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LANDFILL CLOSURE REPORT

BASF Corporation Rensselaer Facility
Rensselaer, New York

Prepared for:

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LIST OF ACRONYMS

AOC	Area of Concern
CAMP	Community Air Monitoring Plan
CQA/QCP	Construction Quality Assurance/Quality Control Plan
GCS	Groundwater Collection System
GAC	Granular Activated Carbon
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
NYSDEC	New York State Department of Environmental Conservation
OM&M	Operations, Maintenance and Monitoring
OU-1	Operable Unit 1
PCB	Polychlorinated biphenyls
RAO	Remedial Action Objectives
RASR	Remedial Action Selection Report
RCRA	Resource Conservation and Recovery Act of 1976
RSCO	Recommended Soil Cleanup Objectives
RI	Remedial Investigation
SVOC	Semivolatile Organic Compounds
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leaching Procedure
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

Remedial Engineering, P.C. (Remedial Engineering) and Roux Associates, Inc. (Roux Associates), on behalf of BASF Corporation (BASF) have prepared this Final Engineering Report (report) to describe the remedial activities performed at the BASF Rensselaer Facility Closed Landfill located in Rensselaer, New York and to certify that the remedial activities were implemented in accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved Remedial Design. A Site location map is included as Figure 1. Remedial activities were performed 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. These documents are collectively referred to as the Contract Documents. The Contract Documents established the specific technical requirements for the remediation of the BASF Rensselaer Closed Landfill (Site).

This report is divided into seven sections. The first section is the introduction to this report and other sections are included as follow:

- Section 2.0 – Background
- Section 3.0 – Remedial Action Objectives and Summary of Remedial Design
- Section 4.0 – Summary of Remedial Action
- Section 5.0 – Construction Quality Assurance
- Section 6.0 – Engineer's Certification

Operation, Maintenance, and Monitoring (OM&M) activities are not discussed in this report since the OM&M Plan will be submitted as a separate document. Supporting tables, figures, and appendices are included at the end of this report. All appendices have been included electronically on a CD which is located in a sleeve on the inside back cover of this report.

2.0 BACKGROUND

Key background information is provided in the following sections including a Site description and an overview of Site history.

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 remainder of 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 currently under construction beyond (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 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.

In January 2001, BASF closed its manufacturing facility.

2.3 Summary of the Previous Remedial Investigations and Activities

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).

As part of these investigations and activities, the following tasks were performed at the Site between 1978 and April 2004:

- 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 adsorbers 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 Associates.

- Installation and sampling of ten piezometers by Roux Associates 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), semi-volatile organic compounds (SVOCs), and filtered and unfiltered metals, including cyanide and hexavalent chromium.

- Groundwater sampling by Roux Associates 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 Associates 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 Associates 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.

- Excavation of Main Plant Area of Concern (AOC) 1 abutting the northern border of the Landfill in 2002. Post-excavation sidewall sampling along the southern border of the excavation (i.e., corresponding to the northern border of the Landfill) indicated very high concentrations of VOCs. Based on the sidewall data, the NYSDEC requested that BASF continue the excavation of AOC 1 from the Main Plant into the Landfill. BASF did not, at that time, perform the additional removal. Rather, BASF indicated that remedial options for the Landfill would be evaluated independent of the remediation of the Main Plant. This report provides the results of this evaluation.

- Boring and sampling program by Roux Associates 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 Associates in 2004.

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 north, west and southern portion 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 that is not addressed by the cover for the Landfill. Key components of the groundwater treatment system include the following:

- Influent equalization
- Metals Removal System:
  - Aeration
  - Vapor Phase granular activated carbon (GAC) off-gas treatment
  - Filtration (two sets of two parallel filters arranged in series)
  - Metals adsorption
- Volatile organic compound/semi-volatile organic compound (VOC/SVOC) Removal System:
  - Air stripping
  - Vapor phase GAC off-gas treatment
  - Liquid phase GAC
- Dissolved Oxygen Injection System

To address areas of high concentrations of VOCs in the Landfill soil, Remedial Engineering prepared a Remedial Action Selection Report (RASR) for the Closed Landfill dated October 3, 2005, which described the remedial goals for the Site and the proposed remedial alternative. The Remedial Design for the Alternative Landfill Closure (dated May 12, 2006) was then

prepared for the selected remedy, which included Design Drawings, Specifications, and Project Plans. The NYSDEC approved the remedial alternative in a letter dated September 26, 2006.

3.0 REMEDIAL ACTION OBJECTIVES AND SUMMARY OF REMEDIAL DESIGN

This section presents the remedial action objectives (RAOs) as provided in the RASR and a description of the remedial design.

3.1 Remedial Action Objectives

The RASR established the following RAOs for the Site:

- 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
  - Ongoing treatment
- Beneficial re-use
  - Public or private use of the Site consistent with conditions following remediation.

3.2 Summary of Remedial Design

As stated in the RASR, the selected remedy included the following general components:

- A remedial design program to provide the details necessary for the construction and monitoring of the remedial program.
- Excavation of the VOC source areas located beneath the northern portion of the Landfill. (The limits of excavation were based on extensive pre-delineation sampling and a variogram statistical analysis, as presented in the RASR.)
- Excavation of the areas of elevated VOCs in the central and south-central portions of the Landfill.
- An Alternative Landfill Cover consisting of a biota barrier, 6- to 12-inch common fill grading layer, and an 18-inch planting substrate layer. The 18-inch substrate and planting layer is to contain plant species to promote creation of a wildlife habitat, with integrated phyto-technology plantings designed to reduce the infiltration of precipitation into the landfill material.

