# Periodic Review Report (PRR)

BASF Rensselaer Facility Closed Landfill
36 Riverside Avenue
Rensselaer, New York

October 8, 2019

Prepared for:

**BASF Corporation**
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Prepared by:

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# Executive Summary

Roux Environmental Engineering and Geology, D.P.C. (Roux) is submitting this Periodic Review Report (PRR) on behalf of the BASF Corporation for the BASF Closed Landfill located at 70 Riverside Avenue in the City of Rensselaer, New York (Site). The BASF Corporation entered into a Voluntary Clean-up Agreement (VCA) on April 19, 2002 with the New York State Department of Environmental Conservation (NYSDEC) for implementation of the remedy for the BASF Closed Landfill at their property. The Remedial Action for the Closed Landfill generally included excavation of hot spot areas conducted between September 2006 and November 2006 in accordance with the applicable portions of the NYSDEC-approved Design Drawings, Specifications, Project Plans, and Contract Documents ("Final Design Documents") dated May 12, 2006, with exceptions noted in the Final Engineering Report (FER) for the Closed Landfill. After the remedial work, some residual contamination remains in the subsurface. Following completion of the hot spot excavations within the former Landfill, a vegetative Landfill cap, drainage swale and two lined ponds (i.e., the "composite cover system") were installed. In 2011, the Ecology Center, parking lot, driveway and walkways were constructed. An active SSDS and vapor barrier were installed beneath the Ecology Center building during the construction in 2011. To manage the remaining contamination and address the potential for future exposure to any residual contamination, Institutional Controls (ICs) in the form of a deed restriction have been placed on the property.

This Site Management Plan (SMP) was prepared to manage future activities at the BASF Closed Landfill Site and specifies the methods to ensure compliance with all the Institutional Controls (ICs) and Engineering Controls (ECs) that are or might be required by the deed restriction.

The composite cover, building, and parking area were inspected by Roux on May 1, 2019 as part of the annual inspection. There were no intrusive ground penetrating activities since the planting for the composite cover system installation was completed in 2011. The vegetation comprising the Phyto Cap provided full coverage of Site soils; there were no bare soil areas observed or signs of rills or gullies from stormwater runoff, and there was no blockage observed within the swales. There was no breach of the HDPE liner within the drainage swales and ponds. The ECs are performing as designed and current ECs are protective of human health and the environment. There were no changes to the building structure since the time of construction completion in August 2011. The monthly SSDS O&M inspection forms were completed and filed in a dedicated binder kept onsite as verified by Roux during the May 1, 2019 inspection. All of the ICs have been adhered to during this reporting period.

Given the competency of the Closed Landfill ICs and ECs, it is recommended the frequency for the PRR reporting is modified from annually to every three years.

# 1. Introduction

On behalf of the BASF Corporation (BASF), Roux Environmental Engineering and Geology D.P.C. (Roux) has prepared this Periodic Review Report (PRR) to document the remedial activities performed at the BASF Rensselaer Facility Closed Landfill (Site) located at 36 Riverside Avenue, Rensselaer, New York (Figure 1), New York State Department of Environmental Conservation (NYSDEC) Site No. 4-42-004. The purpose of this report is to document the implementation of, and compliance with, this last phase of the Site's remedial program (Site Management) established for the Site in accordance with the Voluntary Cleanup Agreement dated April 19, 2002. A completed Institutional and Engineering Controls Certification Form is included in Appendix A.

Several environmental investigations conducted at the Site from 1979 through 2003, identified metals, semivolatile and volatile organic compounds (SVOCs and VOCs) as the constituents of concern (COCs). To address the soil and groundwater contamination at the Site, hot spot excavation, including removal of buried drums and contaminated soil, and backfill with clean fill was completed in 2002 and as part of the remedial action in 2006. Following completion of the hot spot excavations within the former landfill, a vegetative landfill cap, drainage swale, and two lined ponds (i.e., the "composite cover system") were installed. The remedial activities were conducted between September 2006 and November 2006 in accordance with the requirements of the Remedial Design for the Alternative Landfill Closure dated May 12, 2006 and the Remedial Action Selection Report (RASR) dated October 3, 2005.

Following site remediation, a Landfill Closure Report (April 2010) was prepared and submitted to the NYSDEC to document the remedial activities completed at the Site. In addition, an Interim Site Management Plan (December 2010) was prepared and submitted to the NYSDEC to document the engineering and institutional controls for the capped portion of the Site. A building and a combination of permeable pavement and non-permeable pavement were installed as part of the landfill cap in 2011 (Figure 2). Details of previous environmental investigations, remedial actions and results, and compliance with Site Management items are provided in the sections below.

# 2. Site Overview

This section includes a description of the Site, its operational history, previous environmental investigations, and a summary of remedial actions.

## 2.1 Site Description

The Site is a former industrial landfill (Closed Landfill; NYSDEC Site Number 4-42-004) approximately nine acres in size located to the south of the BASF Rensselaer Main Plant. A chain link fence encloses the entire Site boundary. To the north of the Closed Landfill is the BASF Main Plant (NYSDEC Site Number 4-42-027) (with an active chemical manufacturing facility (Albany Molecular [a.k.a Sterling Site NYSDEC Site Number 4-42-009]) and residential areas beyond. A steep slope immediately to the east of the Site rises to the Port of Rensselaer Access Highway. This roadway was constructed in the 1990s and crosses over three sets of railroad tracks immediately to the northeast of the Site. A portion of the Port of Rensselaer Access Highway was constructed over approximately 2.5 acres of the historical landfill footprint. To the south of the Site is one set of railroad tracks and the Empire Generating Co, LLC power plant (former South 40 Parcel). The BASF Main Plant parking lot is located to the west with Riverside Avenue, the Lagoon area, and the Hudson River beyond.

