FIRST FIVE-YEAR REVIEW REPORT FOR HOOKER CHEMICAL/RUCO POLYMERS SUPERFUND SITE NASSAU COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, NY

Walter E. Mugdan, Director
Emergency and Remedial Response Divsion

August 23, 2016
Date

393259

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
DCE	1,2-Dichloroethylene
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OM&M	Operation, Maintenance, and Monitoring
OUs	Operable Units
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RAOs	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
TCE	Trichloroethylene
TICs	Tentatively Identified Compounds
VCM	Vinyl Chloride Monomer
VOCs	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the first FYR for the Hooker Chemical/Ruco Polymers ("Hooker Ruco") Superfund Site (Site). The triggering action for this statutory review is five years following the initiation of construction (May 4, 1992 for this Site). However, due to the complexities inherent in the remediation of multiple Site operable units (OUs) as well as the on-going New York State closure actions associated with the Site (discussed in subsequent sections), EPA made a determination to initiate the five-year review process following its completion of the Preliminary Close-Out Report, signed on July 1, 2015, which called for the completion of the FYR in 2016. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants will remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

Federal lead response actions at the Hooker Ruco Site addressed three OUs (OU1, OU2, OU3). The response actions were conducted by the potentially responsible party (PRP) under EPA oversight. Cleanups at two other OUs at the Site, OU4 and OU5, were conducted under New York State Department of Environmental Conservation (NYSDEC) cleanup programs and are not subject to the CERCLA FYR process. OU1 addresses contaminated soils and associated impacts on groundwater at the Hooker Ruco facility and OU2 addresses surface soils contaminated with polychlorinated biphenyls (PCBs). OU3 addresses the contaminated groundwater beneath the facility and the downgradient commingled contaminated groundwater plume beyond the Hooker Ruco facility. OU1, OU2, and OU3 will be addressed in this FYR.

The Hooker Ruco Superfund Site FYR was led by Michael Negrelli, EPA Remedial Project Manager (RPM). Participants included Robert Alvey, EPA Hydrogeologist, Marian Olsen, EPA Human Health Risk Assessor, Mindy Pensak, EPA Ecological Risk Assessor, and Cecilia Echols, EPA Community Involvement Coordinator. Steven Scharf, representative for the NYSDEC also assisted in the preparation of this report. Occidental Chemical Corporation, the PRP that has conducted the Site work, was notified of the initiation of the FYR, as was the Hamlet of Hicksville, the municipality in which the Site is located. The review began on 2/2/2016.

Site Background

The Site is located in an industrial park area of the Hamlet of Hicksville in Nassau County, New York and was a 14-acre former polymer manufacturing facility (see Site Map, Appendix B). Immediately to the south and hydraulically downgradient of the Hooker Ruco facility is the Northrop Grumman site and Naval Weapons Industrial Reserve Plant (NWIRP). Groundwater remediation, both on and off the Northrop Grumman and NWIRP property, is being conducted and overseen by the NYSDEC pursuant to

the Resource Conservation and Recovery Act (RCRA) and NYSDEC Superfund Program. Downgradient of the Hooker Ruco facility, a portion of the contaminated groundwater emanating from the Hooker Ruco Site is commingled with groundwater contamination from the Northrop Grumman facility.

The Site was originally developed by the Rubber Corporation of America which was a small, privately held company. Operations at the Site began in 1945 and included natural latex storage, concentration, and compounding. From 1946 to 1978, a pilot plant at the facility used a heat transfer fluid called Therminol, which contained PCBs. During this period a release of Therminol occurred, and industrial process wastewater and storm water runoff from the facility was discharged to six on-Site recharge basins or sumps. Drums containing various chemicals were also stored on-Site where occasional spills would occur. Some of the contaminated soil was spread onto surrounding areas by surface water runoff, sediment transport, and truck traffic.

Various entities subsequently operated at the Site including the Ruco Division of the Hooker Chemical Company (currently known as the Occidental Chemical Corporation or Occidental). In 1998, Sybron Chemicals Inc. acquired the Ruco Polymer Corporation. Operations at the Site included the production of various polymers, polyvinyl chloride, styrene/butadiene latex, vinyl chloride/vinyl acetate copolymer, and polyurethane, as well as ester plasticizers. In 2000, the Bayer Corporation acquired the stock of Sybron Chemical Corporation. Operations at the facility ceased in 2002, and in 2003 Bayer Polymers LLC (currently Bayer Materials Science LLC) assumed ownership of the facility. As a result of the cessation of operations, Bayer entered into a Consent Order for closure and followed the RCRA hazardous waste facility closure and corrective action requirements for industrial land use, under NYSDEC oversight. The actions required by NYSDEC included additional soil remediation (OU4) and a soil vapor investigation (OU5); these additional OUs performed under NYSDEC oversight are not part of this FYR.

Initial investigations of the releases by Occidental were started in 1978. An August 1984 report entitled "Report of Groundwater & Soils Investigation at the Former Ruco Division Plant Site, Hicksville, New York" led to the Site being proposed to the National Priorities List (NPL) on October 15, 1984 and listed on the NPL on June 10, 1986.