- A horizontal barrier layer (biota barrier) between the Alternative Landfill Cover and underlying impacted fill to prevent burrowing animals from contacting landfill material.
- Vegetated drainage swales to manage and direct surface water runoff to catch basins.
- A perimeter groundwater and leachate collection system, augmented with phyto-technology plantings designed to mitigate leachate generation and control groundwater migration.
- A monitoring and maintenance program to maintain the effectiveness of the engineering controls.
- A deed notice in the form of an environmental easement as institutional control, stating that all construction will be prohibited within the limits of the Alternative Landfill Cover footprint and the Site will be restricted to industrial/commercial use (in accordance with current zoning).

Remedial Engineering developed a Remedial Design for the Site that met all of the stated remedial goals in the RASR. Detailed descriptions of construction activities and construction quality assurance are included in Sections 5.0 and 6.0, respectively. A general description of the primary Remedial Design elements are described below. A Site plan showing the Remedial Action areas is included as Plate 1.

The VOC source removal activities consisted of excavation of seven hot spots (designated as "Areas 1A, 1B, 2A, 2B, 2C, 2D, and 2E"). A total of 6,020 tons of material was removed from these areas and disposed of offsite. A vegetative landfill cap, drainage swale and two lined ponds (designated as "North Pond" and "South Pond") were constructed following the VOC source removal. The landfill cap consisted of the following components (top to bottom):

- 18-inch vegetated topsoil layer;
- Common fill layer (varying thicknesses);
- 6-inch biota barrier;
- Excavated materials from the pipe trenches, which were placed below the biota barrier within the hot spot areas; and
- Existing 12-inch landfill cover.

During the hot spot excavation activities, the pipe trenches for upgrading the groundwater collection system (GCS) were completed. Piping was installed to connect a new recovery well to

existing EW-9, piping for EW-14 was installed and piping for the re-injection line was installed. As approved by the NYSDEC, excavated materials from the pipe trenches were placed below the biota barrier with the hot spot areas and the trenches were backfilled with clean sand and material excavated from the trenches.

Following completion of the hot spot excavations and installation of the landfill cap and drainage features, a planting plan was implemented and completed in spring 2007 to further promote wildlife habitat development on the former landfill. The planting was completed excluding the western portion of the landfill where construction of an education center is planned.

A long-term OM&M program will be developed for the Site. An OM&M Plan will be submitted to NYSDEC under separate cover.

4.0 SUMMARY OF REMEDIAL ACTION

The Remedial Action generally included excavation of hot spot areas, landfill cap installation and stormwater swale and pond construction. The remedial activities were conducted between September 2006 and November 2006. Appendix A includes photographs of the Site prior to the Remedial Action, during remedial construction activities and after the completion of the Remedial Action. Copies of the daily field reports, prepared by the Contractor's field representative, are included in Appendix B. During the course of the Remedial Action, approximately 6,020 cubic yards of impacted material were excavated and disposed of offsite. The components of the Remedial Action are identified below, and are detailed in the following sections.

- Contractor submittals;
- Health and safety and Community Air Monitoring;
- Mobilization and Site preparation;
- Water management;
- Waste excavation, sorting and disposal;
- Landfill cap installation;
- Drainage Swales and Pond Installation;
- GCS Piping Installation and Catch Basin Modifications;
- Monitoring well closure;
- Final survey;
- Seed and Planting Application; and
- Demobilization and Site restoration.

A description of construction quality assurance activities is included in Section 5.0 of this report.

4.1 Contractor Submittals

Prior to commencement of remedial activities at the Site, the Contractor provided the following documents for review and approval by Remedial Engineering and NYSDEC when requested:

- Materials and equipment suppliers and manufacturers;
- List and qualifications of subcontractors;

- Construction schedule;
- Quality control procedures;
- Work sequence; and
- Health and Safety Plan (HASP).

The Contractor provided numerous other submittals and shop drawings as required in the Specifications. Work did not commence in a particular area (e.g., water management, landfill cap installation, import of common fill, etc.) until the required submittals were received and approved by Remedial Engineering.

4.2 Health and Safety and Community Air Monitoring

Remediation activities were performed in a manner consistent with 29 CFR 1910 and 1926 and in accordance with the Contractor's HASP. The Contractor began intrusive elements of the Work in modified Level C protection which included Tyvek suits, rubber over-boots, work boots, hard hats, safety glasses, and dust masks.

Roux Associates conducted air monitoring consistent with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4031 and in accordance with the site specific Community Air Monitoring Plan (CAMP) during invasive remedial activities and during material sorting and loading. Volatile organic compound (VOC) and particulate dust monitoring was performed upwind and downwind of the Work areas. There were no exceedances for VOCs or dust particulates during the Work: A summary of the CAMP data are provided in Appendix C.

4.3 Mobilization and Site Preparation

Prior to mobilizing to the Site, a Pre-Construction Meeting was conducted on August 28, 2006 to identify the roles and responsibilities of key project personnel, review procedures for Contractor submittals, health and safety, schedule, payment requisitions, change order requests and other general administrative issues. The selected Contractor, Karabinchak Bros, Inc. (KBI), mobilized to the Site on September 3, 2006. KBI served as the general Contractor who performed the majority of the remedial construction tasks, including Site preparation, excavation and backfill,

landfill capping, stormwater pond construction, equipment decontamination and some Site restoration.

BASF's field representative provided construction oversight for the duration of the Remedial Action, with a Remedial Engineering representative providing support. In addition, a full time NYSDEC field representative was present to provide oversight of all of the work activities. Construction oversight included shop drawing review, daily inspection to verify conformance with the Contract Documents, health and safety monitoring, material tracking, photo documentation and holding weekly progress meetings.

Prior to the initiation of the major remedial construction activities, several Site preparation tasks were performed including:

- Verification of onsite utilities within the work zone prior to initiating any intrusive activities;
- Set-up and operation of temporary construction utilities and facilities such as trailers, telephone and electrical service, sanitary facilities and emergency response materials;
- Installation of soil erosion and sedimentation control measures;
- Set-up and operation of systems for management of Site water;
- Installation of a decontamination area;
- Construction of a soil staging area;
- Construction of gravel construction roadways; and
- Clearing and grubbing in the Work areas.