## 2.2 Site Operational History

The area that became the Closed Landfill was owned by multiple corporate entities and was also under United States government control during World War I and World War II. Process wastes from the adjoining manufacturing plant were placed into the landfill up until BASF assumed ownership of the Site in 1978. Historic aerial photos of the northern portion of the landfill adjoining the former drum storage area of the Main Plant indicated surface depressions in the area.

Applications to construct and operate a solid waste facility were submitted by GAF Corporation to the NYSDEC in February 1978. The waste stream indicated for this facility included non-toxic industrial wastes such as spent iron reduction cakes, diatomaceous earth, activated carbon, tonsil clay (that included trace amounts of chlorobenzene and Azo Phloxine [CAS #3734-67-6]), “Nuchar” (wood-based activated carbon), broken laboratory glassware, used empty containers, demolition and construction debris, waste metal drums, waste fiber drums, polyethylene liners, lead sulfate, chromium hydroxide, zinc, zinc oxide, slurry with intermediate samples, waste laboratory solvents, dye samples, in-process samples, product samples, and discarded reagents in small quantities.

In April 1978, BASF acquired the area that became the Closed Landfill from GAF Corporation. BASF immediately stopped use of the landfill for disposal purposes. In addition, following acquisition of the facility, a large number of steel drums in the landfill were removed by BASF for reclamation or scrap.

BASF closed its manufacturing facility in January 2001.

## 2.3 Summary of Previous Investigations

A summary of the major investigations and activities performed at the Closed Landfill is provided in the following reports:

- “Hydrogeological Investigation of Industrial Waste Disposal Area, BASF Wyandotte Corporation, Rensselaer, New York,” February 20, 1979, Dames & Moore (Dames and Moore 1979).

- "Industrial Landfill Post-Closure Groundwater Assessment," October 1984, Calocerinos & Spina Consulting Engineers (Calocerinos & Spina Consulting Engineers [C&S Engineers] 1984).
- "Landfill Closure Evaluation Phase 2 Piezometer Analysis," May 30, 1985, C&S Engineers (C&S Engineers [C&S Engineers] 1985a).
- "Monitoring Well Results," November 22, 1985, C&S (C&S Engineers [C&S Engineers] 1985b).
- "Final Report Geophysical Survey Landfill Detection, Delineation and Thickness Determination," February 2001, Enviroscan, Inc. (Enviroscan, Inc. [Enviroscan] 2001).
- "Additional Remedial Investigation Activities," August 3, 2001, Roux Associates (Roux Associates 2001a).
- "Site Investigation Report, South 40 Parcel," May 3, 2001, Roux Associates (Roux Associates 2001b).
- "Site Investigation Work Plan, Closed Landfill," May 29, 2002, Roux Associates (Roux Associates 2002a).
- "Site Investigation Report, Closed Landfill," September 4, 2002, Roux Associates (Roux Associates 2002b).
- "Closed Landfill Trench Investigation," February 4, 2003, Roux Associates (Roux Associates 2003).
- "Conceptual Remedial Design for the Closed Landfill," August 23, 2004, Roux Associates (Roux Associates 2004a).
- "Remedial Alternative Selection Report for the Closed Landfill," October 5, 2005, Roux Associates, Inc. (Roux Associates 2005).
- "Remedial Design for the Alternative Landfill Closure," May 12, 2006, Roux Associates, Inc. (Roux Associates 2006).
- "Landfill Closure Report," April 27, 2010, Roux Associates, Inc. (Roux Associates 2010).

As part of these investigations and activities, the following tasks were performed at the Site between 1978 and 2007:

- Subsurface investigation of the landfill by Dames & Moore in 1978, which included sixteen borings, eight rock cores, fill sampling, installation of nine monitoring wells, hydraulic tests, and groundwater sampling from eight of the nine monitoring wells.
- Groundwater sampling from four wells by Dames & Moore in October 1979 and analysis for 18 priority pollutants. The wells were re-sampled on November 14, 1983 and June 6, 1984.
- Installation of a soil cap by Dames & Moore in 1982.
- Installation of three monitoring wells by Dames & Moore between 1979 and 1984 along the storm sewer that runs through the Site.
- Post-capping investigation of groundwater flow within the landfill's shallow aquifer by C&S Engineers in 1984, which included geophysical surveys to determine the nature and extent of waste materials, and the installation of 12 shallow piezometers and four driven well points.
- Installation of an additional nine piezometers by C&S Engineers in 1984 to measure the direction and quantity of groundwater flow in the vicinity of sewers that traverse the landfill, and permeability testing and water-level measurements during periods of high and low groundwater conditions.
- Installation of eight monitoring wells by C&S Engineers from December 1984 to November 1985.
- Groundwater sampling performed at the landfill in 1985 and 1986 lead to correspondence between the NYSDEC and BASF in 1987 to discuss groundwater sampling results and treatment options. In 1987, NYSDEC accepted BASF's proposal for a groundwater treatment system consisting of a two gallon per minute pump and treat system and two 350-gallon carbon absorbers installed in series.