In July 1988, EPA notified Occidental and Ruco Polymer of their potential liability and offered them the opportunity to conduct a remedial investigation and feasibility study (RI/FS) of the Site. In September 1988, Occidental agreed to perform the RI/FS with EPA oversight and entered into an Administrative Order on Consent with EPA. The RI/FS commenced in September 1989.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Hooker Chemical/Ruco Polymers		
EPA ID: NYD002920312		
Region: 2	**State:** NY	**City/County:** Hicksville/Nassau
SITE STATUS		
NPL Status: Final		

Multiple OUs? Yes	Has the site achieved construction completion? Yes

REVIEW STATUS
Lead agency: EPA *[If "Other Federal Agency", enter Agency name]*:
Author name (Federal or State Project Manager): Michael Negrelli
Author affiliation: Environmental Protection Agency
Review period: 5/4/1992 - 6/30/2016
Date of site inspection: 4/7/2016
Type of review: Statutory
Review number: 1
Triggering action date: 5/4/1992
Due date: 5/4/1997

Note: Due to the complexities inherent in the remediation of multiple Site operable units (OUs) as well as the on-going New York State Department of Environmental Conservation closure actions associated with the Site, EPA made a determination to initiate the five-year review process following its completion of the Preliminary Close-Out Report, signed on July 1, 2015, which called for the completion of the FYR in 2016.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

OU2 was the subject of a focused investigation and FS, completed in 1990, designed to address only the PCB-contaminated areas of the Site. The calculated cancer risks for specific receptors exceeded the risk range and the main contaminant of concern (COC) was PCBs. Therefore, PCBs, specifically Aroclor 1248, is the OU2 COC.

The OU1 RI was completed in 1992. The OU1 RI characterized the nature and extent of chemical contamination on the Hooker Ruco property. COCs were identified for both soils and groundwater. Shallow soil borings indicated tetrachloroethylene (PCE) as a COC as well as a number of tentatively identified compounds (TICs). A deep soil boring at one area of the Site contained trichloroethylene (TCE), PCE, 1,2-dichloroethylene (DCE), phthalates, ethylbenzene, toluene, xylene, phenols, and TICs which were also identified as COCs. Groundwater beneath the Site property contained vinyl chloride monomer (VCM), PCE, DCE, TCE, TICs, and arsenic at levels above New York State (NYS) Groundwater Quality Criteria and EPA maximum contaminant levels (MCLs) for drinking water and were also identified as COCs.

OU3 consists of the contaminated groundwater plume that has migrated downgradient from the Hooker Ruco facility. Investigations of this groundwater plume were initiated in 1994. However, since the

groundwater contamination associated with the Hooker Ruco facility has commingled with groundwater contamination from the adjacent Northrop Grumman and NWIRP sites, which are under the supervision of NYSDEC, EPA and NYSDEC coordinated their investigations of the groundwater and completed an RI/FS in 2000. Sampling of the commingled plume identified chemical constituents above NYS drinking water standards and EPA MCLs. The COCs for OU3 are volatile organic compounds (VOCs), primarily TCE, PCE, and VCM. The COCs identified for each of the OUs were examined based on frequency of detection and magnitude of exceedance compared to screening criteria in a Human Health Risk Assessment (HHRA), and historical activities to determine which contaminants were related to Site operations.

The 1994 Record of Decision (ROD) for OU1 identified risks associated with future groundwater use for adult and child residents. The main chemical contributors were vinyl chloride, arsenic, beryllium, and tetrachloroethylene. The main chemicals contributing to the cancer risk for the child trespasser exposed to surface water, sediment, and soil were beryllium, PCBs, and polycyclic aromatic hydrocarbons (PAHs). The main risks and hazards for the site worker from dermal contact with soil and ingestion and dermal contact with surface soils were from PCBs, PAHs and beryllium.

OU2 specifically dealt with the PCBs in soils at the facility resulting from past Site activities. A HHRA determined that exposure to PCB-contaminated Site soils may present a risk to on-Site workers based on reasonable maximum exposure estimates. The 1990 ROD evaluated on-Site exposures to PCBs in surface soils by Site workers, trespassers, future residents and construction workers. The risk assessment evaluated exposures to soils through ingestion and dermal contact. The calculated cancer risks for these receptors exceeded the risk range and the main COC was PCBs.

The OU3 HHRA determined that the potential for carcinogenic risks and noncarcinogenic hazards exist for future adult and child residents through exposure to contaminated groundwater, particularly from the chemical VCM.

In its evaluation of risk at Superfund sites, EPA also considers the risk to ecological receptors. The Hooker Ruco Site is a fully developed industrial facility surrounded by industries and residential properties. For the three OUs at the Site, it was determined that in the absence of natural surface water bodies or wetlands within the Site vicinity, there is no potential for the migration of Site contamination to ecological resources.

Response Actions

The following discussion follows the Site chronology.

Remedy Selection

OU2 ROD

The remedial action objectives (RAOs) for the first ROD for the Site, issued in 1990 for OU2, were to protect human health by addressing exposures via ingestion of soil, inhalation of suspended Site soils, and direct contact (ingestion and dermal contact) with the soil.

The major components of the selected remedy included the following:

- Excavation of PCB-contaminated soils in excess of 10 parts per million (ppm) in the direct spill area and transport areas surrounding the pilot plant. Soils at the bottom of the recharge basin will be excavated to ten feet. Confirmatory sampling will be performed to ensure soils that remain after the excavation will have PCB concentrations that do not exceed 10 ppm.
- Soils with PCB concentrations between 10 and 500 ppm, approximately 1,100 cubic yards (CY), will be shipped for disposal to an off-Site hazardous waste landfill permitted under the Toxic Substances Control Act (TSCA).
- Stockpiled soils, which were previously excavated during the removal of an underground fuel oil tank, will be included in the disposal of PCB-contaminated soils at an off-Site chemical waste landfill.
- Soils with PCB concentrations exceeding 500 ppm, approximately 36 cubic yards, will be shipped off-Site to a TSCA-permitted incineration facility. Residuals will be disposed of, as appropriate, by the incineration facility.
- Excavated areas will be backfilled with clean soil, and these soils, excluding the recharge basin will be paved with asphalt as appropriate.
- The PCB contamination in former sump five will be left in-place.

OU1 ROD

The RAOs for the OU1 ROD, issued in 1994, included reduction of risks to human health associated with potential exposure to Site-related compounds by controlling the migration of groundwater downgradient from the Hooker Ruco property and attaining the groundwater cleanup criteria established by applicable or relevant and appropriate requirements (ARARs) beneath the property. In addition, the RAO for soils at the Site are protection of the sole source aquifer groundwater quality, and ultimately human health, as well as limit exposure to surface soil contaminants.