4.4 Water Management

The Contractor was responsible for water management at the Site during construction activities. Water management was required for construction-related water generated from the following sources:

- Runoff from disturbed areas;
- Runoff from stockpiles;
- Dust suppression activities;

- Dewatering of excavations;
- Construction of the south pond; and
- Decontamination activities.

A temporary wastewater treatment system was mobilized to the site for treatment of the generated wastewater. The system, approved by Roux Associates, consisted of three 20,000-gallon Frac tanks and bag filters. Water from the temporary treatment system was then pumped to the onsite groundwater collection system for further treatment and discharge. Approximately 103,000 gallons of water was generated as part of the Remedial Action Work between September and November 2006.

4.5 Waste Excavation, Sorting and Disposal

Waste excavation consisted of the excavation of seven hot spots (designated as "Areas 1A, 1B, 2A, 2B, 2C, 2D, and 2E"). The hot spots were excavated to the limits as shown on Plate 1. Area 1A was extended beyond the design limits by approximately 5 feet to the west due to debris encountered along the southwestern sidewall (old batteries).

Prior to excavating, the limits of each of the locations were surveyed. Then, the first 12 inches of existing landfill cover for each of the hot spot excavation areas (approximately 800 cubic yards) was removed and separately stockpiled for reuse in the southeastern portion of the landfill. The excavations were completed to eight feet below grade. Once the excavations were completed, the excavations were inspected by the NYSDEC for approval to backfill. Post excavation sampling was not required by the NYSDEC. Each hot spot excavation was backfilled to grade with material excavated during the trenching activities and/or imported clean fill and compacted in 12-inch lifts with a 10-ton vibratory roller to 90 percent of the maximum dry density as determined by the Standard Proctor. Nuclear field density tests were performed at a minimum frequency of one test per 10,000 square feet per 12-inch lift. Field density test results for the Site are included in Appendix D.

Excavated material was stockpiled onsite in the designated soil staging areas, as shown on Plate 1. Two additional staging areas were constructed by the Contractor to accommodate the volume of material. As requested by the NYSDEC, material excavated from the Area 1A extension was

stockpiled separately to be immediately sampled for PCBs because the batteries excavated from the landfill were at first mistakenly identified as transformers by the Contractor. The sample results are provided in Appendix E, and indicated no PCBs were present. Prior to offsite disposal, the stockpiles were sorted with the excavator bucket to remove large pieces of debris that could be disposed of separately. When sorting of the material was complete, waste characterization sampling was completed in accordance with the disposal facility requirements from each of the four staging areas. A total of 10 waste characterization samples were collected by Roux Associates and analyzed for VOCs, SVOCs, total metals, TCLP metals, and mercury (Appendix E) by Adirondack Environmental Services, Inc of Albany, New York. Based on exceedances for TCLP lead; approximately 1751 tons of material was transported offsite as hazardous material to CWM Chemical Services, LLC, Model City, New York; approximately 1022 tons of material were transported offsite as hazardous material (for TCLP lead, VOCs and SVOCs) to Stablex Quebec, Canada; and approximately 3247 tons of material were transported offsite as non-hazardous contaminated material to High Acres Landfill, Fairpoint, New York. The non-hazardous and hazardous waste manifests are included in Appendix F.

4.6 Landfill Cap Installation

Following completion of the hot spot excavations and piping installations within the former landfill, the landfill cap was installed. The landfill cap consists of the following components (bottom to top) which are described in further detail below:

- Existing landfill cover;
- Biota barrier;
- Common fill and grading layer;
- Vegetated topsoil layer; and
- Drainage swales and ponds.

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) before the remainder of the cap was installed. The pipe trenches were backfilled with 12 inches of clean sand and material removed from the trenches.

Biota Barrier

A six-inch layer was installed as a horizontal barrier layer between the landfill cover and underlying impacted fill to prevent burrowing animals from contacting landfill material. The biota barrier consisted of a coarse aggregate or recycled concrete aggregate layer and was compacted with the excavator. A total of approximately 18,880 tons of crushed stone / concrete was installed. Compaction field testing was not required for the biota barrier. The biota barrier was installed in all areas of the landfill except under the ponds and swale. The As-built survey of the biota barrier is provided in Appendix H ("Top of Biota Layer").

Common Fill Layer

A six to 36-inch common fill layer was installed on top of the biota barrier as the grading and barrier protection layer. The common fill varies 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 six inches of biota barrier and 18 inches of topsoil. The common fill layer was installed in up to 12-inch lifts and compacted with a 10-ton vibratory roller to 90 percent of the maximum dry density as determined by the Standard Proctor. Nuclear field density tests were performed at a minimum frequency of one (1) test per 10,000 square feet per lift. Field density test results for the Site are included in Appendix D. A total of approximately 16,570 cubic yards of common fill was installed. The As-built survey of the common fill layer is provided in Appendix H ("Top of Select Fill").

Vegetated Topsoil Layer

An 18-inch topsoil layer was installed (not compacted) on top of the common fill layer and hydroseeded with the seed mix provided in Appendix M. For the pond and swales, 12-inches of topsoil were placed above the liner along the bottom and sides to allow for site grading and establishment of vegetation. A total of approximately 28,410 cubic yards of topsoil was installed. The As-built survey of the topsoil layer is provided in Appendix H and also shown on Drawing 06 – 740 ("Record Survey of Topsoil").

Drainage Swale and Ponds

A vegetated drainage swale and two ponds were constructed as part of the landfill closure work. The drainage swale was installed on the landfill to intercept surface water runoff and redirect it to either the southern pond ("South Pond") or the storm water catch basin located adjacent to the South Pond. 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 high density polyethylene (HDPE) geosynthetic membrane. The As-built survey of the swale is provided in Appendix H and also shown on Drawing 06 – 740.