- The NYSDEC requests re-investigation of Closed Landfill based on observations made during the Remedial Investigation (RI) at the adjacent BASF Main Plant performed from 1999 through 2001. The requested investigation of the Landfill was to determine potential sources of groundwater contamination observed emanating from beneath the northern portion of the Landfill and migrating toward the Main Plant.
- Geophysical survey of the Landfill in 2001 by Enviroscan under the supervision of Roux.
- Installation and sampling of ten piezometers by Roux along the perimeter of the Closed Landfill as part of the RI of the Main Plant (2001). Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and filtered and unfiltered metals, including cyanide and hexavalent chromium.
- Groundwater sampling by Roux from 13 monitoring wells and piezometers located in and adjacent to the Site (2002). Samples were analyzed for VOCs, SVOCs, filtered and unfiltered metals, cyanide, hexavalent chromium and polychlorinated biphenyls (PCBs).
- Site investigation of the Closed Landfill by Roux in 2002, which included two rounds of groundwater sampling and water-level measurements, installation of five piezometers and sampling of fill and buried waste.
- Test trench investigation by Roux in 2002, which included the excavation of eight test trenches at the Site through the fill and waste material to the top of the underlying clay unit.
- Boring and sampling program by Roux in 2004 to delineate areas of high concentrations of VOCs in the Landfill soil.
- Preparation of a Conceptual Remedial Design for the Landfill by Roux in 2004.
- Performance of VOC source removal activities from September to November 2006. These activities consisted of excavation of seven hot spots resulting in 6,020 tons of material being removed and shipped off-site. Construction of a vegetative landfill cap, drainage swale and two lined ponds (designated as “North Pond” and “South Pond”) followed VOC source removal efforts.
- Implementation of a planting plan in the spring of 2007 to further promote wildlife habitat development on the former landfill occurred. The planting was completed in 2011 on the western portion of the landfill after the construction of an education center was completed.

The groundwater collection and treatment system around the Closed Landfill was installed from 2002 through 2005. The groundwater collection system (“GCS”) consists of three collection trench areas within and along the perimeter of the Site:

- GCS Area 4 – north of the Closed Landfill;
- GCS Area 6 – south of the Closed Landfill; and
- GCS Area 7 – north and west of the Closed Landfill.

In addition to the GCS collection trenches that border the northern, western, and southern portions of the Landfill, a groundwater extraction sump was installed along the eastern border of the Landfill abutting the Port of Rensselaer Access Highway during the completion of the Landfill cap in October 2006.

The GCS conveys impacted Site groundwater to the groundwater treatment system located at the southwest portion of the Main Plant, within the existing gravel parking lot. The GCS collects all leachate and groundwater moving through the Landfill not addressed by the vegetative cover for the Landfill.

## 2.4 Summary of Remediation

The remedial activities for the Closed Landfill were conducted between September 2006 and November 2006 and consisted of metals and VOC source removal via excavation of hot spot areas, and installation of a vegetative landfill cap, drainage swale, and two lined ponds. In 2011, the Ecology Center building, parking lot, driveway, and walkways were constructed. Although each major component of the remedial action is discussed in depth in the respective Landfill Closure Report (Roux 2010), a description of the composite cover system (vegetated landfill cap, drainage swales, two lined ponds, Ecology Center building, parking lot, driveway, and walkways) components are described in greater detail below.

**The vegetative landfill cap (the "Phyto Cap")** portion of the composite cover system consisted of the following components (bottom to top) which are described in further detail below:

- Existing 12-inch landfill cover;
- Biota barrier;
- Common fill and grading layer; and
- Final cover (vegetated topsoil/gravel) layer.

**Existing Landfill Cover**: The existing 12-inch landfill cover was not disturbed except in areas where the hot spot excavations or trenches were completed. In the hot spot areas, the 12-inch cover was carefully removed and stockpiled separately to be reused. For the pipe trenches, all of the material was stockpiled separately and used to backfill the pipe trenches and hot spot excavations. The areas were backfilled to the pre-existing grade (including the 12-inch cover)

**Biota Barrier**: A six-inch biota barrier layer consisting of a coarse aggregate/recycled concrete aggregate (RCA) was installed in all areas of the landfill except under the ponds and drainage swale.

**Common Fill Layer**: A six to 36-inch common fill layer was installed on top of the biota barrier. It varied in thickness across the landfill, depending on the pre-existing grade of the landfill material and the proposed final grade of the landfill, taking into account stormwater runoff to the drainage swale and the required minimum six inches of biota barrier and 18 inches of topsoil.

**Final Cover (Vegetated Topsoil/Gravel) Layer**: An 18-inch topsoil layer was installed on top of the common fill layer and hydroseeded, except where the on-site stone access road was installed. Within the limits of the stone access road, an approximate 12-inch layer of topsoil was overlain with a six-inch layer of RCA. Due to the timing of the project and weather conditions, planting of the Phyto Cap within areas covered with topsoil and hydroseeded was completed in phases. The first phase of planting was completed in November 2006 and the second planting phase was completed in Spring 2007. The final phase of planting was completed in 2011 upon construction of the environmental learning center building and parking area.

Drainage Swale and Ponds: The ponds consist of a "North Pond," "South Pond," and drainage swale that connects the two ponds. The ponds are lined with a 40-mil high density polyethylene (HDPE) geosynthetic membrane overlain by 12 inches of topsoil. Under the pond liner, six inches of common fill was installed over the existing landfill cover and backfilled excavations. In addition, erosion control matting was installed over the topsoil layer along the vegetative drainage swale and sides of the ponds. The drainage swale was installed along the eastern portion of the landfill, between the two ponds and was constructed with a 12-inch

layer of topsoil and underlain by a 40-mil HDPE geosynthetic membrane and then seeded to promote vegetative growth in the swales.

Ecology Center, Parking Lot, Driveway, Walkways: An Ecology Center building and the associated parking lot and gravel driveway were constructed in the southwest area of the Landfill (comprising a total area of approximately 36,675-square feet). The Ecology Center contains an active sub-slab depressurization system (SSDS) and vapor barrier. The parking lot and building access walkways were constructed using pervious concrete pavers or pervious concrete (in vehicle / pedestrian assess areas). The walkways within the Ecology Center's natural areas were constructed using stone dust. The Ecology Center and associated pavements were constructed above the previously installed Phyto cap fill layers. Surficial vegetation was removed and relocated to surrounding areas as necessary to properly compact the subgrade.

The building was constructed using insulated concrete forms (ICS). ICS are hollow interlocking forms made from insulation and concrete, which is poured in forms to form the walls. The building foundation consists of a reinforced concrete slab supported on footings. The 5-inch thick concrete slab is underlain by a 4.8-inch thick radiant floor slab system, underlain by a 20-mil polyethylene vapor barrier, and the SSDS vapor venting system. The subbase layer consists of compacted structural fill and the biota barrier.