The major components of the selected remedy included the following:

- Installation of groundwater extraction wells to control the flow of contaminated groundwater from leaving the Hooker Ruco property and migrating downgradient.
- Installation of a groundwater treatment system to treat the extracted groundwater.
- Installation of a discharge system to dispose of the majority of the treated groundwater.
- Additional soil testing in the bottom of sump two to determine if contaminants are present in the deep soils and to compare the levels present in the soil to cleanup criteria that are considered protective of groundwater quality.
- Soil flushing for the deep soils in sump one, and possibly sump two (based upon the results of additional soil testing).
- Additional soil testing in the area around monitoring well E (see Figure 2) to determine if contaminants are present.
- Excavation of the soils in the former drum storage area and possibly the area around well E (to be determined by subsequent soil borings).
- Periodic monitoring of the groundwater extraction system to assure adequate control is maintained; periodic sampling of the groundwater treatment system discharge, to assure treatment standards are achieved; and periodic sampling of the soils in sump one and possibly sump two to measure the progress of the selected remedy in achieving the cleanup standards.
- The use of institutional controls in the form of deed restrictions and groundwater use restrictions at the Hooker Ruco property.

OU3 ROD

The RAOs for OU3 were to: protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE, and TICs in groundwater at concentrations in excess of state and federal drinking water standards; and restore the aquifer to meet New York State groundwater standards, New York State drinking water standards, and federal MCLs in a timely manner.

The ROD for OU3 was issued in 2000 and the major components of the OU3 selected remedy included the following:

- The use of biosparging technology in an *in-situ* application to enhance the VCM degradation with the goal of achieving state drinking water standards or federal MCLs.
- Vertical injection wells will be installed in the area of the VCM sub-plume to a depth of 200 to 400 ft. Additives (air/oxygen, nutrients) will be forced into the formation using either static head within the well or using pump-supplied pressure.
- A vadose zone or unsaturated zone monitoring program will be implemented to ensure that air stripping of VOCs, particularly VCM, is not occurring as a result of biosparging.
- If necessary, the selected remedy will also utilize a supplemental aerobic bioremediation technology following biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer.
- A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM sub-plume and to evaluate the fate and migration of VOCs southward and westward beyond the VCM sub-plume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program is to evaluate the effectiveness of the selected remedy.
- If necessary, a contingency remedy would be implemented to install a groundwater extraction and treatment system to remediate the VCM sub-plume. The contingency remedy will be implemented if it is determined that biosparging is not effectively treating the sub-plume. If the Northrop Grumman groundwater treatment system should cease operation before the aquifer is restored or if the system is not capturing the contamination emanating from the Hooker Ruco Site, the contingency remedy would involve the installation of a groundwater extraction and treatment system to remediate the sub-plume.

Status of Implementation

OU2 Remedial Actions

Occidental mobilized at the Site for the performance of the OU2 RA work on May 4, 1992. Approximately 52 CY of soil with PCB concentrations exceeding 500 ppm were excavated and shipped off-Site for thermal destruction at a TSCA-permitted incineration facility. Approximately 1,957 CY of soil with PCB concentrations between 10 and 500 ppm were shipped off-Site and disposed of at a TSCA-permitted landfill. EPA inspected the Site on September 3, 1992, and concluded that the remedial action was completed. Occidental's Remedial Action Report was approved on March 12, 1993. As noted above,

the objective of the remedy was to eliminate human exposure to PCB-contaminated soil. Additional PCB-contaminated soil was revealed, however, during Bayer's implementation of a New York State RCRA closure action in 2000. This additional contamination was removed from the Site by Bayer under NYSDEC oversight under the state hazardous waste and remediation programs in September 2014.

OU1 Remedial Actions

On June 30, 1994, EPA unilaterally issued an administrative order to the Occidental Chemical Corporation and to the Ruco Polymer Corporation for implementation of the OU1 ROD. Soil sampling in the MW-E area, the sump 1 area, and the sump 2 area, took place in December 1998. Based upon the analysis of the soil sampling data collected in 1998, and the NYSDEC soil cleanup guidance, EPA determined that the MW-E area and the sump 2 area were not source areas of contamination to groundwater. In November 2000, the concrete tank in sump 1 was removed. The tank demolition debris was disposed of at the Chemical Waste Management Facility in Model City, New York.

Excavation of PCB-impacted soils was necessary in the former drum-storage area since sampling indicated that the NYS cleanup criterion of 10 ppm had been exceeded. The excavation of 310 tons of soil occurred in early December 2001. Later in December 2001, based on confirmatory results, an additional 17 tons of soil were removed. The PCB-impacted soil was disposed of at the Chemical Waste Management Facility in Model City, New York.

The soil-flushing system for the OU1 remedy was installed in December 2001. The system consisted of one run of approximately 100 feet of perforated pipe installed in a rectangular, horizontal profile at a depth of 8 to 10 feet below ground surface. Four soil flushing events occurred at sump 1 in August 2002, March 2003, March 2004, and March 2005. The volume of water used for each event was approximately 16,000 gallons. Since the flushing system was installed approximately 8 to 10 feet below the ground surface in an unsaturated zone which extends to approximately 50 feet below ground surface, the flushing system was abandoned in place.

EPA's final inspection of the OU1 remedy occurred in January 2006. On March 16, 2006, Occidental submitted to EPA the sampling data which demonstrated that the operation achieved the state soil cleanup goals for PCBs, PAHs, arsenic, zinc and chromium. On September 28, 2007, EPA approved a Remedial Action Report which documented the completion of OU1.