4.7 Construction of the Drainage Swale and Ponds

Construction of the new storm water pond system was substantially completed in November 2006. The pond system consists of a "North Pond," "South Pond," and drainage swale that connects the two ponds. The water surface area of the North Pond is approximately 27,350 square feet and approximately three to four feet deep (deepest on the eastern portion of the pond by hot spot excavation Area 1A), the water surface area of the South Pond is approximately 25,150 square feet and approximately two to three feet deep. The ponds are lined with a 40-mil 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, an erosion control matting was installed over the topsoil layer along the vegetative drainage swale and sides of the ponds. Manufacturer information for the selected erosion control matting and the pond liner is provided in Appendix G. The As-built survey showing the North Pond, South Pond, and drainage swale is provided in Appendix H and on Drawing 06 – 740.

4.8 GCS Piping Installation and Catch Basin Modifications

Included in the scope of work included the installation of piping related to the groundwater collection system (GCS) as well as modifications to the onsite catch basins. The following items were completed during the landfill closure:

- Installation of two inch Schedule 40 PVC pipe from the south west corner of the landfill to the north side of the landfill for the re-injection line of the GCS, with cleanout, tee and valve box;
- Installation of two inch Schedule 40 PVC pipe on south west corner of the landfill for collection well EW-14 tie-in;

- Installation of one inch Schedule 40 PVC pipe on the south west corner of the landfill for newly installed collection well tie-in to existing collection well EW-9; and
- Two catch basins within the landfill area as well as the vault for collection well EW-12 were raised to meet the new grade of the landfill.

The locations of these modifications are provided on Plate 1 and the as-built surveys in Appendix H.

4.9 Monitoring Wells

KBI was required to perform ground-water monitoring well protection, modification, and abandonment activities during the Work. These activities included:

- Location of all Site monitoring wells within the project work limits;
- Hand clearing of any vegetation immediately surrounding the wells;
- Marking of monitoring wells with stakes, flagging and/or high-visibility paint; and
- Abandonment of 20 monitoring wells.

Monitoring well abandonment documentation is included in Appendix I.

4.10 Final Survey

Surveying was performed throughout the work to confirm excavation/backfill extent and limits and for the purpose of making progress payments. The surveying was performed by CT Male, a New York State-certified surveyor. The final as-built surveys (survey of the biota barrier, common fill layer, and topsoil layer) are included in Appendix H. In additional, the final as-built surveys show the locations and elevations of the raised catch basins and locations and elevations of the drainage swale and pond.

4.11 Seed and Planting Application

Upon completion of the topsoil layer installation, the landfill was hydroseeded with the seed mix as shown on Table 1. Due to the timing of the project and weather conditions, the planting was completed in phases. The first phase of planting was completed in November 2006. The remainder of the plants and trees were planted in Spring 2007. A summary of the plants and trees is provided in Table 1. A description of the required maintenance and any remaining trees or

plants that need to be installed or replaced will be provided in the OM&M Plan under separate cover.

4.12 Demobilization and Site Restoration

Demobilization and final Site restoration activities included the following:

- Decontamination of all Site equipment;
- Removal of the decontamination pad; and
- Removal of personnel, equipment, and materials from the Site.

KBI demobilized from the Site in November 2006.

5.0 CONSTRUCTION QUALITY ASSURANCE

Quality assurance activities were performed during the work to verify that construction activities were performed in accordance with the Contract Documents. The objectives of the quality assurance activities were to ensure:

- The use of appropriate construction practices, means and methods;
- The use of construction materials as required by the Contract Documents;
- The use of specified or approved sampling and analytical methods and procedures, and quality assurance protocols, as required by the Contract Documents; and
- The preparation of documentation to track and verify that activities related to the Remedial Action were conducted in accordance with the Contract Documents.

Quality assurance activities were required to be performed in accordance with the Construction Quality Assurance/Quality Control Plan (CQA/QCP) and the Specifications.

Construction quality assurance activities conducted during the Work are discussed in detail in the following sections. The general quality assurance categories include:

- Fill materials;
- Swale and pond liner;
- Piping; and
- Topsoil and seed installation.

Below is a summary of materials installed at the Site and quality assurance testing performed during the work.

5.1 Fill Materials

Physical and chemical quality assurance testing was required for various types of offsite fill materials handled during the Work. The various fill materials included:

Offsite Materials

- Imported common fill;
- Crushed aggregate (biota barrier); and
- Topsoil.

The chemical and physical testing required for each fill type is discussed in the following sections. Pre-qualification information was obtained and Remedial Engineering's field representative visually examined all fill materials used for the Work in addition to the physical and chemical testing discussed below.

5.1.1 Imported Common Fill

R.J. Valente Gravel, Inc of Rensselaer, New York supplied common fill which was used in the landfill cap construction. Sieve/hydrometer, density, and permeability testing were required. The common fill was also analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, and RCRA metals by Severn Trent Laboratory, Inc of Shelton, Connecticut. The common fill physical test results met the requirements of the Specifications. Chemical analyses indicated several minor exceedances of the TAGM Recommended Soil Cleanup Objective (RSCO) for several samples.

Laboratory results indicated chromium, nickel, and zinc concentrations slightly above the site-specific allowance for imported fill of 10 milligrams per kilogram (mg/kg), 13 mg/kg, and 20 mg/kg, respectively. Chromium concentrations above 10 mg/kg were detected in five of the 10 samples collected, and nickel and zinc were detected above their respective limits for all 10 samples collected. All common fill sample results were provided to the NYSDEC for approval prior to procurement and placement. Upon review of these results, the NYSDEC considered the exceedances to be minor and within normal limits and approved the use of the fill as backfill at the Site.