An active SSDS and vapor barrier were installed beneath the Ecology Center building during the construction in 2011. The active SSDS was constructed in accordance with Section 4.2 of NYSDOH Guidance, which included the following provisions:

- The active SSDS was designed by a professional engineer;
- An information package documenting the design of the active SSDS was provided to the building tenants;
- The system piping was sealed with the appropriate sealant to prevent migration of potential vapors; and
- The SSDS collection pipe network is below the waterproofing membrane/vapor barrier.

The active SSDS consists of four-inch diameter perforated PVC collection pipes embedded in a six-inch gas permeable aggregate layer (uncrushed, rounded gravel, one-inch maximum diameter and containing less than 10% sand) underlain with filter fabric. Solid PVC vapor collection piping connects to the perforated piping and extends through one sealed penetration on each side of the building in the first-floor slab and is routed to the roof of the building. A centrifugal inline fan is connected to each of the two solid PVC risers leading to the rooftop. The two fans selected for the SSDS are manufactured by Fantech® (Model FR-100) with a maximum flow rate of 150 standard cubic feet per minute (SCFM) and a maximum vacuum pressure of 0.90 inches of water column.

## 2.5 Remaining Contamination

Residual VOCs and metals remain within the Site soils below the Phyto Cap. All of the fill material is contained below the composite cover system described in Section 2.4. The demarcation layer for each component of the composite cover system is summarized below:

| Element of Composite Cover System | Demarcation Layer | Depth of Demarcation Layer |
|---|---|---|
| Phyto Cap | Bottom of Biota Barrier | Varies (minimum of 30 inches) |
| Drainage Swales and Ponds | Bottom of Common Fill Layer | Varies (minimum of 18 inches) |

| Element of Composite Cover System | Demarcation Layer | Depth of Demarcation Layer |
|---|---|---|
| Ecology Center Building | Bottom of Biota Barrier | Varies (minimum of 30 inches) |
| Crushed stone (driveway and partial parking area) | Bottom of Biota Barrier | Varies (minimum of 30 inches) |
| Pervious Concrete Pavement (walkways and partial parking area) | Bottom of Biota Barrier | Varies (minimum of 30 inches) |
| Stone Dust Pavement (Ecology Center natural area trails) | Bottom of Biota Barrier | Varies (minimum of 30 inches) |

# 3. Remedial Action Objectives

The following remedial action objectives were outlined in the RASR (Roux 2005):

- Protect public health and the environment
  - Prevent direct contact
    - Dermal absorption, inhalation, and ingestion
  - Control surface water
  - Minimize erosion
  - Reduce infiltration
  - Control and treat leachate
- Continuing improvement
  - On-going treatment
- Beneficial re-use
  - Public or private use of the Site consistent with conditions following remediation.

The remedial program was intended to remove source area soils and eliminate the threat to human health associated with potential exposure to residual impacted soil.

# 4. SMP Requirements and Compliance Reporting

Since contaminated soil remains beneath the Site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This section details the elements of the Interim Site Management Plan (SMP) including the inspection and reporting requirements, EC/ICs, whether the EC/IC requirements were met, and regulatory notification and certification requirements. The Closed Landfill SMP dated February 8, 2018 was approved by the NYSDEC on March 13, 2018. A Site Plan is provided on the Figure 3 aerial, which shows the extent of the composite cover system, building, and permeable pavement areas comprising the landfill cap.

## 4.1 Inspections

Inspections of all remedial components installed at the site are conducted annually in accordance with the SMP Monitoring Plan schedule. Inspections of remedial components will also be conducted whenever a severe condition has taken place, such as an erosion or flooding event that may affect the Engineering Controls (ECs). The inspections determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of the SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events, if applicable;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted within five days of the event by a qualified environmental professional as determined by NYSDEC to verify the effectiveness of the EC/ICs implemented at the Site.

### 4.1.1 Monitoring Reporting Requirements

A record of the findings of each monitoring/inspection event and maintenance activity performed, when applicable, will be kept in a dedicated log book by the inspector and also documented on the Site monitoring, inspection and maintenance ("MI&M") Form. A report shall be generated each year that summarizes the findings of the maintenance and inspection activities.

The MI&M form was completed by Roux on May 1, 2019 (Appendix B). The findings of the inspection are summarized in the following sections.

## 4.2 Engineering Controls

Exposure to remaining contamination in soil/fill at the site is prevented by a composite cover system that covers remaining contamination as described in Section 2.4. The composite cover system (Phyto Cap, drainage swales, and ponds), building and parking area are a permanent EC and the quality and integrity of this system is inspected annually.

Access to the Site is restricted by a six-foot high, barbed wire, chain link fence surrounding the Site. The fence is maintained as necessary to prevent the public from unauthorized entering. Signs are placed on the perimeter fence to notify the community that the Site has restricted access. The chain link fence and signs were inspected as part of the annual inspection MI&M checklist (Appendix B). Currently, there is a locked gate with restricted access protecting the property from trespassers.

The composite cover, building and parking area were inspected by Roux on May 1, 2019 as part of the annual inspection. The completed Site Monitoring, Inspection and Maintenance Form (MI&M) is included in Appendix C. There were no intrusive ground penetrating activities since the planting for the composite cover system installation was completed in 2011.

The vegetation comprising the Phyto Cap provided full coverage of Site soils; there were no bare soil areas observed or signs of rills or gullies from stormwater runoff, and there was no blockage observed within the swales. There was no breach of the HDPE liner within the drainage swales and ponds. The ECs are performing as designed and current ECs are protective of human health and the environment.