Additionally, the RAO for soils at the Site includes protection of the sole source aquifer groundwater quality. This RAO became the focus of OU3 and more information on the actions take to protection and restore groundwater quality is discussed under OU3.

OU3 Remedial Actions

The ROD for OU3 was issued on September 29, 2000. The remedy called for the use of *in situ* bio treatment of the VCM sub-plume using air biosparging to reduce the concentration of VCM to 2 parts per billion (ppb) which is the NYS drinking water standard and the federal MCL for VCM.

The VCM sub-plume's perimeter contains oxygen, nutrients, carbon sources, and microbes that biodegrade peripheral concentrations of VCM. It is in the core area of high VCM concentrations where the oxygen has been consumed, thus limiting the VCM biodegradation process. Low level PCE and TCE concentrations within the sub-plume have been biodegraded due to the anaerobic conditions created by

the VCM. The injection of oxygen into the central core of the VCM sub-plume, replenishes the oxygen supply to restart and enhance the VCM biodegradation process after the PCE and TCE have been degraded.

PCE and TCE associated with the Site that is not degraded flows from the Hooker Ruco Site towards the treatment system constructed by Northrop Grumman under NYSDEC oversight. The groundwater is extracted from a recovery well and treated by the system at the Northrup Grumman property for PCE and TCE contamination from the Northrup Grumman and NWIRP sites and discharged to a series of recharge basins installed as part of the Northrop Grumman groundwater containment and treatment system.

The on-Site air injection system is comprised of two injection well fences, or lines of injection wells. These two injection fences are identified as the middle and northern fences. There are eight injection locations for the middle fence and seven for the northern fence. A cluster of two air injection wells at different depths were installed at each injection location. The system was installed in two phases. The first phase was the pilot system which included a control building and the first four injection well nests of the middle fence. The second phase included the remainder of the biosparging system and associated system components. EPA and the NYSDEC conducted a final inspection of the system on September 12, 2012 and on September 17, 2012, the system became fully operational.

A Remedial Action Report for OU3 was approved by EPA on June 30, 2013. Operation, maintenance, and monitoring (OM&M) activities are currently carried out by Occidental in accordance with the OM&M Plan submitted by Occidental in September 2012 and most recently updated in March 2015.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil and groundwater	Yes	Yes	Site property	Restrict use of the Site property to industrial development only and restrict installation of groundwater wells and groundwater use.	Environmental Easement/ Restrictive Covenants, planned for December 2016.

Systems Operations/Operation & Maintenance

OM&M activities are currently carried out by Occidental in accordance with the OM&M Plan. The most recent version of the OM&M Plan is dated March 2015. The plan addresses the long-term operation, maintenance, and monitoring of the biosparging system and provides a summary of maintenance requirements for the various components of the system. Quarterly OM&M Reports are provided to EPA and the data are evaluated to confirm the efficacy of the remedial system.

The OM&M Manual contains detailed information regarding the description and specifications of the equipment used in the biosparge treatment system. Operating parameters for each piece of equipment are provided including the instrumentation parameters for determining the proper function of each piece of equipment, the reason for monitoring, and troubleshooting potential problems. Treatment startup and shutdown proceedures are provided as well as any personal protective equipment that may be necessary in the routine inspection and operation of the system. The system is shutdown monthly to allow for inspections which include the following tasks:

- Inspection of oil levels in the compressor;
- Inspection to verify proper instrument operation;
- Inspection of piping, valves, and vessels for leakage;
- Inspection of injection wells to verify proper operation of the valves; and
- Inspection of monitoring wells to verify well cap is securely fastened, relief valve is closed, and that no air or water has leaked out of the well cap.

Additionally, semi-annual inspections are conducted to confirm that the surface features of all monitoring wells are intact. Routine maintenance is performed as necessary and includes the cleaning/repair of the metering pump, the cleaning/repair of the mixing unit, and the cleaning/repair of the compressor.

Groundwater monitoring is performed on the three groups of well nests as well as additional monitoring wells as needed. Monitoring is generally performed quarterly for the first year of operation and semi-annually thereafter. Sample collection methodology and parameter analysis has been refined over time but initially each well is monitoried for VOCs (including TICs) and conditional parameters of the groundwater such as total organic carbon (TOC), dissolved oxygen, pH, temperature, and conductivity. Process monitoring targets the rate of VCM biodegradation, injection material distribution and migration, and the monitoring of groundwater flow pathways. Remedy logic is also provided in the OM&M Manual based upon VCM concentrations, redox conditions, and TOC concentrations to make adjustments in the field to maximize the efficiency of the system.

Quarterly monitoring reports are provided to EPA containing validated biosparge system performance data.

There have been no changes at the Site as the result of natural disasters or climate change impacts.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Hooker Chemical/Ruco Polymers Superfund Site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 19, 2015, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 32 Superfund sites and four federal facilities in New York and New Jersey,

including the Hooker Chemical/Ruco Polymers Site. The announcement can be found at the following web address: http://www2.epa.gov/sites/production/files/2015-11/documents/fy_16_fyr_public_website_summary.pdf. In addition, a public notice was made available by posting on the Hicksville municipal website a public notice titled "U.S. Environmental Protection Agency Reviews Cleanup at the Hooker Chemical/Ruco Polymer Superfund Site" on 4/29/2016, stating that there is a five-year review and inviting the public to submit any comments to the USEPA. The results of the review and the report will be made available at the Site information repository located at the Hicksville Public Library, 169 Jerusalem Avenue, Hicksville, NY.

Data Review

Data are collected and reviewed to ensure that RAOs are met following implementation of the remedial action(s). For this Site, data for the three OUs were evaluated and discussed below.

OU1 and OU2 soils were remediated to industrial levels. There is no data collected, other than evaluation of ICs.