Common fill was placed in 12-inch lifts and compacted to 90 percent of the maximum dry density as determined by the Standard Proctor. In-place nuclear field density testing was performed at a minimum frequency of one test per 10,000 square feet per 12-inch lift in the landfill.

Field density testing results for the Work is included in Appendix D. Physical and chemical testing results as well as the weight tickets for imported common fill are included in Appendix J.

During installation of the common fill layer, one of the truck drivers for the fill supplier, R.J. Valente Gravel, tipped over his dump truck and spilled approximately 15 gallons of diesel and one gallon of hydraulic oil on the common fill layer. The onsite NYSDEC representative

provided oversight of the cleanup, which included removal of seven cubic yards of impacted soil from the landfill area. Following disposal of the material, no further action was required and the incident was considered closed by the NYSDEC.

5.1.2 Crushed Aggregate

Crushed aggregate was installed in two areas of the Site:

- Access roads; and
- Biota barrier.

Sieve analyses were performed for crushed stone materials. The crushed stone materials met the requirements of the Specifications. In addition, chemical analysis of the crushed aggregate was provided. The six samples were analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, and the RCRA metals. The results of the analysis indicated RSCO exceedances for arsenic, beryllium, calcium, chromium, iron, magnesium, and zinc. All crushed aggregate sample results were provided to the NYSDEC for approval prior to procurement and placement. Upon review of these results, the NYSDEC considered the exceedances to be minor and within normal limits and approved the aggregate for use at the Site. Chemical analysis results for crushed stone materials as well as the weight tickets are included in Appendix K.

5.2 HDPE Liner

The following quality assurance testing (destructive and non-destructive) was performed on the HDPE liner:

1. Test seams were made at the start of work for each seaming crew, after four hours of continuous seaming, when seaming equipment was changed and/or when significant changes in HDPE temperature were noted.
2. Non-destructive seam testing was performed for all seams.
3. Destructive seam testing was performed by the HDPE installer as indicated on Table 2 and included:
    - Thickness
    - Bonded shear strength
    - Peel adhesion/separation

- Seam continuity

  If a seam failed any testing, the seam was reconstructed in each direction between the location of the sample that failed and the location of the next acceptable sample in accordance with the Specifications and the manufacturer's recommendations.

4. HDPE liner samples were tested by the geotextile manufacturer for the following characteristics:
   - Thickness
   - Tensile strength at break
   - Elongation at break
   - Puncture resistance
   - Tear resistance initiation
   - Dimension stability
   - Carbon black content
   - Carbon black dispersion rating

The HDPE liner installed on the landfill met the requirements of the Specifications. HDPE liner quality assurance data is included in Appendix L.

5.3 Piping

All piping brought onsite was inspected by Remedial Engineering's field representative for damage, defects, and general condition. In addition, the CQA/QCP required pressure testing of the new piping installed for the groundwater treatment system. The pipe was tested with 20 psi of compressed air for 15 minutes and passed.

5.4 Topsoil, Seed Installation and Planting

The following materials were used for restoration of the Site:

- Topsoil
- Seed
- Various trees and plants

R.J. Valente Gravel, Inc of Rensselaer, New York supplied topsoil for the Site which was used to establish a vegetative layer in the landfill. The topsoil was visually inspected for general condition (e.g., foreign materials, frozen, etc.) and pH, organic content, and sieve analysis were performed. The initial topsoil physical test results met the requirements of the Specifications, except for organic content. Leaf compost was added to the topsoil in the ponds and swale, rot-o-tilled and sampling was completed again. The final topsoil physical test results met all of the requirements of the Specifications. In addition, the topsoil was sampled for VOCS, SVOCS, PCBs, herbicides, pesticides and RCRA metals by Adirondack Environmental Services, Inc. of Albany, New York. Exceedances for the topsoil of the TAGM RSCOs for all samples included iron and zinc. Several of the topsoil samples also had minor exceedances of the TAGM RSCOs for beryllium and chromium. The NYSDEC considered these exceedances to be within normal limits and approved the use of the topsoil at the Site.

No quality assurance testing was required for the seed, however information provided by the supplier including a certification for seed purity, germination percentage, and weed content was obtained.

Top soil test results and seed certification information is included in Appendix M. In addition, weight tickets for the top soil are provided in Appendix M.

Following completion of the topsoil installation and hydroseed, trees and plants were planted in accordance with the Specifications Planting Plan. Due to the timing of the end of the Remedial Work and local weather, part of the planting was completed in late October/early November 2006 and the remainder was finished in Spring 2007. Documentation of the planting completed on the landfill is provided in Table 1.

6.0 ENGINEER'S CERTIFICATION

I, Charles J. McGuckin, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Design was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Design except as noted below.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Design and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in for the remedy.

It should be noted that all plantings in accordance with the Remedial Design have not been completed at the time of this report due to the impending construction of an education center in the western portion of the landfill. However, the portions of the Site that have been completed will be maintained in accordance with the site specific OM&M Plan.

I certify that all information and statements in this certification form 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, of 209 Shafter Street, Islandia, New York, am certifying as Owner's Designated Site Representative and I have been authorized and designated by all site owners to sign this certification for the site.