Maintenance of the Phyto Cap has included periodic herbicide application in the south pond for invasive species control, minor maintenance of the gravel paths to fill in animal burrows and periodic mowing and pruning of the vegetation. During the May 2019 composite cover system inspection, there were no signs of erosion or bare spots. Minor signs of insect damage and disease were observed on the woody vegetation and two dead trees along the pedestrian pathway were cut at the base and removed.

There were no changes to the building structure since the time of construction completion in August 2011. The monthly SSDS O&M inspection forms were completed and filed in a dedicated binder kept on-Site as verified by Roux during the May 1, 2019 inspection.

## 4.3 Institutional Controls

A series of Institutional Controls is required by the VCA to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to restricted industrial/commercial uses only. Institutional Control adherence is required by the Environmental Easement and is implemented under the SMP. The Institutional Controls and Site restrictions that apply to the Site are:

- Compliance with the Environmental Easement and the SMP by the Grantor and the Grantor's successors and assigns.
- All Engineering Controls must be operated and maintained as specified in the SMP.
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP, as summarized in Section 4.1.
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner as defined in the SMP.
- Unless prior written approval by the NYSDEC, or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens (hereinafter referred to as "the Relevant Agency)" is first obtained, there shall be no construction, use, or occupancy of the Site that results in the disturbance or excavation of the Site that threatens the integrity of the composite cover system, or results in human exposure to contaminated soils.

- The Controlled Property may be used for restricted industrial/restricted commercial use only (not including day care, child care, and medical care) provided the long-term Engineering and Institutional Controls included in the SMP remain in use without the express written waiver of such prohibition by the NYSDEC or other Relevant Agency.
- The owner of the Site shall maintain the composite cover system, where appropriate, or after obtaining the written approval from the Relevant Agency, by modifying with alternative materials.
- The owner of the Site shall prohibit the use of the groundwater underlying the Site without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Relevant Agency.
- This Environmental Easement is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Site and shall provide that the owner, and its successors and assigns, consent to the enforcement by the Relevant Agency, of the prohibitions and restrictions that Paragraph X of the VCA requires to be recorded and hereby covenants not to contest the authority of the Department to seek enforcement.
- Any deed of conveyance including the portion of the Site referred to as the Site shall recite that the said conveyance is subject to this Environmental Easement.

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to, or extinguishment of, the Environmental Easement. All of the above-mentioned ICs have been adhered to during this reporting period.

## 4.4 Notification

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are required under the terms of the VCA, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 15-day advance notice of any proposed ground-intrusive activities pursuant to the EWP.
- Notice within 48-hours of any damage or defect to the foundations or structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing the SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the VCA, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing.

No notifications to the NYSDEC were required between 2011 and 2019.

## 4.5 Certification of Engineering and Institutional Controls

After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare the following certification:

- For each institutional or engineering control identified for the site, I certify that all of the following statements are true:
  - The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
  - The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
  - Nothing has occurred that would impair the ability of the control to protect the public health and environment;
  - Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;
  - Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
  - If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;
  - Use of the site is compliant with the environmental easement;
  - The engineering control systems are performing as designed and are effective;
  - To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program; and
  - The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Charles J. McGuckin, P.E., of Roux Environmental Engineering and Geology D.P.C., am certifying as Owner's Designated Representative Rendering Certification for the Site.

The completed Institutional and Engineering Controls Certification Form is provided in Appendix A.

Respectfully submitted,

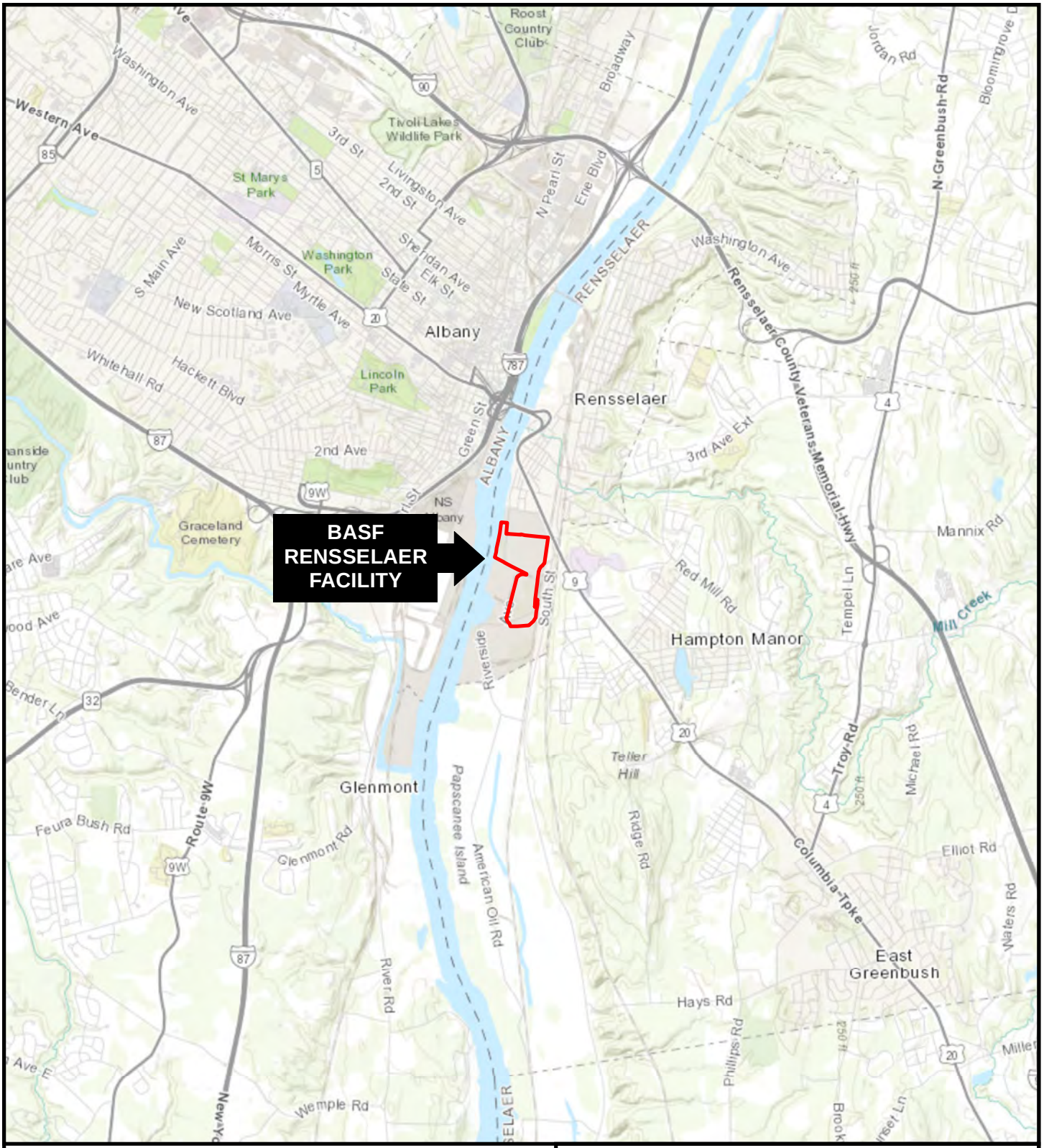
**ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY D.P.C.**

