods to be used.
    - (1) Analytical methods utilized must be capable of achieving the screening levels specified in Attachment C, and the data quality requirements specified in the approved method. The need for deviation from any of these criteria must be fully documented in the Quality Assurance Project Plan and submitted to the Department for approval prior to conducting any sampling events.
    - (2) Test methods for analyses of hazardous constituents have been standardized by EPA in its publication, Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods (SW-846), 3rd Edition as updated. Any other appropriate standardized method may be used by the Permittee provided the alternate method is capable of producing the required level of data quality and so long as the method adheres to the quality assurance requirements in this Attachment. Non-standardized methods may be used with prior Department approval provided the Permittee submits a comprehensive description of the test method along with data from tests designed to evaluate equivalency with standard methods. This data shall include a statistical analysis of the equivalency test data.
  - e. Use, at a minimum, the quality control procedures found in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846), 3rd Edition as updated.
2. Quality Assurance Project Plan: the Quality Assurance Project Plan shall fulfill the following minimum requirements:
- a. The Permittee shall have a Quality Assurance program for ensuring that all information, data and decisions resulting from the RCRA Facility Investigation, Interim Measures and/or Corrective Measure Study are technically sound and properly documented.
  - b. The Permittee shall use an analytical laboratory, which has a documented Quality Assurance Program.

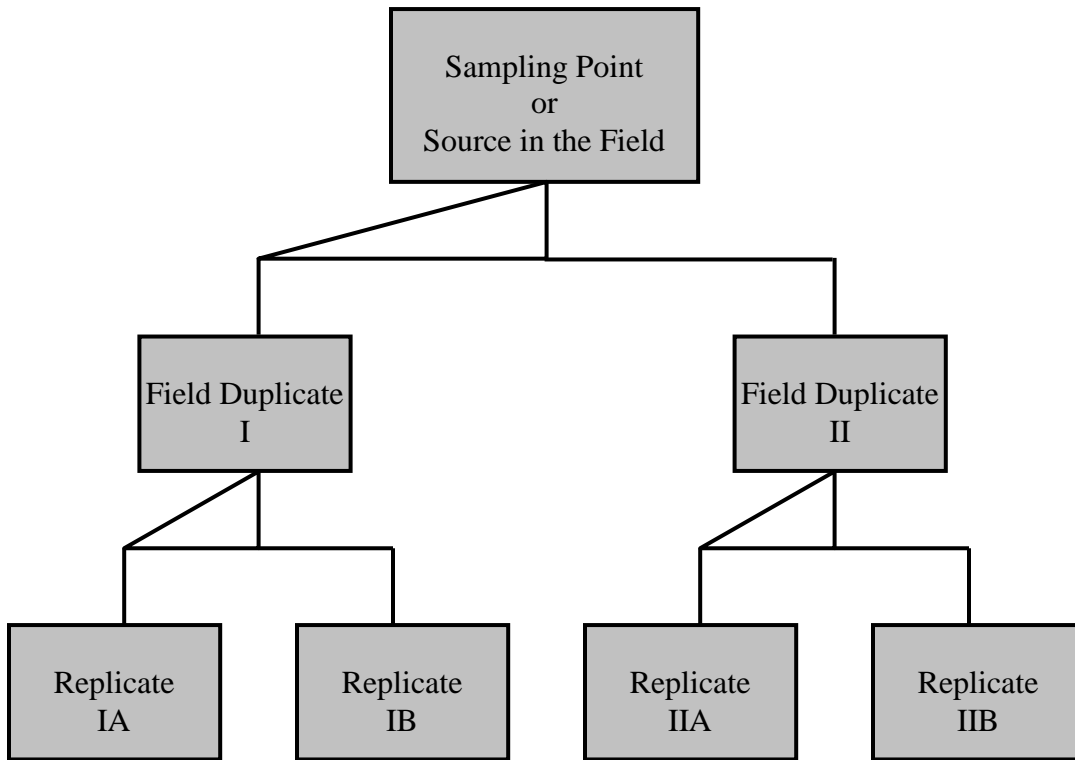
- c. The Permittee shall prepare a Quality Assurance Project Plan for each data collection project or continuing activity, utilizing guidelines and specifications found in EPA's documents: EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, 2001) and EPA Guidance on Quality Assurance Project Plans (EPA QA/G-5, 1998).
  3. Laboratory Data Package - The Permittee shall ensure that the laboratory(s) analyzing samples required by this Permit shall use the methods identified in the Department's approved Quality Assurance Project Plan, and submit the required deliverables. The laboratory data package shall include:
    - a. A Quality Control Summary including:
      - (1) Case Narrative;
      - (2) Methods Summary;
      - (3) Surrogate Recoveries;
      - (4) Matrix Spike/Matrix Spike Duplicate Recoveries;
      - (5) Method/Trip/Field/Blank Results;
      - (6) Storage; and
      - (7) Certificate of Analysis
    - b. A Sample Data Section including:
      - (1) Specific Compound Results;
      - (2) Results of Tentatively Identified Compound Analysis;
      - (3) Detection Limits; and
      - (4) Sample Analysis Dates.
    - c. The Permittee shall provide data validation of analyses done by the laboratory(ies) (to be described in the Quality Assurance Project Plan). This data validation shall determine data acceptability and shall be performed in accordance with EPA's Functional Guidelines for Data Review for data derived by Contract Laboratory Procedure Methods (Region III Modifications to National Functional Guidelines for Organic Data Review, US EPA Region III Central Regional Laboratory, June 1992 and Laboratory Data Validation - Functional Guidelines for Evaluating Inorganic Analyses, Hazardous Site Evaluation Division, US EPA, June 13, 1988). If another method is used, the data validation shall be performed in accordance with the QA/QC data validation criteria set forth in that method. For methods lacking QA/QC data validation protocols, the Permittee must establish validation criteria such as those in Section 8 of the EPA Series Methods in 40 CFR Part 136. The appropriate quality assurance data validation summary reports shall be submitted to the Department, along with sample data and summary sheets and final sample results.
4. Data Management Plan