069509
NYS Professional Engineer #

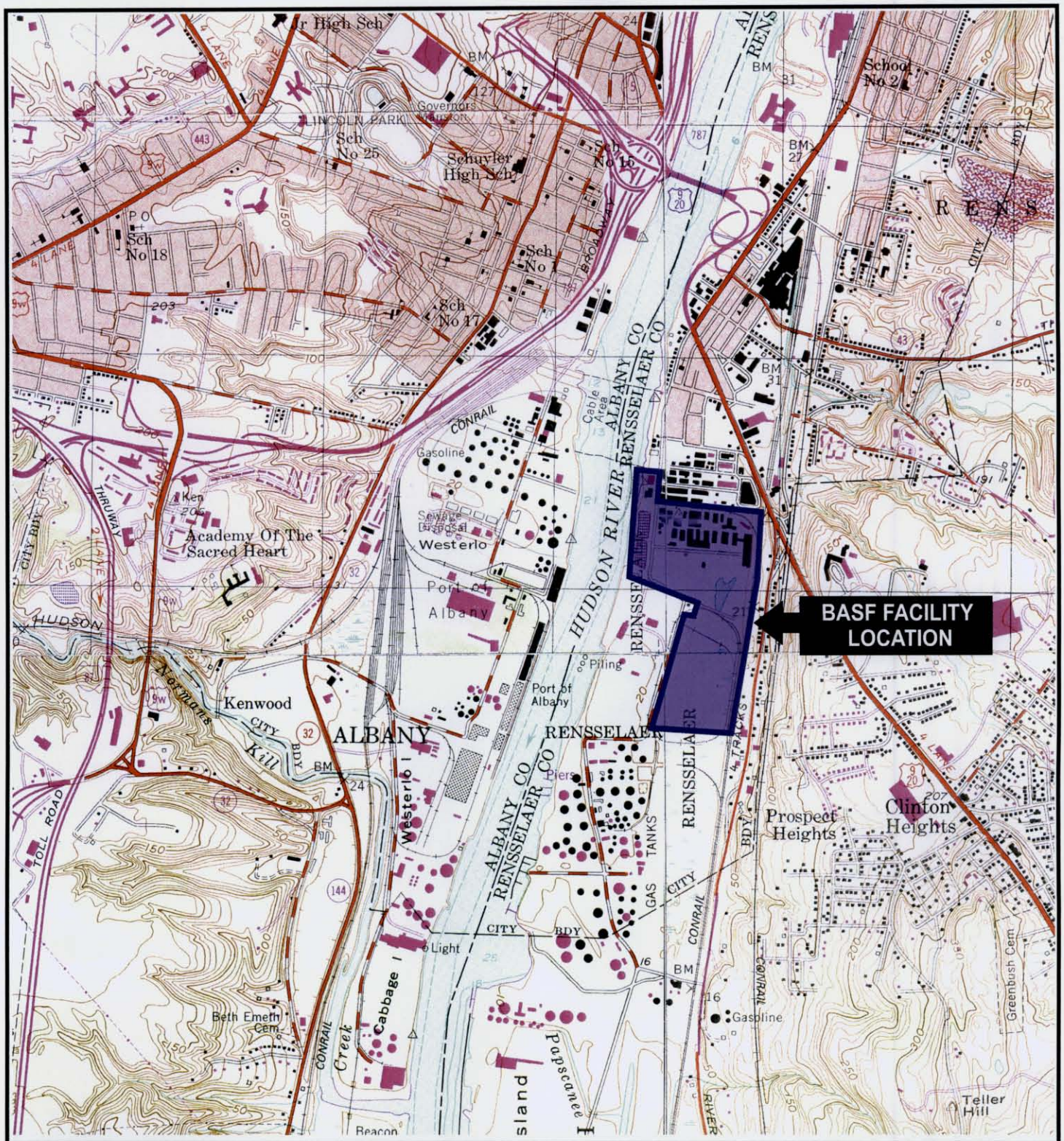
4/27/10
Date

Table 1. Planting Summary — BASF Closed Landfill, Rensselaer, New York

Common Name	Scientific Name	Planting Form	Plant Quantity
Core Reserve (32,900 ft2)			
Eastern Red Cedar	*Juniperus virginiana*	Container, 6-8'	94
Shadbush	*Amelanchier canadensis*	Container, 6-8'	80
Highbush Cranberry	*Viburnum opulus*	Container, 24-36"	37
Silky Dogwood	*Cornus amomum*	Container, 30-36"	21
Northern Bayberry	*Myrica pensylvanica*	Container, 24-36"	50
Trees and Shrubs (165,000 ft2)			
White Spruce	*Picea glauca*	Container, 6-8'	23
River Birch	*Betula nigra*	Container, 6-8'	74
Sassafras	*Sassafras albidum*	Container, 6-8'	74
Chestnut	*Castanea dentata*	Container, 2-2.5" caliper	30
American Basswood	*Tilia americana*	Container, 2-2.5" caliper	21
Red Maple	*Acer rubrum*	Container, 2-2.5" caliper	30
Arrowwood	*Viburnum dentatum*	Container, 24-36"	182
Purple Leaved Virburnum	*Viburnum acerifolium*	Container, 24-36"	87
Leatherleaf Viburnum	*Viburnum rhytidophyllum*	Container, 30-36"	114
Red Chokeberry	*Aronia arbutifolia*	Container, 24-36"	21
Sweet Pepperbush	*Clethra alnifolia*	Container, 24-36"	114
Spicebush	*Lindera benzoin*	Container, 24-36"	283
Red-Osier Dogwood	*Cornus sericea*	Container, 30-36"	60
New Jersey Tea	*Ceanothus americanus*	Container, 24-36"	53
Beaked Hazel	*Corylus cornuta*	Container, 24-36"	17
Gray Dogwood	*Cornus racemosa*	Container, 30-36"	52
Witch Hazel	*Hamamelis virginiana*	Container, 24-36"	32
White Oak	*Quercus alba*	Container, 2-2.5" caliper	20
Green Ash	*Fraxinus pennsylvanica*	Container, 2-2.5" caliper	39
White Ash	*Fraxinus americana*	Container, 2-2.5" caliper	39
Gray Alder	*Alnus incana*	Container, 2-2.5" caliper	32
Sensitive Fern	*Onoclea sensibilis*	2-inch Plug	93
Cinnamon Fern	*Osmunda cinnamomea*	2-inch Plug	93
Phytotechnology Species (110,000 ft2)			
DN-34	*Populus sp.*	6 ft whip	600
OP-367	*Populus sp.*	6 ft whip	600
Pussy Willow	*Salix discolor*	6 ft whip	200
Black Willow	*Salix nigra*	6 ft whip	112
American Sycamore	*Platanus occidentalis*	6 ft whip	400