Groundwater

Remedial design data collected from the biosparging pilot system, which was installed as part of the remedial design, and data collected since the pilot have demonstrated that biosparging is reducing VCM concentrations in the groundwater. The remedy primarily concentrates on the central core area of the sub-plume where elevated concentrations exist. Once the concentrated VCM areas are addressed, lower concentrations are expected to be susceptible to the processes of natural degradation in the groundwater resulting in further reduction of the VCM sub-plume. EPA and the NYSDEC conducted a final inspection of the system in September 2012 and EPA approved the Remedial Action Report for OU3 in June 2013.

OM&M performance data collected and reported to EPA since the biosparge treatment system began operating confirm that the system is effective in removing VCM from the aquifer. Quarterly progress reports have demonstrated a reduction in VCM groundwater concentration from 2011 through 2015. Evaluation of the VCM data collected from core plume wells from that period show a reduction in plume size and VCM concentration. For example MW-76 demonstrated a reduction in VCM concentration from 1,100 ppb in 2011 to 4 ppb in 2015. Total VOC concentrations in the same well have steadily declined from approximately 400 ppb in June 2014 to nearly zero ppb in October 2015. Similar trends are observed in the other monitoring wells in the biosparge treatment system, supporting that the VCM biotreatment is also resulting in PCE/TCE reductions. Downgradient wells show similar reduction in VCM concentrations due to natural degradation. For example, MW-68 demonstrated a reduction in VCM concentration from 940 ppb in 2013 to 260 ppb in 2015. Table 2 provides sampling data of the VCM sub-plume over time since the system began operating.

Additionally, since some of the residual concentrations of VCM, PCE, and TCE are treated at the Northrop Grumman property, EPA also evaluates the treatment data provided by Northrop Grumman to NYSDEC to ensure that downgradient plume contamination is collected and treated in accordance with design protocols and RAOs. Review of these data also confirm that remedial objectives are being met. VCM, PCE, and TCE (and any additional VOCs) are pumped from recovery well 3R to the treatment facility on the Northrup Grumman property. Occidental has constructed a pre-treatment aerobic bioremediation treatment system (the Supplemental Treatment System) on the Northrup Grumman property to treat residual VCM in the groundwater prior to treatment of VOCs via air stripping. This is a polishing system

that runs continuously and is operated by Northrup Grumman, but maintained by Occidental. Performance data are collected by Northrup Grumman and reported to the NYSDEC quarterly. Analysis of these data demonstrates that the pre-treatment of VCM is effective in removing VCM from the treatment stream. Additionally, a comparison of VOC concentrations in well 3R influent to treated levels in the effluent confirms that the treatment system is effective in removing VOCs from the captured plume. For example, data reported for March 2016 show vinyl chloride measured at 8.6 ppb in influent and <1.0 ppb measured in effluent. For the same reporting period, PCE was measured at 31 ppb in influent and <1.0 ppb in effluent and TCE at 529 ppb in influent and 2.6 ppb in effluent.

In addition, during the first two years of operation of the biosparge treatment system (2012-2014), soil vapor sampling was performed quarterly to ensure that biosparging operation was not causing the migration of VOCs into the vadose zone of the aquifer. Analysis of the data confirmed that the biosparge operation was not causing VOC migration into the vadose zone and monitoring of soil vapor was therefore discontinued in 2014.

Review of the quarterly progress reports provided to EPA by Occidental have indicated that additional details should be provided in future reports. For example, recent reports show inconsistent reporting of analytical data for certain wells which are in fact due to protocols followed in the OM&M Manual whereby certain wells are no longer sampled or are sampled voluntarily due to consistent non-detect readings in the well over a pre-established time interval. Another example is that in certain instances earlier reports detail condition issues for certain wells, while subsequent reports omit these details, which can be confusing to the reader. Finally, VOC trends, which are also monitored under the biosparging program and reported in detail during quality assurance/quality control (QA/QC) reviews in accordance with the OM&M plan, are lacking detail when reported in the quarterly progress reports. Following a discussion with Occidental to rectify these reporting issues, adjustments have been made in the July 2016 quarterly progress report (which will be carried through to future reports) that corrects these minor discrepancies. These issues are also elucidated in the "Other Findings" section below.

Evaluation of the data collected for the treatment of groundwater at the Hooker Ruco Site confirms that RAOs for groundwater are being met.

Site Inspection

The inspection of the Site was conducted on 4/7/2016. In attendance were Michael Negrelli, EPA Remedial Project Manager, Robert Alvey, EPA Hydrogeologist, Steven Scharf, NYSDEC Project Engineer, Roger Smith, Occidental Petroleum Senior Project Manager, Klaus Schmidtke, GHD (Occidental contractor), and Victoria Whelan, C. A. Rich Inc. (Occidental contractor). The purpose of the inspection was to assess the protectiveness of the remedy. No issues or adverse conditions were observed.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The remedy is functioning as intended by each of the three RODs for the Site.

Discussion

Pursuant to the OU2 ROD, PCB contaminated soil that exceeded the cleanup criteria of 10 ppm has been removed from the Site and disposed of in an appropriate manner. Excavated areas have been backfilled with clean fill. The OU2 remedy was deemed complete upon approval of the OU2 Remedial Action Report in 1993.

For OU1, contaminated soil that acted as a source of groundwater contamination was excavated from the Site and disposed of appropriately. Other soil at the Site that contributed to groundwater contamination was treated on-Site by soil flushing. The OU1 remedial action for soils was completed upon approval of the OU1 Remedial Action Report in 2007.

The VCM plume associated with OU3 is being treated through biosparging and evaluation of the data indicates that the process is effective. Downgradient VCM and PCE/TCE groundwater contamination is being effectively captured and treated by the Northrop Grumman groundwater treatment system. Review of influent and effluent data for VCM and PCE/TCE included in the quarterly monitoring reports provided to the NYSDEC by Northrup Grumman confirm that RAOs are being met by the groundwater treatment system.