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

- a. Data Record - The Data Record shall include the following:
  - (1) Unique sample or field measurement code;
  - (2) Sampling or field measurement location and sample or measurement type;
  - (3) Sampling or field measurement raw data;
  - (4) Laboratory analysis ID Number;
  - (5) Property or component measured; and
  - (6) Result of analysis (e.g., concentration).
  
- b. Tabular Displays - The following data shall be presented in tabular displays:
  - (1) Unsorted (raw) data;
  - (2) Results for each medium or for each constituent monitored;
  - (3) Data reduction for numerical analysis;
  - (4) Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and
  - (5) Summary data.
  
- c. Graphical Displays - The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc):
  - (1) Display sampling location and sampling grid;
  - (2) Indicate boundaries of sampling area, and areas where more data are required;
  - (3) Display levels of contamination at each sampling location;
  - (4) Display geographical extent of contamination;
  - (5) Display contamination averages, and maximum levels;
  - (6) Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and
  - (7) Indicate features affecting transport between media and show potential receptors.

The Permittee shall ensure that the Department's personnel and/or authorized representatives are allowed reasonable access to the laboratory (ies), records and personnel utilized by the Permittee for analysis of samples collected pursuant to this Permit. Furthermore, nothing shall preclude the Department from requiring Permittee's laboratory to submit to a Performance Evaluation sample analysis, or from requiring the Permittee to furnish split samples to the Department during a sampling event.