Table 1. Planting Summary — BASF Closed Landfill, Rensselaer, New York

Common Name	Scientific Name	Planting Form	Plant Quantity
Low Marsh (5,500 ft2)			
Buttonbush	*Cephalanthus occidentalis*	Container, 24-36"	70
Sweetspire	*Itea virginica*	Container, 24-36"	100
Pickerelweed	*Pontederia cordata*	2-inch Plug	50
Soft Rush	*Juncus effusus*	2-inch Plug	196
Wool Grass	*Scirpus cyperinus*	2-inch Plug	70
Three-square Bulrush	*Scirpus americanus*	2-inch Plug	204
Soft Stem Bulrush	*Scirpus validus*	2-inch Plug	168
Rattlesnake Manna Grass	*Glyceria canadensis*	2-inch Plug	414
Sweet Flag	*Acornus calamus*	2-inch Plug	423
Swamp Milkweed	*Ascelepias incarnata*	2-inch Plug	247
Blue Flag	*Iris versicolor*	2-inch Plug	369
High Marsh (17,900 ft2)			
Red-Osier Dogwood	*Cornus sericea*	Container, 30-36"	40
Spicebush	*Lindera benzoin*	Container, 24-36"	50
Sweet Pepperbush	*Clethra alnifolia*	Container, 24-36"	50
Elderberry	*Sambucus nigra*	Container, 24-36"	91
New York Ironweed	*Vernonia noveboracensis*	2-inch Plug	178
Blue Vervain	*Verbena hastata*	2-inch Plug	115
Cardinal Flower	*Lobelia cardinalis*	2-inch Plug	214
Joe Pye Weed	*Eupatorium macaulatum*	2-inch Plug	327
Monkeyflower	*Mimulus ringens*	2-inch Plug	142
Purple Coneflower	*Echinacea purpurea*	2-inch Plug	647
Wild Bergamot	*Monarda fistulosa*	2-inch Plug	458
Various Sedges	*Carex sp.*	2-inch Plug	993



QUADRANGLE LOCATION

SOURCE:
USGS; 1980. Albany, New York;
USGS; 1980. Troy South, New York
USGS; 1980. Delmar, New York
USGS; 1980. East Greenbush, New York
7.5 Minute Topographic Quadrangles

N

0 2000'

Title:

SITE LOCATION MAP

LANDFILL CLOSURE FINAL ENGINEERING REPORT
RENSSELAER, NEW YORK

Prepared for:
BASF CORPORATION
FLORHAM PARK, NEW JERSEY

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: D.M.H.		Date: 14APR10	FIGURE
Prepared by: B.H.C.		Scale: AS SHOWN	1
Project Mgr.: D.M.H.		Office: NY	
File No.: BF1154801.CDR		Project No.: 25111Y36	

N:\PROJECTS\BF251Y\BF11Y548\BF1154801.CDR

APPENDICES
(See Attached CD)

A. Photographs (Also included in Report)

B. Daily Field Reports

C. Community Air Monitoring Data

D. Field Density Test Results

E. Waste Characterization Sampling Data

F. Non-Hazardous and Hazardous Waste Manifests

G. Erosion Control Matting and Pond Liner Manufacturer Information

H. Interim As-Built Surveys

I. Monitoring Well Documentation

J. Imported Common Fill Quality Assurance Data

K. Crushed Aggregate Quality Assurance Data

L. HDPE Liner Quality Assurance Data

M. Topsoil, and Seed Quality Assurance Data


NORTH LAGOON
SOUTH LAGOON
GRASS
RIVERSIDE AVENUE
MAIN GATE
MAIN PLANT AREA
APPROXIMATE LOCATIONS OF ADDITIONAL SOIL STAGING AREAS
STAGING AREA FOR BULK AND WASTE DEBRIS
EXISTING PAVED STAGING AREA (ALSO USED FOR SOIL SCREENING)
GROUNDWATER TREATMENT SYSTEM AND CONTAINMENT PAD
GRAVEL PARKING AREA
ASPHALT PAVEMENT
EXISTING 2" PVC SCHEDULE 40 RE-INJECTION LINE
NEW PIPE CONNECTED TO EXISTING RE-INJECTION LINE BELOW GRADE (SEE NOTE 5)
AREA 1B
2" TEE AND (2) BRASS BODY GATE VALVES SUITABLE FOR BURIED SERVICE WITH VALVE BOX
AREA 1A
PROPOSED 2" PVC SCHEDULE 40 PIPE FOR RE-INJECTION LINE
2" CLEANOUT WITH CAST IRON COVER AT GRADE
CONNECTED TO EXISTING SUMP PUMP DISCHARGE PIPE IN WELL VAULT
FORMER CLOSED LANDFILL
2" PVC SCHEDULE 40 PIPE CONNECTED TO EW-14
2" PVC SCHEDULE 40 PIPE FOR RE-INJECTION LINE
EXISTING 2" PVC SCHEDULE 40 PIPE FOR RE-INJECTION LINE (SEE NOTE 5)
AREA 2A
AREA 2B
EXISTING 2" PVC SCHEDULE 40 STICKUP (FOR EW-14 TIE-IN SEE NOTE 5)
AREA 2E
AREA 2C
AREA 2D
1" SCHEDULE 40 PVC PIPE CONNECTED TO EXISTING 3" SCHEDULE 40 PVC RECOVERY TRENCH FORCE MAIN
PIPE LEFT AS STICK UP AND CAPPED FOR FUTURE CONNECTION
SEE NOTE 5
N
60' 0 60'