Completion of the construction of the OU3 remedy was documented in the OU3 Remedial Action Report approved by EPA in 2013. OM&M of the OU3 remedy is ongoing.

The OU3 remedy also allowed for a contingency extraction and treatment remedy should biosparging of the VCM plume prove to be ineffective. Based on the results observed from implementation of the pilot system in 2006 and review of subsequent OM&M data of the biosparge system, it is not anticipated that the contingency remedy will be exercised.

The OU1 ROD also specifically required the use of institutional controls in the form of deed restrictions and groundwater use restrictions at the facility property. EPA is currently coordinating with the NYSDEC to ensure that deed restrictions are codified in an environmental easement for the property to ensure that future site use remains industrial in nature and that groundwater use is restricted until such time as drinking water standards are met in the aquifer. Currently, local zoning ordinances restrict reuse of the Site to industrial development and Nassau County prevents the use of groundwater as a potable water source to protect public health. It is expected that an environmental easement for the Hooker Ruco property can be executed by the end of 2016.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Question B Summary

There are no changes in the physical conditions of the Site or Site uses that would affect the protectiveness of the selected remedy. The exposure assumptions and the toxicity values that were used to estimate the potential risks and hazards to human health followed general risk assessment practice at the time the risk assessment was performed and are generally consistent with current practice.

Discussion

The soil and groundwater remediation have reduced potential direct exposures to COCs. These actions have changed the physical conditions at the Site. In addition, the Site has limited access based on its location in an industrial area and a fence around the property. At the Site visit, no indications of trespassing were observed.

As described above, the main COCs identified were PCBs in soil, and VCM, PCE and TCE in groundwater. The soil RAO for PCBs was 10 ppm for soils, which is below NYSDEC guidance values for industrial use (25 ppm). The PCB concentrations are protective based on comparison of the remedial concentrations to risk based standards indicating that the risks are within the risk range and below the goal of protection of a hazard index = 1. PCB toxicity values were updated in 1996 and the Integrated Risk Information System (IRIS) program is currently evaluating the non-cancer toxicity and any changes to the toxicity values will need to be evaluated in the next FYR.

The ROD established federal MCLs and state groundwater quality standards as the cleanup criteria for the COCs for groundwater, namely VCM, PCE, DCE, TCE, TICs, and arsenic. Exposure to the contaminated groundwater underlying the facility is considered unlikely because of the general availability of a municipal water supply (e.g., Hicksville Water Supply District). This supply is periodically tested to ensure its quality in accordance with New York State law.

The toxicity value for TCE was updated on the Agency's IRIS database for toxicity information on 9/28/2011. The toxicity value for vinyl chloride was updated in 2000. The MCLs remain protective. The MCLs for these chemicals have not changed since the RODs were signed.

The original HHRA used the 1991 Standard Default Exposure assumptions. Since that time, in 2014 EPA updated the exposure assumptions for certain parameters. The updates to the standard default update do not significantly change the original assumptions. For eample, the residential exposure duration was changed from 30 years to 26 years; the adult bodyweight was updated to 80 kgs from 70 kgs; and there were changes in assumptions regarding skin surface area and dermal absorption factors. Overall, these changes in exposure assumptions, do not significantly change the results of the original HHRA regarding the need for remedial action and the protectiveness of the remedy.

Soil and groundwater use at the Site did not change during the period of this review. Changes in the land use are not expected to change during the next five years. The original HHRA considered residential groundwater use and industrial land use exposures. As described above, EPA is working to to ensure that deed restrictions are codified in an environmental easement for the property to ensure that future site use remains industrial.

The vapor intrusion pathway was evaluated based on the maximum concentrations of TCE, PCE and VCM in groundwater. The calculated concentrations provided in the Vapor Intrusion Screening Level (VISL) for the volatile COCs established at residential levels at a risk of 1×10^{-6} compared to the maximum detected concentration in groundwater. The maximum concentrations of 100 ppb of TCE in well MW-81D2 exceeded the TCE screening level of 1.2 ppb. The maximum concentration of 320 ppb in well MW-81D1 exceeded the screening level of 0.15 ppb for vinyl chloride. Currently, there are no buildings on the site; in the future if a building is built on the property, potential vapor intrusion will need to be

considered. Although not part of the CERCLA remedy, vapor intrusion mitigation for any future redevelopment at the facility is a component of the 2012 NYSDEC OU4 ROD.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

Question C Summary

No other information has come to light that would call into question the protectiveness of the remedy. There have been no changes at the Site as the result of natural disasters or climate change impacts.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU2

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1	**Issue Category: Institutional Controls**			
	Issue: OU1 requires deed restrictions be placed on the Hooker Ruco property at the Site to restrict reuse of the Site and restrict groundwater use. Local ordinances in place ensure the protection of public health.			
	Recommendation: EPA is coordinating with NYSDEC to ensure that deed restrictions are placed on the Hooker Ruco property at the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	12/31/2016

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and may improve management of OM&M, but do not affect current and/or future protectiveness:

- Monitoring well analytical data reporting in the quarterly progress reports lack a degree of consistency. Table 2 of this FYR report contains data gaps from wells that are sampled in some years but not in others. Recent discussions with Occidental point to the discrepancies being due to improved sampling techniques (e.g., switching from low flow sampling to using diffusion bags)

as well as changes in the OM&M program whereby the sampling of certain wells are no longer mandatory but are sometimes sampled voluntarily. As a result of these discussions, improvements have been made in the quarterly progress reports (beginning in July 2016) to clarify these issues.

- Quarterly progress reports occasionally note anomalous condition issues with certain wells. For example, "air injection difficulties" or "injection wells were inoperable but dissolved oxygen levels in the groundwater is sufficient" have been occasionally reported. The reports also include a Well Conditions Update section to indicate the operational status of monitoring and injection wells whereby certain wells are described as non-functional and several are slated for abandonment without providing further detail. As a result of discussions with Occidental on this issue, improvements have been made in the quarterly progress reports (beginning in July 2016) to rectify the lack of detail with respect to well function.

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU1	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:* 12/31/2016
Protectiveness Statement: The remedies implemented for the Site under OU1 are considered short-term protective of human health and the environment pending the filing of the environmental easement in the County Office of Records.		

Protectiveness Statement(s)		
Operable Unit: OU2	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedies implemented for the Site under OU2 are protective of human health and the environment.		

Protectiveness Statement(s)		
Operable Unit: OU3	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedies implemented for the Site under OU3 are protective of human health and the environment.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Planned Addendum Completion Date:* 12/31/2016
Protectiveness Statement: The remedies implemented for the Site are considered short-term protective of human health and the environment pending the filing of the environmental easement in the County Office of Records.	

VIII. NEXT REVIEW

The next five-year review report for the Hooker Chemical/Ruco Polymers Superfund Site is required five years from the completion date of this review.

Table 2: Groundwater Monitoring Results – VCM Concentrations (ppb)

Monitoring Well	May 2010	Apr/May 2011	Apr/May 2013	Apr/Jul 2014	Oct/Nov 2014	April 2015	Oct/Nov 2015
MW-58	ND		ND		ND		
MW-61		14	13	1	1	1	ND
MW-63	47		76	21	4	5	1
MW-66			ND	ND	ND		ND
MW-67	91		140	38	6	ND	ND
MW-68	ND		940	270	400	1	260
MW-70		1000	26	16	19	11	8.8
MW-72		21	1	0.6	ND	ND	ND
MW-73		1400	16	ND	ND	1	1
MW-75			530	220	190	150	87
MW-76		1100	19	8	7	5	4
MW-77		140	150	ND	ND	ND	0.7
MW-81		190	ND	2	6	1	ND
MW-82		74	41	2	1	1	ND
MW-83		34	1	2	3	ND	1.5
MW-84		ND	ND	ND	ND	ND	ND
MW-85		1100	25	7	ND	ND	ND
MW-86		14	62	180	110	33	ND
MW-87		160	1	ND	ND	ND	ND
MW-88		160	38	1	3	2	ND
MW-89		63	60	19	7	7	4.3
MW-90		4100	780	27	37	3	1.9
MW-92		100	79		51		42
MW-93		190	20		7		3.8

The remediation goal for VCM is 2 ppb.
ND = not detected

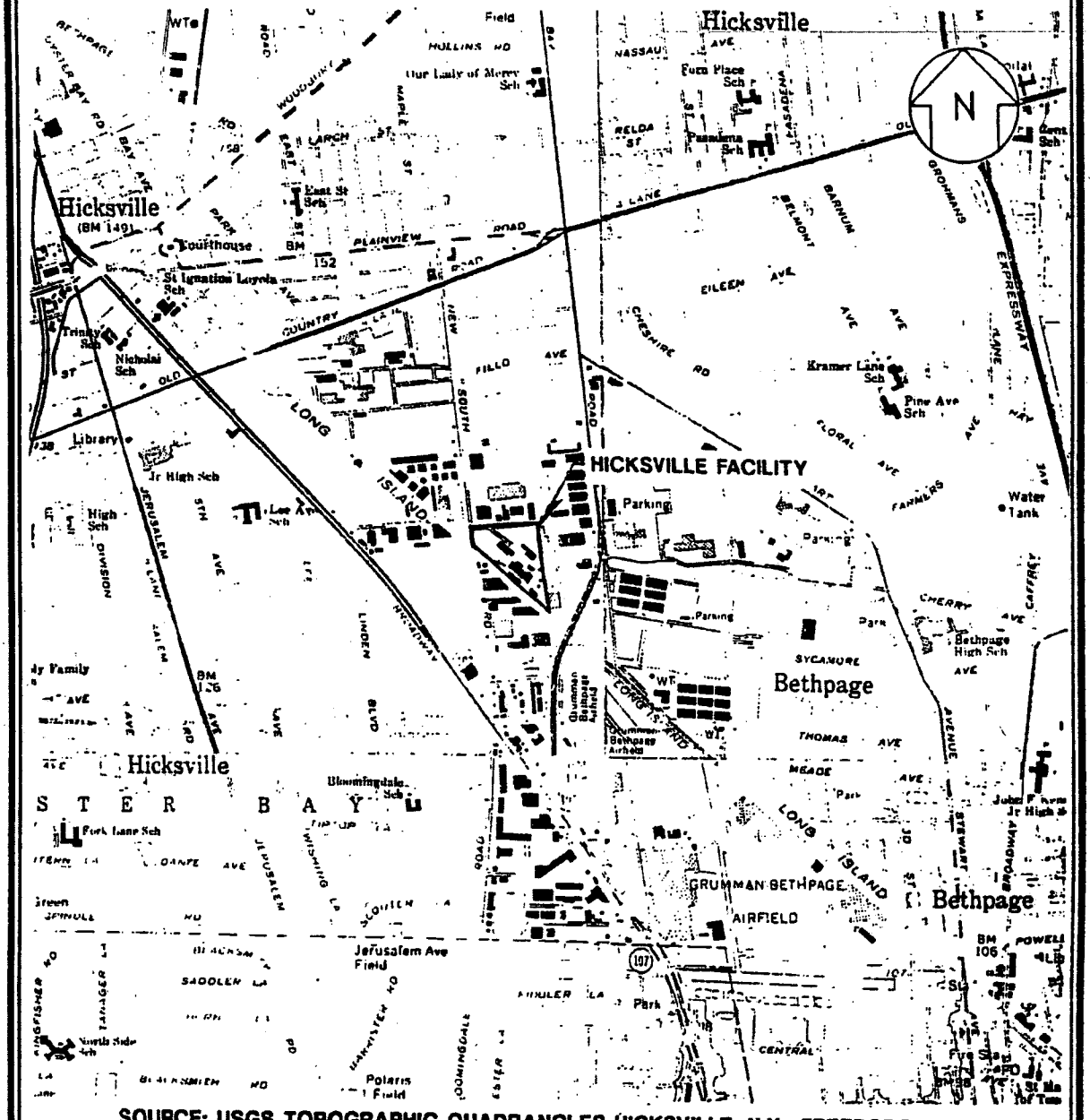
APPENDIX A – REFERENCE LIST

Documents, Data, and Information Reviewed in Completing the Five-Year Review:

Document Title, Author	Date
OU2 Record of Decision, Hooker Chemical/Ruco Polymer Site, EPA	September 28, 1990
OU1 Record of Decision, Hooker Chemical/Ruco Polymer Site, EPA	January 28, 1994
OU3 Record of Decision, Hooker Chemical/Ruco Polymer Site, EPA	September 29, 2000
Preliminary Site Close Out Report, EPA	July 1, 2015
Quarterly Reports, Hooker Chemical/Ruco Polymer Site, Occidental	April 2013 – January 2016
Quarterly Operation Maintenance and Monitoring Report, Northrup Grumman Systems Corporation and NWIRP	May 31, 2016

APPENDIX B – SITE MAP

(Figure 1, General Site Location Map/Figure 2, Site Location Map)

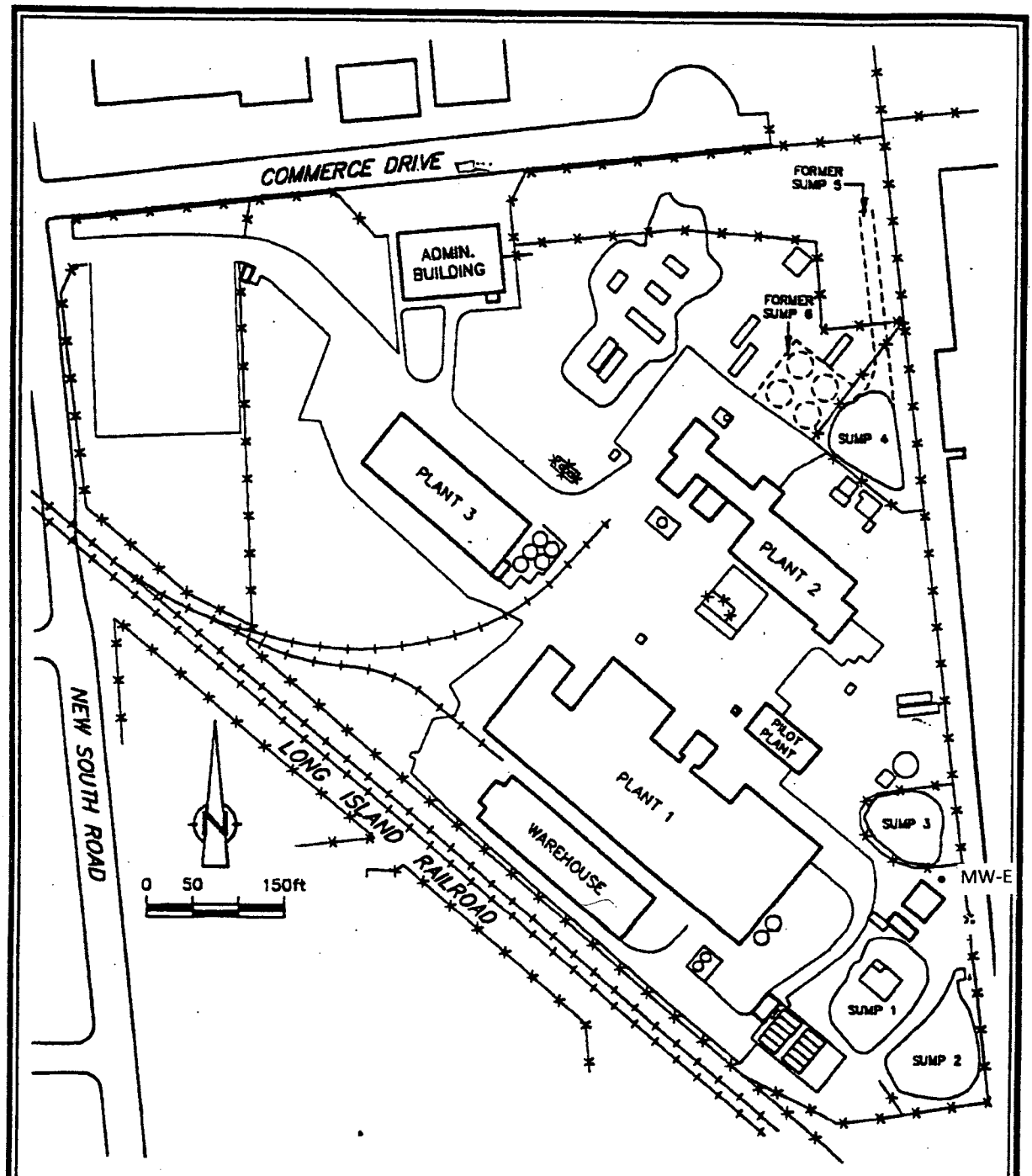


SOURCE: USGS TOPOGRAPHIC QUADRANGLES HICKSVILLE, N.Y., FREEPORT, N.Y., HUNTINGTON, N.Y. AND AMITYVILLE, N.Y.

HOOKER CHEMICAL/RUCO POLYMER SITE LOCATION MAP

Figure 1

Modified from LBG Engineering Services Inc. (2/93)



HOOKER CHEMICAL/RUCO POLYMER
SITE LOCATION MAP

Figure 2

Modified from Conestoga-Rovers & Associates (11/99)