Figure H-1 Duplicates vs Replicates



Duplicates are collected in the field  
Replicates are analyzed in the laboratory

**ATTACHMENT I**  
**HEALTH AND SAFETY PLAN REQUIREMENTS**

## **ATTACHMENT I HEALTH AND SAFETY PLAN REQUIREMENTS**

The Permittee shall prepare a facility Health and Safety Plan for Corrective Action RCRA Facility Investigations (RFIs) and Corrective Measures activities at the Permitted facility and shall submit to the Department and the EPA Region 3. Compliance with the Occupational Safety and Health Administration (OSHA) Regulations is not under the jurisdiction or the authority of the Department or the EPA in the Commonwealth of Virginia. Therefore, the Health and Safety Plan submittal to the Department and the EPA Region 3 is for the administrative record only and the submittal will not receive approval nor disapproval by the Department or the EPA.

In the Commonwealth of Virginia, compliance and enforcement of the OSHA regulations under 29 C.F.R. 1910.120, falls under the authority of the Virginia Office of Safety and Health, the Virginia Department of Labor and Industry. Therefore, the above office should be contacted to determine the major elements and requirements for a Health and Safety Plan under the OSHA Regulations.

**ATTACHMENT J**

**CORRECTIVE MEASURES IMPLEMENTATION  
SCOPE OF WORK REQUIREMENTS**



**ATTACHMENT J**  
**CORRECTIVE MEASURES IMPLEMENTATION**  
**SCOPE OF WORK REQUIREMENTS**

**PURPOSE**

This Scope of Work (SOW) requirements for the Corrective Measures Implementation (CMI) sets forth the requirements for the implementation of the design, construction, operation, maintenance, and monitoring of the corrective measures implementation in accordance with Permit Module II F. The CMI is required if the Department determines that corrective measures for releases of hazardous waste or hazardous constituents are necessary to protect human health and the environment. The Department will advise the Permittee of a determination that corrective measures for releases of hazardous waste or hazardous constituents are necessary on the basis of the RFI or any other information and the reasons, in writing and any amendments thereto.

If Corrective Measures are deemed necessary to protect human health and the environment, the Permittee will perform work in accordance with the requirements specified in this SOW to implement the corrective measures that have been selected by the Department in the Final Decision and Response to Comments (FDRTC), and any amendments thereto. The Permittee will furnish all personnel, materials, and services necessary for the implementation of the corrective measure or measures.

**SCOPE OF WORK**

The Corrective Measure Implementation SOW consists of four tasks:

**1. Task I -Corrective Measure Implementation Work Plan:**

1. Management Plan.
2. Community Relations Plan.
3. Sampling and Analysis Plan.
4. Corrective Measures Permitting Plan.
5. Supplemental Field Investigation Work Plan.

**2. Task II - Corrective Measure Design:**

1. Design Plans and Specifications.
2. Operation and Maintenance Plan.
3. Cost Estimate.
4. Construction Quality Assurance Objectives.

5. Health and Safety Plan.
  6. Sampling and Analysis Plan Revision.
  7. Design Phases.
3. **Task III - Corrective Measure Construction:**
1. Preconstruction Inspection and Meeting.
  2. Inspections.
  3. CMI Report.
4. **Task IV- Reports:**
1. Progress Reports.
  2. CMI Work Plan.
  3. CMI 30% Design Report.
  4. CMI 90% Design Report.
  5. CMI 100% Design Report.
  6. CMI Final Report.

Further specifications of the work outlined in this SOW will be provided in the Corrective Measures Implementation Work Plan and subsequent plans to be approved by the Department. Variations from the SOW will be made, if necessary, to fulfill the objectives of the Corrective Measures set forth in the FDRTC and any amendments thereto.

Additional studies may be needed as part of the Corrective Measures Implementation to supplement the available data. At the direction of VDEQ for any such studies required, the Respondent shall furnish all services, including field work, materials, supplies, plant, labor, equipment, investigations, and superintendence. Sufficient sampling, QA/QC procedures, testing and analysis shall be performed to optimize the required treatment and/or disposal operations system.

### **TASK I - CORRECTIVE MEASURE IMPLEMENTATION WORK PLAN**

The Permittee shall prepare a Corrective Measure Implementation (CMI) Work Plan. The Permittee shall submit a CMI Work Plan to the Department for approval. A copy of the CMI Plan shall also be sent to the EPA Region 3.

The CMI Work Plan shall outline the design, construction, operation, maintenance and monitoring of all actions taken to implement the Corrective Measures as defined in the Order and the FDRTC and any amendments thereto. This CMI Work Plan will include the development and implementation of several plans, which require concurrent preparation. It may be necessary

to revise plans as necessary during the performance of this Order. The CMI Work Plan includes the following:

**A. Management Plan**

The Permittee shall prepare a Management Plan which will include:

1. Documentation of the overall management strategy for performing the design, construction, operation, maintenance, and monitoring of corrective measure(s).
2. Description of the responsibility and authority of all organizations and key personnel involved with the implementation.
3. Description of the qualifications of key personnel directing the CMI, including contractor personnel.
4. Conceptual design of the treatment and/or disposal system or any corrective measures to be installed as set forth in the requirements of the FDRTC.
5. An outline of proposed field activities necessary to complete the CMI Design.
6. Proposed locations of groundwater monitoring wells and a detailed well development plan.
7. Proposed discharge options for treated groundwater, with a proposed option upon which the CMI Design will be based.
8. Proposed detailed performance criteria for groundwater treatment.
9. A description of how the conceptual design is expected to meet the technical requirements of the FDRTC and any amendments thereto.
10. Flow chart and schedule of work to be performed during the CMI.

**B. Community Relations Plan**

The Permittee shall prepare a Community Relations Plan for the CMI. The Permittee shall submit the Community Relations Plan for the CMI to the Department for approval. A copy of the Community Relations Plan shall also be sent to the EPA Region 3. The Permittee shall submit and/or revise the Community Relations Plan to include any material changes in the level of concern or information needs of the community during

design and construction activities.

Specific activities which must be conducted during the design stage are the following:

1. The facility Community Relations Plan is to reflect knowledge of citizen concerns and involvement at this stage of the process.
2. Prepare and distribute a public notice and an updated fact sheet at the completion of engineering design.

**C. Sampling and Analysis Plan**

The Permittee shall prepare a Sampling and Analysis Plan. The Permittee shall submit the Sampling and Analysis Plan to the Department for approval. A copy of the Sampling and Analysis Plan shall also be sent to the EPA Region 3. The Permittee shall submit and/or revise the Sampling and Analysis Plan describing work to be performed during Corrective Measures Design, which shall be comprised of:

1. Data quality objectives for design phase activities.
2. A Quality Assurance Plan (QAP).
3. A Field Sampling Plan.
4. Data Management Plan describing the steps to be followed in compiling, organizing, and reviewing data collected in accordance with the Sampling and Analysis Plan and identifying the frequency of periodic data reviews and evaluations.

The Sampling and Analysis Plan will include the existing soil and well sampling and analysis program, with appropriate revisions as necessary.

**D. Corrective Measures Permitting Plan**

The Permittee shall prepare a Corrective Measures Permitting Plan. The Permittee shall submit the Corrective Measures Permitting Plan to Department for approval. A copy of the Corrective Measures Permitting Plan shall also be sent to the EPA Region 3.

The Corrective Measures Permitting Plan shall identify all federal, state, interstate and local permits and approvals required for the implementation of the Corrective Measures required by this Permit, and for the implementation of any institutional controls required by this Permit. The plan shall also identify all agreements or other arrangements with

adjoining landowners, if any, known by Permittee to be necessary for the implementation of the Corrective Measures, including, but not limited to, site access and easement agreements. The plan shall include a schedule indicating the time needed to obtain all such approvals and permits and to enter into such agreements and arrangements (this may be integrated with the design/implementation schedule items).

**E. Supplemental Field Investigation Work Plan**

If any additional hydrogeologic investigations or other field work is necessary for the proper design any proposed remediation system, the Permittee shall prepare and submit to the Department a Supplemental Field Investigation Work Plan setting forth the protocols and methodologies for any additional hydrogeologic investigations or other field work. The Permittee shall submit the Supplemental Field Investigation Work Plan to the Department for approval. A copy of the Supplemental Field Investigation Work Plan shall also be sent to the EPA Region 3. The work plan shall include an expeditious schedule for the completion of any such supplemental fieldwork.

**TASK II - CORRECTIVE MEASURE DESIGN**

The Permittee shall prepare design plans and specifications to implement construction for the corrective measure at the facility as defined in the Corrective Measures set forth in the FDRTC and any amendments thereto.

The Permittee shall submit the comprehensive design plans and specifications to the Department for approval. A copy of the comprehensive design plans and specifications shall also be sent to the EPA Region 3.

**A. Design Plans and Specifications**

The Permittee shall develop clear and comprehensive design plans and specifications, which include, but are not limited to, the following:

1. Discussion of the design strategy and the design basis, including:
  - a. Compliance with all applicable or relevant environmental and public health standards.
  - b. Minimization of environmental and public health impacts.
  - c. Update schedules, if necessary, from commencement through completion of construction of the CMI.

2. Discussion of the technical factors of importance including:
  - a. Use of currently accepted environmental control measures and technology.
  - b. The feasibility of constructing the design.
  - c. Use of currently acceptable construction practices and techniques.
3. Description of assumptions made and detailed justification of these assumptions.
4. Discussion of the possible sources of error and references to possible operation and maintenance problems.
5. Detailed drawings of the proposed design including:
  - a. Qualitative flow sheets.
  - b. Quantitative flow sheets.
6. Tables listing equipment and specifications.
7. Tables giving material and energy balances.
8. Appendices including:
  - a. Sample calculations (one example presented and explained clearly for significant or unique design calculations).
  - b. Derivation of equations essential to understanding the report.
  - c. Results of laboratory or field tests.

**B. Operation and Maintenance Plan**

The Permittee shall prepare or revise the Operation and Maintenance (O&M) Plan to cover both implementation and long term maintenance of the corrective measure. The O&M Plan is to identify the processes to occur, submissions during O&M, and schedule for O&M activities consistent with remedial objectives set forth in the FDRTC and any amendments thereto.

The Permittee shall submit the O&M Plan to the Department for approval. A copy of the O&M Plan shall also be sent to the EPA Region 3. An initial O&M Plan shall be

submitted simultaneously with the Preliminary Design document submissions and the Final O&M Plan with the Final Design documents. The plan shall be composed of the following elements:

1. Description of normal O&M:
  - a. Description of tasks for operation.
  - b. Description of tasks for maintenance.
  - c. Description of prescribed treatment or operation conditions.
  - d. Schedule showing frequency of each O&M task, also to be included in the Management Plan.
2. Description of potential operating problems:
  - a. Description and analysis of potential operation problems.
  - b. Sources of information regarding problems.
  - c. Common and/or anticipated remedies.
3. Description of routine monitoring and laboratory testing:
  - a. Description of monitoring tasks.
  - b. Description of required laboratory tests and their interpretation.
  - c. Required QA/QC.
  - d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.
4. Description of alternate O&M:
  - a. Should systems fail, alternate procedures to prevent undue hazard.
  - b. Analysis of vulnerability and additional resource requirements should a failure occur.
5. Safety plan:

- a. Description of precautions, of necessary equipment, etc., for site personnel.
  - b. Safety tasks required in event of systems failure.
6. Description of equipment:
- a. Equipment identification.
  - b. Installation of monitoring components.
  - c. Maintenance of site equipment.
  - d. Replacement schedule for equipment and installed components.
7. Records and reporting mechanisms required:
- a. Daily operating logs.
  - b. Laboratory records.
  - c. Records for operating and maintenance costs.
  - d. Mechanism for reporting emergencies.
  - e. Personnel and maintenance records.
  - f. Contents of periodic progress reports described in Task IV.A and providing details on how Task IV.A. requirements will be met.
  - g. Monthly/annual reports to State agencies.

**C. Cost Estimate**

The Permittee shall develop cost estimates of the Corrective Measures for the purpose of assuring that the Respondent has the financial resources necessary to construct and implement the corrective measure. The cost estimate developed in the Corrective Measure Study shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs. The Permittee shall submit the cost estimates of the Corrective Measures to the Department for approval. A copy of the cost estimates of the



Corrective Measures shall also be sent to the EPA Region 3.

**D. Construction Quality Assurance Plan**

The Permittee shall prepare and submit a Construction Quality Assurance (CQA) Plan to the Department for approval. A copy of the CQA Plan shall also be sent to the EPA Region 3. The CQA Plan shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements, and documentation. The CQA Plan shall be based upon CQA requirements as specified under 40 CFR Part 264 §264.19, Construction quality assurance program, and other EPA guidance for such CQA activities.

**E. Health and Safety Plan**

The Permittee shall prepare a Health and Safety Plan or modify the Health and Safety Plan developed for the RCRA Facility Investigation to address the activities to be performed at the facility to implement the corrective measures. The Health and Safety Plan shall be in accordance with the requirements specified in Attachment I of this permit. The Permittee shall prepare and submit a Health and Safety Plan to the Department and to the EPA Region 3.

Compliance with the OSHA Regulations is not under the jurisdiction of the Department. Therefore, the Health and Safety Plan submittal to the Department and the EPA Region 3 is for the administrative record only and the submittal will not receive approval or disapproval by the Department. In the Commonwealth of Virginia, compliance and enforcement of the OSHA regulations under 29 C.F.R. 1910.120, falls under the authority of the Virginia Office of Safety and Health, the Virginia Department of Labor and Industry.

**F. Sampling and Analysis Plan Revision**

The Permittee shall update the Sampling and Analysis Plan, including the QAPP, during each phase of Design, as appropriate, to reflect changes in the following: responsibility and authority, personnel qualifications, inspection activities, sampling requirements, documentation, and other changes to the sampling and analysis program. The updated Sampling and Analysis Plan, including the QAPP, shall be submitted to the Department for approval. A copy of the updated Sampling and Analysis Plan, including the QAPP, shall also be sent to the EPA Region 3.

**G. Design Phases**

The design of the corrective measure should include the phases outlined below:

1. Preliminary (30%) CMI Design

- a. The Permittee shall submit the 30% CMI Design Report when the design effort is approximately 30% complete. At this stage the Permittee shall have field verified the existing conditions of the facility. The 30% design shall reflect a level of effort such that the specifications may be reviewed to determine if the final design will provide effective, operable and usable corrective measures. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The 30% construction drawings shall reflect organization and clarity. The Permittee shall include with the 30% design submission, calculations reflecting the same percentage of completion as the designs they support.
- b. Correlating plans and specifications. The project specifications to be included in the 30% CMI Design Report shall demonstrate that the Permittee has:
  - i. Coordinated and crosschecked the specifications and drawings.
  - ii. Completed the proofing of the edited specifications and required crosschecking of all drawings and specifications.
- c. Equipment start-up and operator training.

The Permittee shall prepare, and include in the technical specifications governing treatment and or disposal systems; contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, training covering appropriate operational procedures once the startup has been successfully accomplished.

2. Final (90% and 100%) CMI Design

The Permittee shall execute the required revisions and submit the final documents as draft Final (90% complete) CMI Design Report and Final (100% complete) CMI Design Report with reproducible drawings and specifications.

The Final CMI Design submittal shall consist of the Final Design Plans and Specifications (100% complete), the Permittee's Final Cost Estimate, the Final Draft Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule, and Final Health and Safety Plan specifications. The quality of the design documents should be such that the Permittee would be able to include them in a bid package and invite contractors to submit bids for the construction project.

### **TASK III - CORRECTIVE MEASURE CONSTRUCTION**

Following the Department's approval of the Final CMI Design Report, the Permittee shall develop and implement construction in accordance with procedures, specifications, and schedules in the Department's approved Final CMI Design Report and the Department's approved CMI Work Plan. During the Construction Phase, Permittee will continue to submit periodic progress reports. The Permittee shall also implement the elements of the approved O&M plan.

The Permittee shall update the Sampling and Analysis Plan, including the QAPP, during the construction phase, as appropriate, to reflect changes in the following: responsibility and authority, personnel qualification, construction quality assurance, inspection activities, documentation, and other changes affecting quality assurance.

The updated Sampling and Analysis Plan, including the QAPP, shall be submitted to the Department and to the EPA Region 3. DEQ approval of the updated Sampling and Analysis Plan, including the QAPP, during the construction phase, is not required prior to implementation; however, the Department and the EPA must be notified of the updated changes by correspondence prior to implementation of such changes.

If the Department does not concur with changes to the Sampling and Analysis Plan, including the QAPP, then the DEQ will notify the Permittee and their representative of such non-concurrence and construction will be suspended until the Department formally approves of further changes to the Sampling and Analysis Plan, including the QAP.

The Permittee shall conduct the following activities during construction:

#### **A. Preconstruction Inspection and Meeting**

The Permittee shall conduct a preconstruction inspection and meeting to:

1. Review methods for documenting and reporting inspection data.
2. Review methods for distributing and storing documents and reports.

3. Review work area security and safety protocol.
4. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed.
5. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person of the Permittee or their representative and the minutes of the preconstruction inspection and meeting shall be transmitted to all parties in attendance and/or which request the minutes.

**B. Inspections**

1. The Permittee will conduct inspections to monitor the construction and/or installation of components of the corrective measure. Inspections shall verify compliance with all environmental requirements and the Construction Quality Assurance Plan and include, but not limited to, review of air quality and emissions monitoring records, waste disposal records (e.g. RCRA transportation manifests), etc, as applicable. Inspections will also ensure compliance with all health and safety procedures. Treatment and/or disposal equipment will be operationally tested by the Permittee. The Permittee will certify that the equipment has performed to meet the purposes and intent of the specifications. Retesting will be completed where deficiencies are revealed.
2. When all construction is complete, the Permittee shall notify VADEQ for the purposes of conducting a final inspection. The final inspection will consist of a walk through inspection of the project site. The inspection is to determine whether the project is complete and consistent with contract documents and the VADEQ approved corrective measures. Any outstanding construction items will be identified and noted. If necessary, Permittee shall notify VADEQ upon completion of any outstanding construction items and another final inspection consisting of a walk-through inspection of the project site to confirm all outstanding items have been resolved.

**C. CMI Report**

Upon completion of construction and also an initial period of performance monitoring after starting, and in accordance with the schedule included in the Management Plan, the

Permittee will prepare and submit a CMI Report to the Department for approval. A copy of the CMI Report shall also be sent to the EPA Region 3.

#### **TASK IV- REPORTS**

The Permittee shall prepare plans, specifications, and reports as set forth in Tasks I through III to document the design, construction, operation, maintenance, and monitoring of the corrective measure. The documentation shall include, but not be limited to the following:

##### **A. Quarterly Progress Reports**

The Permittee shall provide the Department and the EPA Region 3 with signed, periodic progress reports, as defined by the approved workplan, containing:

1. A description of the work performed during the preceding monitoring interval and estimate of the percentage of the CMI completed.
2. Summaries of all findings.
3. Summaries of all changes made in the CMI during the reporting period.
4. Summaries of all contacts with representative of the local community, public interest groups, or State government during the reporting period.
5. Summaries of system performance during the reporting period including a summary of all problems or potential problems encountered or anticipated during the reporting period.
6. Actions being taken to rectify problems.
7. Changes in personnel during the reporting period.
8. Projected work for the next reporting period.
9. Copies of daily reports, inspection reports, laboratory/monitoring data, and other information pertinent to the remediation or remediation systems.

##### **B. Annual Progress Reports**

The Permittee shall provide the Department and the EPA Region 3 with signed Annual Progress Reports. However, Annual Progress Report shall not be required for any year in

which the Permittee is required to submit a Corrective Measures Five Year Assessment Report. The Annual Progress Report shall contain:

1. A narrative summary of principal activities conducted during the reporting period.
2. Graphical or tabular presentations of monitoring data, including but not limited to average monthly system pumping rates and throughput, efficiency, groundwater levels and flow direction, and groundwater quality.
3. A schedule of sampling and field activities to be performed in the following year.
4. An O&M Evaluation.

O&M Evaluation shall assess performance of the corrective measure over time and provide one basis for the Department's five-year Evaluation of the corrective measure. Annual O&M Evaluation shall include:

- a. Summarized data representing corrective measure performance during respective two-year intervals.
- b. Any proposed changes to the corrective measure and summary of changes that have been previously made.
- c. Isoconcentration maps for each contaminant of concern listed in the Permit.
- d. Statistical assessment of the progress of the corrective measure towards achievement of media clean-up standards.
- e. When appropriate notification that corrective action media clean-up standards have been achieved.

**C. CMI Work Plan**

The Permittee shall submit a CMI Work Plan as outlined in Task I. The QAPP, included with the CMI Work Plan, will be revised, as appropriate, throughout the CMI.

**D. The 30% CMI Design Report**

The 30% CMI Design Report shall include:

1. Draft Design Plans and Specifications reflecting 30% of design work to be

completed.

2. A draft O&M Plan.
3. A preliminary cost estimate.
4. A revised project schedule, also to be included in a revised CMI Management Plan.

**E. The 90% CMI Design Report**

The 90% CMI Design Report shall include:

1. A summary of activities performed and data generated during Corrective Measure Design, including results and interpretation of treatability studies.
2. Draft detailed Corrective Measure Design Plans and Specifications reflecting 90% of design work to be completed.
3. Final performance criteria for the corrective measures, consistent with comments to have been provided by VADEQ on the Conceptual Design proposed in the Management Plan.
4. Proposal of means to evaluate system performance against media cleanup standards listed in the FDRTC and any amendments thereto.
5. A Final O&M Plan.
6. A revised Cost Estimate.
7. Revision to the Sampling and Analysis Plan, including the QAPP, to address sampling activities to be performed during the Corrective Measures Construction Phase, including the sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems as addressed in the project specification.
8. Sampling and construction activities to be performed during the Corrective Measure Construction Phase.
9. Proposed changes to the Project Schedule, if appropriate, with emphasis on short-term Construction schedule. These proposed changes in the schedule also will be included in the revised Management Plan.

**F. Final (100%) CMI Design Report**

The Permittee shall submit a Final (100%) CMI Design Report as outlined in Task II to this SOW to the Department and the EPA Region 3.

**G. CMI Report**

The Permittee shall submit the CMI Reports as outlined in Task III of this SOW to the Department and the EPA Region 3. The CMI Report shall describe activities performed during construction, provide actual specifications of implemented remedy, and provide a preliminary assessment of CMI performance. The CMI Report shall include, but not be limited to, the following elements:

1. Synopsis of the corrective measure and certification of the design and construction.
2. Explanation of any modifications to the Department's approved construction and/or design plans and why these were necessary for the project.
3. Listing of the criteria, established in the Department's approved CMI Work Plan, for judging whether the corrective measure is functioning properly, and also explaining any modification to these criteria.
4. Certification by registered professional engineer, registered in the Commonwealth of Virginia, that the construction is complete, consistent with contract documents, and the Department's approved corrective measure, and that the equipment performs to meet the intent of the specifications.
5. Results of Facility monitoring, assessing the likelihood that the Corrective Measure will meet or exceed the media clean-up standards set forth in the FDRTC and any amendment thereto.

The CMI Report should include all of the daily inspection summary reports, inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation), and as-built drawings.