LEGEND

- GROUNDWATER COLLECTION SYSTEM TRENCHES
- GRAVITY RE-INJECTION LINE FROM DISTRIBUTION BOX DB-1
- LANDFILL BOUNDARY
- LIMITS OF EXCAVATION AREAS
- 110 EXISTING BUILDING
- EW-12 LOCATION AND DESIGNATION OF EXTRACTION WELL VAULTS WITH PUMPS
- EW-9 LOCATION AND DESIGNATION OF EXTRACTION WELL VAULTS NO PUMPS
- LOCATION OF DISTRIBUTION BOX DB-1
- LOCATION OF STANDARD INFILTRATOR

NOTES:

1. SURVEY INFORMATION PROVIDED BY C.T. MALE ASSOCIATES, P.C. 50 CENTURY HILL DRIVE, LATHAM, NY 12110.
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.
5. CONTRACTOR SHALL PROVIDE ALL NECESSARY AND APPROPRIATE SCHEDULE 40 PVC FITTINGS TO COMPLETE THE PIPE CONNECTIONS AS SHOWN, AND AS DIRECTED BY THE ENGINEER, AT 4.5' BELOW GRADE. EXISTING STICK UPS AND 2" FLEXIBLE PIPES SHALL BE REMOVED.

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 C.T. MALE ASSOCIATES DATED JANUARY 28, 2001, DWG. NO. 01-109.
3. RECORD SURVEY OF GCS AREAS 2, 3, 4, 5, 6 AND 7 PREPARED FOR OBRIEN AND GERE ENGINEERS, INC., PREPARED BY C.T. MALE ASSOCIATES P.C., DATED JULY 2, 2003, DWG NO. 03-450. MODIFICATIONS TO GCS AREA 3 IN 2004 ARE BASED ON FIELD MEASUREMENTS PROVIDED BY O'BRIEN AND GERE OF NORTH AMERICA, INC. IN FEBRUARY 2005.
4. RECORD SURVEY OF GCS TRENCHES PREPARED BY C.T. MALE ASSOCIATES, P.C. IN SEPTEMBER 2005.

File Name: N:\PROJECTS\BF251Y\BF11Y\548\BF1154801.DWG Date: 22APR10 Plot Scale: 1:1

NO.	DATE	REVISION DESCRIPTION	INT.
2	4/12/10	AS-BUILT, EXCAVATION AREAS, PIPING AND SOIL STAGING AREAS	D.M.H.
1	8/29/06	REVISED REINJECTION ALIGNMENT, ADDED BURIED CONTROL VALVES AND CLEANOUT	KT

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF STATE LAW.

THESE DOCUMENTS (OR COPIES OF ANY THEREOF) PREPARED BY OR BEARING THE SEAL OF THE ENGINEER, SHALL NOT BE REUSED FOR ANY EXTENSIONS OF THE PROJECT OR ANY OTHER PROJECT WITHOUT THE WRITTEN CONSENT OF THE ENGINEER.

PROJECT ENGINEER: DMH
DESIGNED BY: DMH
DRAWN BY: BHC
CHECKED BY: CJM

PROJECT NO.: 25111Y36
FILE NO.: BF1154801.DWG
SCALE: AS SHOWN
DATE: APRIL 2010

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

PROJECT NAME:
ALTERNATIVE LANDFILL CLOSURE DESIGN
RENSSELAER, NEW YORK

PROJECT FOR:
BASF CORPORATION
FLORHAM PARK, NEW JERSEY

TITLE:
AS-BUILT FOR LANDFILL SUBSURFACE WORK

DRAWING NO.
1
DRAWING 1 OF 1

XREFS: NONE

PROJECT NUMBER: 06.6532

CAD DWG. FILE NAME: RS_TOP-SOIL.DWG

SITE LOCATION MAP
SCALE:1"=2000'

BAR SCALE
50 0 25 50 100
1 inch = 50 ft.

MAP NOTES

1. North orientation and bearing base per map reference number one.
2. Topographic information shown hereon was compiled from an actual field survey conducted during the month's of October and November, 2006.
3. Elevation base BASF plant datum.
4. Underground facilities, structures, and utilities have been plotted from data obtained from previous maps and record drawings. Surface features such as catch basin rims, manhole covers, water valves, gas valves, etc. are the result of field survey unless noted otherwise. There may be other underground utilities, the existence of which are not known to the undersigned. Size and location of all underground utilities and structures must be verified by the appropriate authorities. Dig Safely New York must be notified prior to conducting test borings, excavation and construction.

MAP REFERENCES

1. "Topographic Survey BASF Landfill Parcel Prepared for Roux Associates Inc. 36 Riverside Avenue." City of Rensselaer, Rensselaer County, NY., prepared by C.T. Male Associates, P.C., dated Sept. 12, 2005 as DWG. No. 05-687.

LEGEND

CIRF o	CAPPED IRON ROD FOUND
CBR ○	CATCH BASIN ROUND
MW ◑	MONITOR WELL
SMH ○	SANITARY MANHOLE
WV ▷◁	WATER VALVE

"ONLY COPIES OF THIS MAP SIGNED IN RED INK AND EMBOSSED WITH THE SEAL OF AN OFFICER OF C.T. MALE ASSOCIATES, P.C. OR A DESIGNATED REPRESENTATIVE SHALL BE CONSIDERED TO BE A VALID TRUE COPY".

JAMES F. COOK
PLS. NO. 49260

DATE		REVISIONS RECORD/DESCRIPTION	DRAFTER	CHECK	APPR.
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				

APPROVED: WJN
DRAFTED : TCB
CHECKED : JFC
PROJ. NO: 06.6532
SCALE : 1"=50'
DATE : OCT. 27, 2006

TOPOGRAPHIC SURVEY
RECORD SURVEY OF TOP SOIL
ALTERNATIVE LANDFILL CLOSURE DESIGN
BASF CORPORATION
36 RIVERSIDE AVENUE

CITY OF RENSSELAER — RENSSELAER COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES

SHEET 1 OF 1
DWG. NO: 06-740