Kathryn Sommo
Senior Scientist

Charles J. McGuckin, P.E.
Principal Engineer

# FIGURES

1. Site Location Map
2. Site Areas
3. Site Plan




QUADRANGLE LOCATION


N

2,500 0 2,500'

Title:

# SITE LOCATION MAP

RENSSELAER, NEW YORK

Prepared for:

BASF CORPORATION
FLORHAM PARK, NEW JERSEY

ROUX

| | | |
|---|---|---|
| Compiled by: K.S. | Date: 09/12/19 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 1 |
| Project Mgr: K.S. | Project: 0251.0011Y054 | |
| File: 0251.0011Y649.1.mxd | | |

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LEGEND

- BASF CORPORATION MAIN PLANT
- FORMER LAGOON AREA
- CLOSED LANDFILL (SITE)
- SOUTH 40

N

200 0 200'

Title:

# FACILITY

RENSSELAER, NEW YORK

Prepared for:

BASF CORPORATION
FLORHAM PARK, NEW JERSEY

ROUX

| | |
|---|---|
| Compiled by: K.S. | Date: 09/12/19 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: K.S. | Project: 0251.0011Y054 |
| File: 0251.0011Y649.2.mxd | |

FIGURE 2

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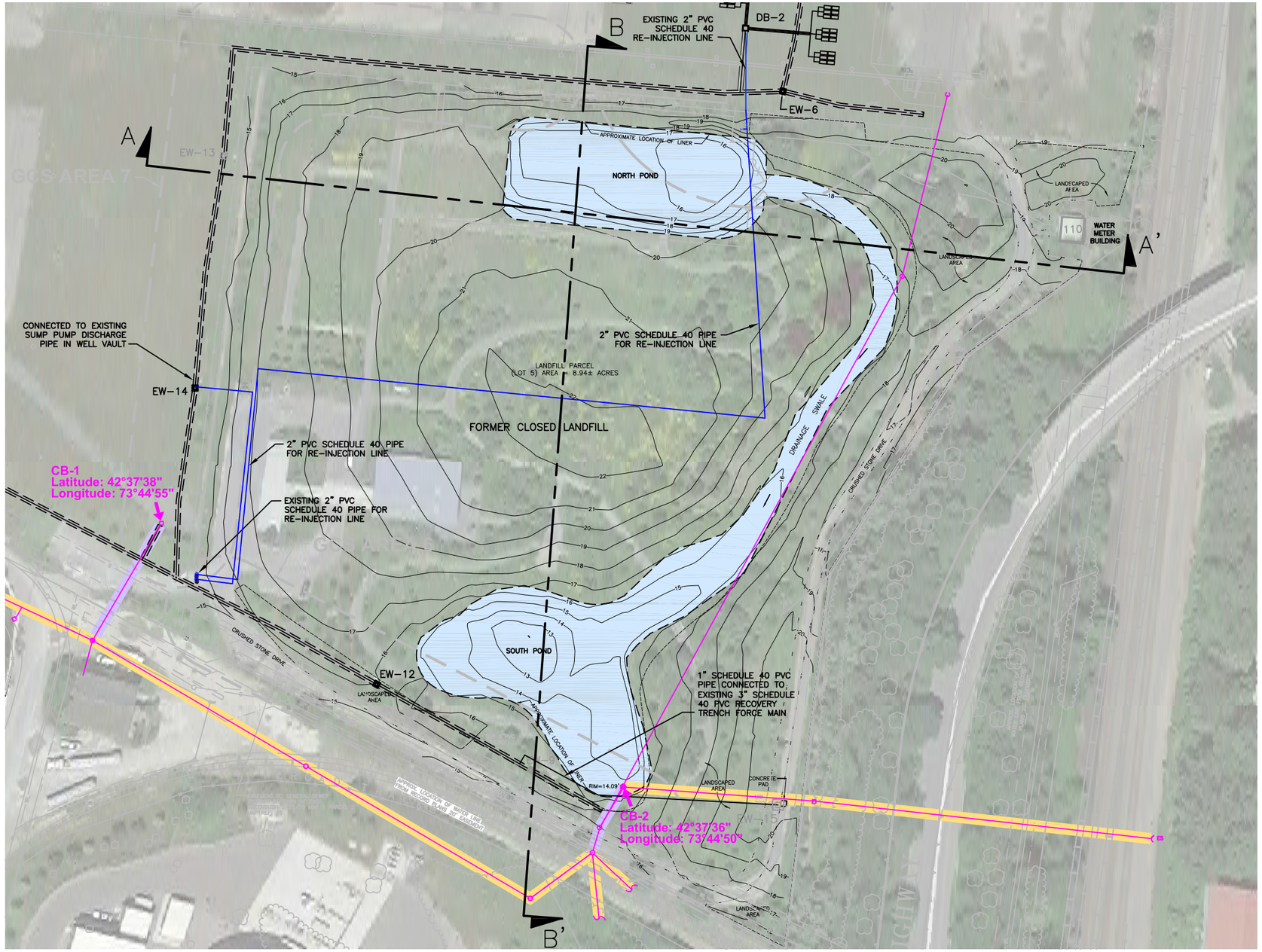


NOTES:

1. SITE PLAN BASED ON TOPOGRAPHIC AS-BUILTS PROVIDED BY C.T. MALE ASSOCIATES, P.C. OF LATHAM, NEW YORK (OCTOBER 2006)
2. NORTH ORIENTATION AND BEARING BASED ON MAP REFERENCE NO. 1.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM, 1929 (NGVD 29), HEREINAFTER REFERRED TO AS MEAN SEA LEVEL. ALL HORIZONTAL LOCATIONS ARE IN FEET RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, NYE 3101, NORTH AMERICAN DATUM, 1927.
4. LOCATIONS FOR THE FOLLOWING COMPONENTS OF THE GROUNDWATER EXTRACTION, TREATMENT, RE-INJECTION AND DISCHARGE SYSTEM ARE BASED ON FIELD MEASUREMENTS PROVIDED BY O'BRIEN AND GERE OF NORTH AMERICA, INC. IN FEBRUARY 2005:
   A. GCS AREAS 1 AND 3;
   B. DISCHARGE TRENCHING TO CB-1;
   C. TREATMENT SYSTEM AREA AND CONTAINMENT PAD;
   D. TRENCHING IN THE VICINITY OF THE CONTAINMENT PAD;
   E. AIR RELEASE CHAMBERS AR-1 AND AR-2; AND
   F. RE-INJECTION AREA FOR AOC-2.

MAP REFERENCES

1. ALTA/ACSM LAND TITLE SURVEY LANDS NOW OR FORMERLY OF BASF WYANDOTTE, CORPORATION PREPARED FOR BESICORP-EMPIRE DEVELOPMENT, LLC, CITY OF RENSSELAER, RENSSELAER COUNTY, NEW YORK, PREPARED BY C.T. MALE ASSOCIATES DATED JANUARY 31, 2001, DWG. NO. 01-114R.
2. TOPOGRAPHIC SURVEY LANDS NOW OR FORMERLY OF BASF WYANDOTTE, CORPORATION, PREPARED FOR BESICORP-EMPIRE DEVELOPMENT, LLC, CITY OF RENSSELAER, RENSSELAER COUNTY, NEW YORK, PREPARED BY C.T. MALE ASSOCIATES DATED JANUARY 28, 2001, DWG. NO. 01-109.
3. RECORD SURVEY OF GCS AREAS PREPARED FOR OBRIEN AND GERE ENGINEERS, INC., PREPARED BY C.T. MALE ASSOCIATES P.C., DATED JULY 2, 2003, DWG NO. 03-450.

100' 0 100'

LEGEND

- EW-12 — LOCATION AND DESIGNATION OF OPERATING EXTRACTION WELL
- EW-11 — LOCATION AND DESIGNATION OF NON-OPERATING EXTRACTION WELL
- CB-1 — STORMWATER CATCH BASIN
- STORMWATER MANHOLE
- GROUNDWATER COLLECTION TRENCH
- STORMWATER SEWER SYSTEM
- FLOW CONTRIBUTING TO OUTFALL 001 FROM BASF PROPERTY
- FLOW CONTRIBUTING TO OUTFALL 001 FROM PROPERTIES OTHER THAN BASF
- REINJECTION LINE
- 20 — LANDFILL SURFACE ELEVATION CONTOUR LINE (FEET ABOVE MEAN SEA LEVEL)
- WILDLIFE POND SYSTEM

Title:

**SITE PLAN**

CLOSED LANDFILL
RENSSELAER, NEW YORK

Prepared For:
BASF CORPORATION
FLORHAM, NEW JERSEY

ROUX ASSOCIATES, INC.
*Environmental Consulting & Management*

| | | |
|---|---|---|
| Compiled by: K.S. | Date: 10SEPT19 | FIGURE |
| Prepared by: G.M. | Scale: AS SHOWN | 3 |
| Project Mgr: D.M.H. | Project: 0251.0011Y52 | |
| File: 0251.0011Y649.01.DWG | | |

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# APPENDICES

A. Institutional and Engineering Controls Certification Form

B. Site Monitoring, Inspection and Maintenance Form

# APPENDIX A

Institutional and Engineering Controls Certification Form

**Enclosure 2**
**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**Site Management Periodic Review Report Notice**
**Institutional and Engineering Controls Certification Form**

**Site Details** **Box 1**

**Site No.** **V00521**

**Site Name BASF Corporation Closed Landfill**

Site Address: 36 Riverside Avenue Zip Code: 12144
City/Town: Rensselaer
County: Rensselaer
Site Acreage: 8.940

Reporting Period: March 13, 2018 to July 13, 2019

| | YES | NO |
|---|---|---|
| 1. Is the information above correct?<br>If NO, include handwritten above or on a separate sheet. | X | |
| 2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period? | | X |
| 3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))? | | X |
| 4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period? | | X |
| **If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.** | | |
| 5. Is the site currently undergoing development? | | X |

**Box 2**

| | YES | NO |
|---|---|---|
| 6. Is the current site use consistent with the use(s) listed below?<br>Commercial and Industrial | X | |
| 7. Are all ICs/ECs in place and functioning as designed? | X | |

**IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.**

**A Corrective Measures Work Plan must be submitted along with this form to address these issues.**

Signature of Owner, Remedial Party or Designated Representative Date

**SITE NO. V00521** **Box 3**

**Description of Institutional Controls**

| Parcel | Owner | Institutional Control |
|---|---|---|
| **154.00-5-2.12** | BASF WYANDOTTE CORP | Ground Water Use Restriction<br>Monitoring Plan<br>Site Management Plan<br>IC/EC Plan<br><br>Landuse Restriction |

1. Unless prior written approval by the New York State Department of Environmental Conservation (Department) is first obtained, where contamination remains at the property subject to the provisions of the Site Management Plan (SMP), there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which threatens the integrity of the engineering controls or which results in unacceptable human exposure to contaminated soils.
2. The owner of the Property shall not disturb, remove or otherwise interfere with the installation, use, and maintenance of engineering controls required for the Remedy (which are described in the SMP), unless in each instance the owner first obtains a written waiver of such prohibition from the Department.
3. The owner of the Property shall prohibit the Property from ever being used for purposes other than for its current use as a wildlife refuge and educational center without the express written waiver of such prohibition by the Department.
4. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the New York State Department of Health or the Rensselaer County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
5. The Owner of the property shall provide a periodic certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department, which will certify that the institutional and engineering controls put in place are unchanged from the previous certification, comply with the SMP, and have not been impaired.
6. The owner of the property shall continue in full force and effect any institutional and engineering controls required for the Remedy and maintain such controls, unless the owner first obtains permission to discontinue such controls from the Department, in compliance with the approved SMP, which is incorporated and made enforceable hereto, subject to modifications as approved by the Department.
7. This Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property, and shall provide that the owner and its successors and assigns consent to enforcement by the Department of the prohibitions and restrictions that the Voluntary Cleanup Agreement requires to be recorded, and hereby covenant not to contest the authority of the Department to seek enforcement.

Any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Department has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

**Box 4**

**Description of Engineering Controls**

| Parcel | Engineering Control |
|---|---|
| **154.00-5-2.12** | Vapor Mitigation<br>Cover System |

**Box 5**

**Periodic Review Report (PRR) Certification Statements**

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

| YES | NO |
|---|---|
| X | |

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

| YES | NO |
|---|---|
| X | |

**IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.**

**A Corrective Measures Work Plan must be submitted along with this form to address these issues.**

Signature of Owner, Remedial Party or Designated Representative

Date

**IC CERTIFICATIONS**
**SITE NO. V00521**

**Box 6**

**SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE**

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I J.Douglas Reid-Green (print name) at BASF Corporation, 100 Park Avenue, Florham Park, NJ (print business address),

am certifying as Owner & Remedial Party (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

J. Douglas Reid-Green

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

10/2/19
Date

## IC/EC CERTIFICATIONS

**Box 7**

**Signature**

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Charles J. McGuckin (print name) at Roux Env. Eng. & Geology, 209 Shafter St., Islandia, NY, (print business address)

am certifying as a Designative Representative Rendering Certification for the Owner & Remedial Party (Owner or Remedial Party)

Signature of , for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

9/10/19
Date

# APPENDIX B

Site Monitoring, Inspection and Maintenance Form

**ROUX ASSOCIATES, INC. / REMEDIAL ENGINEERING, P.C.**
**ANNUAL SITE MONITORING, INSPECTION AND MAINTENANCE FORM**

Client: BASF Corporation
Location: 36 Riverside Ave, Rensselaer, NY
Project Number: 0251.0011Y052
Operable Unit: Closed Landfill

**GENERAL INSPECTION (Inspect Annually)**

**Inspection Requirements:** **Performed by (Kathryn Sommo) on (May 1, 2019)**

| Yes | No | |
|---|---|---|
| [ ] | [X] | Site locks missing? |
| [ ] | [X] | Trespassing/vandalism/dumping noted? |
| [ ] | [X] | Perimeter fencing or gates requires repair? |

**SSDS INSPECTION (Inspect Annually)**

**Inspection Requirements:** **Performed by (Kathryn Sommo) on (May 1, 2019)**

| Description | Status: Ok | Status: Action Req. | Actions Taken / Comments |
|---|---|---|---|
| **A. Aboveground Piping** | X | | |
| 1 Inspect visible aboveground piping for cracks, leaks and support issues. | X | | |
| **B. Electrical** | | | |
| 1 Check that the electrical control panel is closed/secured. | X | | |
| **C. Blower Enclosure** | | | |
| 1 Inspect exhaust fans are functioning No. 1 | X | | |
| 2 Inspect exhaust fans are functioning No. 2 | X | | |
| 3 Alarm Functioning | X | | |
| **D. O&M** | | | |
| 1 Monthly Inspection Log Completed | X | | BASF Completed Monthly Logs |

**COMPOSITE COVER SYSTEM (Inspect Annually)**

**Inspection of Phyto Cap:** **Performed by (Kathryn Sommo) on (May 1, 2019)**

| Yes | No | |
|---|---|---|
| [ ] | [X ] | Significant rills or gullies observed? |
| [ ] | [X ] | Signs of settlement/ subsidence observed? |
| [ ] | [X ] | Significant bare spots observed? |

**Inspection of Drainage Swales and Ponds:** **Performed by (Kathryn Sommo) on (May 1, 2019)**

| Yes | No | |
|---|---|---|
| [ ] | [X ] | Significant rills or gullies observed in drainage swales? |
| [ ] | [X ] | Signs of settlement/ subsidence observed? |
| [ ] | [X ] | Significant bare spots observed in drainage swales? |
| [ ] | [ X ] | Exposed HDPE/ breach of HDPE observed? |
| [ ] | [X ] | Significant clogging/ blockage observed? |
| [ ] | [X ] | Other conditions observed? |

## Additional Comments or Clarification Where Corrective Actions May Be Required: