Third Five-Year Review Report
Forest Glen Mobile Home Subdivision Site
City of Niagara Falls and Town of Niagara
Niagara County, New York

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

September 2007

Third Five-Year Review Report
Forest Glen Mobile Home Subdivision Site

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate
CIC	Community Involvement Coordinator
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
NCDH	Niagara County Department of Health
NPL	National Priorities List
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
PAH	Polyaromatic Hydrocarbons
PRP	Potentially Responsible Party
RI	Remedial Investigation
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
O&M	Operation and Maintenance
TIC	Tentatively Identified Compound

Executive Summary

This is the third Five-Year Review for the Forest Glen Mobile Home Subdivision Site located in the City of Niagara Falls and the Town of Niagara, Niagara County, New York.

Based upon reviews of the 1999 Record of Decision, Remedial Action Report, Quarterly Groundwater Sampling Results, Annual Operation & Maintenance Reports, Site Inspection Reports and a Site inspection by EPA in June 2007, it has been concluded that the remedies as defined by the Site's decision documents continue to protect human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name *(from WasteLAN)*: Forest Glen Subdivision Superfund Site

EPA ID *(from WasteLAN)*: NYD981560923

Region: 2	**State:** NY	**City/County:** Niagara Falls/Niagara

SITE STATUS

NPL Status: O Final G Deleted G Other (specify)_____

Remediation Status (choose all that apply): G Under Construction G Operating O Complete

Multiple OUs? OYES G NO	**Construction completion date:**

Has site been put into reuse? OYES G NO G N/A

REVIEW STATUS

Lead agency: O EPA G State G Tribe G Other Federal Agency _____

Author name: Gloria M. Sosa

Author title: Remedial Project Manager	**Author affiliation:** EPA

Review period:** 09/28/2002 to 09/027/2007

Date(s) of site inspection: 05/01/2007

Type of review:

G Post-SARA G Pre-SARA G NPL-Removal only
G Non-NPL Remedial Action Site G NPL State/Tribe-lead
G Regional Discretion O Statutory

Review number: G 1 (first) G 2 (second) O 3 (third) G Other (specify) _____

Triggering action:

G Actual RA Onsite Construction at OU #____ G Actual RA Start at OU#__1__
G Construction Completion O Previous Five-Year Review Report
G Other (specify) _____

Triggering action date *(from WasteLAN)*: 09/27/2002

Due date *(five years after triggering action date)*: 09/27/2007

Does the report include recommendation(s) and follow-up action(s)? G yes O no

Acres in use or available for use: **restricted:** __9__ **unrestricted:** __30__

Five-Year Review Summary Form (continued)

Issues, Recommendations, and Follow-Up Actions

This Site has ongoing operation, maintenance and monitoring activities as part of the selected remedy. As was anticipated by the decision documents, these activities are subject to routine review and, when necessary, modification and adjustment. This report did not identify any issue or make any recommendation for the protection of human health and/or the environment which was not included or anticipated by the Site decision documents.

Protectiveness Statement

The remedy at the Forest Glen Subdivision Site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none are expected as long as the engineered controls currently in place continue to be properly operated, monitored and maintained.

Third Five-Year Review Report
Forest Glen Subdivision Superfund Site

I. Introduction

This third Five-Year Review of the Forest Glen Subdivision Superfund Site (Site) was conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001).

The purpose of a Five-Year Review is to ensure that implemented remedies continue to be protective of human health and the environment and that they continue to function as intended by the Site's decision documents. This document, prepared by the Forest Glen Subdivision Superfund Site Remedial Project Manager, Gloria M. Sosa, will become part of the Site file.

This is the third Five-Year Review for the Site. Since, after the completion of the remedial action, contaminants remain onsite, a statutory Five-Year Review is required. In accordance with the Section 1.3.3 of the Five-Year Review guidance, a subsequent statutory Five-Year Review is triggered by the signature date of the previous Five-Year Review Report. The trigger for this third Five-Year Review is the date of the previous Five-Year Review Report, which was September 27, 2002.

II. Site Chronology

Table 1, which is attached, summarizes the Site-related events running from the discovery of hazardous wastes on the Site through the present.

III. Background

Physical Characteristics

The Forest Glen Subdivision Site is located in both the Town of Niagara and the City of Niagara Falls, Niagara County, New York. The Site is accessed from Service Road, which is located off Porter Road. The Site is bounded by the Expressway Village mobile home subdivision on the south; I-190 on the north and east; and the Conrail-Foote Railroad Yard on the west.

The 39-acre Site is bisected by East Gill Creek, a narrow, low-flowing creek. The former 15-acre Forest Glen Subdivision, which once consisted of 51 mobile and two permanent residences, was located south of East Gill Creek. Also south of the creek are the two undeveloped 3-acre Wooded Lots. The portion of the Site north of East Gill Creek Site consists of an 18-acre parcel referred to as the Northern Aspect. The Northen Aspect consists of a 15-acre undeveloped triangle of land which was bordered on the west by a 1.5-acre berm, approximately 11 feet in height (removed during remediation) and on the east by the 1.5-acre Wooded Wetland.

Geology/Hydrogeology

The geology of the region consists predominantly of compact and generally impermeable lodgement till and glacial lacustrine clay common to the Niagara Escarpment. The topography is generally flat and it is poorly drained because of the impermeability of the glacial lacustrine clay and glacial till.

The regional overburden consists of glaciolacustrine deposits (clay) and clay till deposits overlying the Lockport Dolomite bedrock. The Lockport Dolomite is a karst formation, generally 150 feet of dolostone overlying 120 feet of limestones and shales, including the impermeable Rochester Shale, below which is limestone and sandstone, overlying the Queenstown Shale. The bedrock beneath the Site and throughout the region dips gently to the south at 29 feet per mile.

The Lockport Dolomite is the major water-producing formation of the area. At the site, the hydrogeology is defined by three hydrostratigraphic zones: perched overburden water, shallow bedrock and deep bedrock. The overburden extends approximately from zero to 20 feet below ground surface (BGS). Because of the low permeability of the overburden clay and till, perched groundwater conditions were encountered at the Site. The shallow bedrock zone extends from 16 to 28 feet BGS. Groundwater in this zone flows both vertically and horizontally through an interconnecting system of closely-spaced joints and bedding plane fractures. The deep bedrock zone is encountered at depths of 40 to 45 feet BGS. There is a zone of competent dolostone between the shallow and deep bedrock zones. It is probable that hydraulic communication occurs between the bedrock zones.

Land and Resource Use

The site is located in an area zoned for mixed residential, commercial and industrial use. The southern portion of the Site, including the Subdivision, was zoned for residential use until 1999 when the entire Site was zoned commercial/light industrial by the City of Niagara Falls and the Town of Niagara.

The population of the City of Niagara Falls is approximately 62,000. The population of Niagara County is approximately 221,000 and the population of the Town of Niagara is approximately 10,000. Approximately 500 people live within one-half mile of the Site.

A municipal water system serves the City of Niagara Falls and the Town of Niagara. General land use and drinking water sources in the vicinity of the site have not changed since the 1999 Record of Decision (ROD).

History of Contamination

The Forest Glen Subdivison Site was found to be contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals. The contaminants of concern at the site are: benzo(a)pyrene; vinyl chloride; aniline; phenyl isothiocyanate; diphenylamine; 2-mercaptobenzothiazole; 2-anilinobenzothiazole; perylene; n,n-diphenyl-1,4-benzenediamine; phenothiazine; and, benzothiazole. Investigations have determined that the source of contamination was wastes disposed at the site.

Initial Response

EPA first became involved in Forest Glen in 1987 when both the New York State Department of Environmental Conservation (NYSDEC) and the Niagara County Department of Health (NCHD) brought it to the Agency's attention. Analytical results for soil samples collected by EPA indicated that volatile and semi-volatile organic chemicals and heavy metals were present at varying concentrations. In addition, numerous tentatively identified compounds (TICs) were noted at high concentrations. EPA conducted an expanded site investigation and concluded that high concentrations of TICs were present in the northern portion of the Subdivision.

In a March 9, 1989 Health Consultation, the Agency for Toxic Substances and Disease Registry (ATSDR) classified the Forest Glen Subdivision Site as posing a potential health threat to residents. ATSDR did not recommend the relocation of the residents at that time, but, indicated that the TICs should be positively identified so that their health effects could be determined.

EPA executed interim measures to stabilize conditions and protect the public at the site, including collection, staging, and securing drums of waste that were located in the areas north and east of the Subdivision. EPA also installed temporary fencing around areas of suspected contamination in the two wooded areas north and south of Edgewood Drive. In addition, an area where contaminants were detected in high concentrations in surface soils was temporarily covered with concrete.

EPA conducted another sampling event in April 1989 consisting of soil and air sampling. The analysis of these soil samples positively identified aniline, phenothiazine, mercaptobenzothiazole and benzothiazole present in the soils at significant concentrations. The analysis of ambient air samples collected at locations throughout the Subdivision and beneath several mobile homes and from the basement of one permanent residence did not identify any of the compounds detected in the soil.

In June 1989, the New York State Department of Health (NYSDOH) conducted an exposure survey at the Forest Glen Subdivision. In that survey, 39 people from 23 households reported having come into contact with the chemical wastes and 45 people reported health problems that they believed were associated with chemicals on the site.

Based on the positive identification of aniline, phenothiazine, mercaptobenzothiazole, and benzothiazole, together with the presence of semi-volatile polyaromatic hydrocarbons (PAHs), ATSDR issued a Preliminary Health Assessment for the Forest Glen Subdivision on July 21, 1989. It stated that the Site posed a significant threat to human health because of possible contact with contaminated soils and wastes and advised that immediate action be taken to relocate residents of the entire Subdivision.

On July 26, 1989, EPA, through an interagency agreement with the Federal Emergency Management Agency (FEMA), began a removal action for the temporary relocation of residents from the Forest Glen Subdivision.

Basis for Taking Action

ATSDR issued a Public Health Advisory on July, 31, 1989, recommending that individuals be disassociated from the site, that is, relocated, and that the site be placed on the National Priorities List (NPL). The Site was listed on the NPL in November 1989. Placement on the NPL enabled EPA to take remedial action at the site to relocate the residents.

Hazardous wastes on the Site are a threat to human health and required the relocation of all residents on the Site. Contamination exists in the soil, sediments and groundwater of the Site. Some groundwater contamination extends off the Site property boundaries. These conditions led to EPA performing a Remedial Investigation and Feasibility Study (RI/FS) at the Site.

IV. Remedial Actions

Remedy Selection

Operable Unit 1 - Relocation

In December 1989, EPA issued a ROD selecting permanent relocation of the residents of the Forest Glen Subdivision as the remedial action for the first operable unit (OU1).

EPA entered into an Interagency Agreement with FEMA to implement the remedy. FEMA relocated the residents from June 1990 through December 1992.

Remedial Investigation

EPA conducted an RI/FS at the Site from 1994 - 1997. Environmental sampling of soil, sediment and groundwater was performed. The analyses of these samples detected contamination with VOCs, SVOCs and metals. The contaminated areas within the Site, including the former subdivision, the berm, the wooded wetland, wooded lots and East Gill Creek sediments, were delineated for subsequent remediation. The FS for soil was completed in September 1997. A proposed plan for soil was also issued in September 1997 and a public meeting was held in October 1997.

A supplemental groundwater investigation was conducted in 1999 to address data gaps with respect to the contaminated groundwater. The FS for groundwater was completed in April 1999, a proposed plan was issued and a public meeting was held.

Remedy Selection

Operable Unit 2 - Contaminated Soil and Sediment

On March 31, 1998, EPA issued a ROD which addressed contaminated soil and sediment. This ROD provided for the excavation, consolidation and onsite capping of wastes. Wastes would be excavated from the former Subdivision and consolidated and capped in the Northern Aspect so that the former Subdivision would be suitable for residential development. At that time, the land-use zoning of the subdivision was residential. The ROD also called for the excavation of sediments from East Gill Creek with disposition of these sediments under the cap. In addition, the ROD called for either capping or excavating contaminated sediments from the Wooded Wetland area.

On September 30, 1999, EPA issued a ROD for contaminated groundwater which also amended the 1998 ROD for contaminated soils and sediments. The main change to the soil remedy resulted from the City of Niagara Falls and the Town of Niagara rezoning the Site property for commercial/light industrial use. The 1999 soil remedy called for the placement of a cap over most areas of soil contamination according to the specification in 6 New York Code of Rules and Regulations, Title 6, Part 360, for landfill caps. Limited volumes of contaminated soil and sediment were to be excavated and consolidated under the cap. The remedy also called for securing institutional controls to prohibit activities that would compromise the integrity of the cap and implementation of a long-term inspection and maintenance program to ensure cap integrity. This remedy would allow for the redevelopment of the entire site for commercial/light industrial use.

The Goodyear Tire & Rubber Company, Inc. (Goodyear) entered into a Consent Decree with EPA in 2001 to perform the remedial design and remedial action for both soil and groundwater at the Forest Glen Subdivision Site. The remedial design for soil was approved in July 2002.

Operable Unit 3 - Contaminated Groundwater

The September 30, 1999 ROD also selected a remedy for contaminated groundwater which included two major components. The first component is the extraction of contaminated groundwater from the on-property plume and the transfer of the extracted groundwater via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant. The off-property plume will be remediated by monitored natural attenuation (MNA). In addition, the groundwater remedy includes the implementation of a Long-Term Groundwater Monitoring Program to assess whether the remedy is functioning as intended.

The remedial action objective for groundwater is to restore the potable aquifer to drinking-water quality. The 1999 ROD anticipated that the on-property plume will be restored to drinking-water standards.

The Applicable or Relevant and Appropriate Requirements (ARARs) for groundwater cleanup include EPA's Maximum Contaminant Levels (MCLs), established under the Safe Drinking Water Act, and New York State's groundwater quality standards.

Remedy Implementation

Soil Remediation

The remedial action objectives for soil outlined in the 1999 ROD are to prevent direct contact with contaminated soils and sediments and to mitigate the potential for contaminants to migrate from the soil into the groundwater. These objectives were achieved by excavating soil and sediment with concentrations of contaminants above the NYS TAGMs, which were designed to protect the groundwater by eliminating the migration of contaminants from soil to groundwater. These objectives were also achieved by capping contaminated soil and sediment to prevent exposure.

Goodyear implemented the remedy at the Site contracting O'Brien & Gere Engineers, Inc. (OBG) to be the Supervising Engineer. In September 2002, approximately 43 tons of asbestos-containing materials were removed from the Site and disposed of at the BFI special waste landfill in Kenmore, N. Y. Subsequent to the removal of the asbestos, the trailers and two permanent homes were demolished. Approximately one ton of demolition debris, excluding the metal trailer frames which were recycled, were disposed of at the BFI Pine Avenue Landfill in Niagara Falls.

Goodyear conducted an investigation in East Gill Creek in 2002 to determine if there were upstream sources of contamination that may have impacted the Site. No discrete sources of contamination were identified.

Goodyear excavated approximately 43,000 cubic yards of contaminated soil and sediment and consolidated this material in the northern half of the former subdivision. Approximately 4.5 tons of waste containing PAHs were removed and disposed of at the Modern Landfill in Model City, N. Y. In addition, drum carcasses, discovered during the remediation and placed in 16 over-pack drums, were disposed at the Chemical Waste Management Facility in Model City, NY. Goodyear performed verification sampling after the excavation was completed to determine whether the bottom and sides of the excavation had achieved the action levels set forth in the 1999 ROD. The results of the verification sampling indicated that these action levels had been achieved.

The 1999 ROD required the excavation of the Wooded Wetland to a depth of six inches. Goodyear excavated approximately 1000 yards of sediment and consolidated it in the area which

was subsequently capped. Six inches of topsoil were imported to the Site and the wetland was restored according to the Wetlands Mitigation Plan. In addition, approximately 3.5 acres of wetland at the Site were restored and/or enhanced utilizing hydrophylic plant species.

The excavation of contaminated sediment along East Gill Creek varied between 6-12 inches. Approximately 1000 cubic yards of sediment were excavated and consolidated in the area which was subsequently capped. The limits of excavation are depicted in the record drawings.

Goodyear constructed a Part 360 cap that consisted of a polypropylene nonwoven geotextile filter fabric and a 40-mil linear low-density polyethelene (LLDPE) liner. Independent testing of the seams of the LLDPE liner was performed to assure the integrity of the liner seams.

The barrier protection layer encompasses an area of approximately 9 acres and supports several distinct regions, including a vegetated area, a one-story commercial/light-industrial building, a heavy-duty asphalt area and a standard asphalt area. Approximately 23,000 cubic yards of barrier protection material (silty sand and silty loam) were placed over these areas, with thicknesses of 24-inches, 12-inches, 11.5-inches and 15-inches, respectively. The barrier protection layer was covered with 6 inches of topsoil and the vegetated area was seeded.

The building foundation is a part of the Part 360 cover. The foundation is composed of 12-inches of compacted structural fill (crushed stone) and footings. The geomembrane was placed within the footprint of the building to provide a separation between the contaminated soil and the clean structural fill and barrier protection layer, which was then covered with a concrete slab. Within the layer of structural fill, a network of perforated pipe was installed as a passive venting system.

Groundwater Remediation

Goodyear installed and developed the two groundwater extraction wells according to work plans developed by OBG and approved by EPA. The remedial design indicated that groundwater would be recovered from each extraction well at a flow rate of 10 gallons per minute (gpm) for a combined discharge rate of 20 gpm, under normal pumping circumstances.

Goodyear brought the groundwater remedial system on-line in September 2003. The two extraction wells are pumped at a combined rate of 20 gpm. OBG took water-level measurements and created draw-down curves and water-level maps. The water-level maps indicate that the area of capture of the groundwater remedial system is of sufficient size to capture the on-property groundwater plume.

The City of Niagara Falls requires that Goodyear shut off the groundwater-extraction-well pumps during a 12-hour storm event to avoid discharging into a potential combined sewer overflow. In order to determine when there is a potential for a combined sewer overflow, Goodyear installed a transmitter attached to a sensing device in Regulator No. 8 of the City sewer. The transmitter,

located in an electrical enclosure in the public right-of-way near Regulator No. 8, sends a signal to the recovery well pumps control panel located on the Site that shuts off the pumps.

OBG performed a MNA Study which determined that the conditions in the aquifer are such that the contaminants in the off-property plume are naturally attenuating. EPA reviewed and approved the MNA Study. OBG prepared a MNA Monitoring Plan as part of the long-term groundwater monitoring plan.

Institutional Controls Implementation

The 1999 ROD requires institutional controls in the form of deed restrictions to limit site activities and to restrict access to the capped area. The June 2006 Consent Decree Civil Action No. 96-CV-07215S(H) between The United States of America and The Goodyear Tire & Rubber Company and Niagara Falls U.S.A. Campsite, Inc., also requires institutional controls intended to preclude any development activities that would interfere with the implementation and/or effectiveness of the remedial action. Goodyear transferred title of the property to the Cherokee Development Corporation with a deed restriction that prohibits any activities that will impair the integrity of the cap. The company that leases the on-site building from the Cherokee Development Corporation was required to sign a contract along with the lease which specifies that hazardous wastes remain on-site beneath the cap and restricts activities which would damage the cap. The RPM is in frequent contact with the representative of the company that leases the building.

There are no additional institutional controls required as actions under CERCLA. The soil and sediment cleanup outside the capped area met residential standards and should be suitable for unlimited use without restriction of exposures. There are additional layers of protection for this area. The entire Site property was zoned commercial/light industrial by the City and Town. Further, the Site was listed with the Niagara County Industrial Development Agency and Registry of Inactive Hazardous Waste Disposal Sites in New York State.

No institutional controls were included in the 1999 ROD or the Consent Decree to address groundwater contamination. The final remedy provides for unlimited use without restriction of exposures. The region did not find a need for institutional controls as an interim action based on the reasonably anticipated use of the groundwater during the remediation. There are additional layers of protection for the groundwater. There are no drinking-water wells located within the plume area. No new wells are expected as a Niagara County ordinance prohibits the installation of drinking-water wells without a permit.

Systems Operation/Operation and Maintenance (O&M)

<u>Soil O&M</u>

Quarterly inspections are performed on behalf of the Cherokee Development Corporation by Great Lakes Environmental. Inspection reports are submitted to EPA. The inspection reports to

date indicate that the soil remedy is being maintained properly. The condition of the cap is excellent. The condition of the remainder of the Site is also excellent.

Groundwater O&M

Goodyear has been operating the groundwater extraction system since September 2003 under the EPA approved Operation & Maintenance Plan, revised on March 24, 2004.

Goodyear has experienced problems with the electrical system which operates the pumps. In March 2006, Goodyear replaced one of the pumps which had failed.

Goodyear inspects Regulator No. 8, which relays a potential overflow condition to the site and shuts off the pumps, on a quarterly basis. Goodyear replaced faulty radio equipment at Regulator No. 8 in 2006.

O&M Costs

The inspections, sampling, monitoring, data evaluation and reporting costs are approximately $1.5 million: these costs are broken down in Table 2.

V. Progress Since Last Five-Year Review

The second Five-Year Review was completed in September 2002, pursuant to OSWER Directives 9355.7-02 (1991), 9355.7-02A (1994) and 9355.7-03A (1995). The second five-year review concluded that although all the remedial actions at the Site were not yet completed, the remedial actions implemented at that time were protective of human health. The remedy for soil was completed in September 2004. The wastes have been capped and surface exposure to these wastes has been eliminated. The cap is routinely inspected and is in excellent condition. Thirty acres of the site are available for unrestricted use and the 9 acres that comprise the capped area are available for restricted use.

The groundwater remedy at the site has been implemented since September 2003 and groundwater extraction is ongoing. An extensive groundwater monitoring program has been implemented.

The results of groundwater monitoring since the second five-year review are discussed in this Report.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of: Gloria M. Sosa (Remedial Project Manager), Richard Krauser (Hydrogeologist), Marian Olsen (Human Health Risk Assessor), Charles Nace (Ecological Risk Assessor) and James F. Doyle (Attorney).

Community Involvement

The EPA Community Involvement Coordinator for the Site, Michael J. Basile, published a notice in the *Niagara Gazette,* a local newspaper, on July 24, 2007, notifying the community of the initiation of the five-year review process. The notice indicated that the EPA would be conducting a five-year review of the remedy for the Site to ensure that the implemented remedy remains protective of human health and the environment and is functioning as designed. It was also indicated that once the five-year review is completed, the results will be made available in the local Site repository. The notice, including the RPM's mailing address, e-mail address and telephone number, solicits public comments or questions related to the five-year review process or to the Site.

Document Review

The documents, data and information which were reviewed in completing this third five-year review are summarized in Table 3.

Monitoring and Data Review

The remedial action objective for groundwater is to reduce or eliminate the threat to human health and the environment posed by groundwater contamination by remediating groundwater to MCLs, thereby restoring the aquifer to beneficial uses. The groundwater remedy addresses both the on-property plume and the off-property plume.

The contaminated groundwater from the on-property plume is being extracted by two pumping wells (RW-1 & RW-2) located within the capped area. The remedial design combined pumping rate of these two wells is 20 gpm. The extracted groundwater is discharged to the sewer for treatment at the City of Niagara Falls Wastewater Treatment Plant under a Significant Industrial User (SIU) permit. The water level is monitored at Regulator No. 8 for the occurrence of an overflow that may occur during a severe storm event or snowmelt. The SIU permit requires that discharge from the Site be suspended during these potential overflow periods since this may result in a bypass of the Wastewater Treatment Plant.

The SIU permit requires that Goodyear perform self-monitoring on a quarterly basis. This monitoring is performed for VOCs, total phosphorous, lead, chromium and nickel. In addition,

the permit requires Goodyear to inspect the overflow sensor and test the alarm, which will shut off the pumps, once every quarter.

During 2006, a total of 7,660,553 gallons of groundwater were extracted and treated at the Wastewater Treatment Plant. This equates to a time-weighted average yield of 14.6 gpm. The pumps operated approximately 92% of the time. The downtime was because of the potential for combined sewer overflow and due to a lightning strike, which damaged the electrical system in July 2006.

The groundwater extraction system is removing contaminants from the on-property plume. The concentrations of contaminants in RW-1 have generally declined, however, the concentrations of contaminants in RW-2 have remained generally unchanged.

The off-property plume is being remediated through Monitored Natural Attenuation (MNA). During 2006, the groundwater was sampled twice for VOCs and once for natural attenuation indicator compounds. The VOC and geochemical data suggest that the off-property plume is naturally attenuating. The strongest evidence for attenuation by biological process is the declining TCE concentrations and the presence of degradation byproducts, including 1,2-DCE and vinyl chloride.

Site Inspection

The Site was inspected by EPA's Remedial Project Manager, Gloria M. Sosa, Richard Krauser (Hydrogeologist) and Charles Nace (Ecological Risk Assessor) on May 1, 2007. In attendance were Goodyear's Project Manager, Ron Clark, and Al Farrell from O'Brien & Gere, Engineers, Inc. The Site was inspected by representatives of NYSDEC on August 31, 2007.

The current condition of the cap is excellent. The condition of the remainder of the Site, including the Northern Aspect, Wooded Wetland, Wooded Lots and East Gill Creek, is also excellent.

Interviews

No interviews were conducted for this review.

VII. Technical Assessment

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

The soil/sediment remedies identified in the Record of Decision for OU2 (1998 and 1999) consisted of excavation, consolidation, and capping of soils, as well as capping sediments in the forested wetland. Based on the site visit and review of existing data, the remedy is functioning as intended.

The groundwater remedy consists of the extraction of contaminated groundwater from the on-property plume and the MNA of the off-property plume. Groundwater monitoring data indicate that the plume is stabilized and is not moving uncontrolled to areas where it could affect drinking-water supplies or the environment. The groundwater remedy also includes the implementation of a long-term groundwater monitoring program to assess whether the groundwater extraction system is functioning as designed and natural attenuation is occurring. Review of the groundwater monitoring data indicates that the groundwater remedy is functioning as designed. Hydraulic control of the on-property plume is being achieved through the operation of the extraction wells.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Protection of Human Health

There have been no changes in the physical conditions of the Site over the past five years that would change the protectiveness of the remedy. The site is located in an area zoned for commercial and light industrial land use. The remedy completed in 2003 involved excavation of contaminated site soil and sediments from East Gill Creek and the construction of a cap over the consolidated contaminated soil and sediment.

Soil

The soil exposure assumptions remain valid. The Forest Glen Subdivision Site Contaminants of Potential Concern included: VOCs, SVOCs and metals. The contaminants of concern at the site are: benzo(a)pyrene; vinyl chloride; aniline; phenyl isothiocyanate; diphenylamine; 2-mercaptobenzothiazole; 2-anilinobenzothiazole; perylene; n,n-diphenyl-1,4-benzenediamine; phenothiazine; and, benzothiazole. The implementation of the cap provides a barrier to potential exposures. The Site reuse plan ensures that the Site will be used in a manner that is protective of human health and the environment.

Groundwater

The groundwater exposure assumptions are still valid since the 1999 ROD. A municipal water system serves the City of Niagara Falls and the Town of Niagara. At the current time the groundwater at the site is not being used for drinking water purposes. All residents in the area are on public water supplies and are not being exposed to site contaminants through their drinking water. The potential for exposure through ingestion has been eliminated.

The Applicable or Relevant and Appropriate Requirements for groundwater cleanup include EPA's MCLs and New York State's groundwater quality standards.

Groundwater data were collected over the past five years for VOCs. The data were obtained from the 2006 Annual Report titled "Remedial Work Element 2 (Groundwater) Forest Glen Subdivision Site, Niagara Falls, New York". Review of the groundwater data indicate the NYS Class GA groundwater standards and the EPA MCLs were exceeded for several contaminants. Table 4 compares the maximum concentrations detected for a range of contaminants with the current NYS Class GA groundwater standards and the EPA MCLs where appropriate. The data comparison is provided for shallow and deep wells.

The ROD established the federal MCLs and NYSDEC Class GA groundwater standards as the cleanup criteria for contaminants of concern identified above. The toxicity values for several of the chemicals of concern in groundwater were modified over the past five years (e.g., 1,1-dichloroethene, vinyl chloride, 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, methylene chloride, trans-1,2-chloroethene, acetone, total xylenes, and benzene) and are being updated through the Integrated Risk Information System (IRIS), EPA's consensus toxicity system. Trichloroethylene is being re-evaluated through the IRIS program. The EPA MCLs and NYSDEC Class GA GW standards remain protective.

Soil Vapor Intrusion.

Soil vapor intrusion, based on groundwater concentrations, was also evaluated. The current building design includes a vapor mitigation system. The concentrations of several VOCs in groundwater wells MW-05S, MW-05D and MW-07DD suggest the need in the future, in the event that other portions of the property are developed with new buildings, for soil vapor intrusion to be evaluated further.

Overall, based on the past remedial actions, including the consolidation and capping of the wastes, contaminated soil and sediment, that prevent potential exposure, and ongoing groundwater monitoring at the site and use of public water supplies, the remedy remains protective under the commercial/light industrial scenario.

Protection of the Ecology

The ecological risk assessment for the site indicated that chemicals in the soil were present at concentrations that could result in impairment to ecological receptors at the site. Specifically the ROD indicated:

> "The potential risk to ecologic receptors at the site was assessed by comparing the estimated exposure levels with toxicity values. Aquatic, as well as terrestrial risks, were considered. Aquatic risks from East Gill Creek sediment and surface water were evaluated using the muskrat as a receptor. Terrestrial risks were evaluated using the short-tail shrew and the red-tail hawk.

Evaluation of the muskrat as an ecological receptor for chemicals from East Gill Creek sediment and surface water indicates the potential for both acute and chronic adverse effects. Aluminum and iron are the major contributors to these potential adverse effects. Chemicals in site soils also present the potential for adverse effects. For the short-tail shrew, an ecological receptor at the base of the food chain, the potential exists for both acute and chronic effects from exposure to contaminated soils in the Northern Aspect, Subdivision, Wooded Wetland and Edgewood Drive Wooded Lots. The primary contributor to this risk is lead, with chromium and copper as secondary contributors. For the red-tailed hawk, an ecological receptor at the top of the food chain, no acute adverse effects are expected from exposure to site soils, either from individual AOCs or from the entire site. However, the potential exists for chronic adverse effects for the red-tail hawk, primarily from copper. It is possible that some ecological COCs detected in on-site sediment and surface water are not related to site activities, but were transported from an upstream source. An example of this is that water flowing onto the site in East Gill Creek contains higher concentrations of compounds than water leaving the site. An investigation of such potential upstream sources of contamination, which may be impacting the site, is planned as part of the ongoing Supplemental RI/FS."

Given that the contaminated soils were excavated, consolidated and capped, and the wetland sediments were capped, the potential for exposure to ecological receptors has been eliminated. Since these actions have resulted in interrupting the exposure pathways for ecological receptors, the remedial action objectives used at the time of the remedy are still valid.

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

No. There is no new information that would call into question the protectiveness of the remedy. The land use remains commercial/light industrial and is expected to remain commercial/light industrial.

Technical Assessment Summary

Based upon the results of this third five-year review process, including a review of the Site data and the Site inspection, it has been concluded that the remedy is functioning as intended by the Site's decision documents. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern and there has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues, Recommendations and Follow-up Actions

This Site has ongoing operation, maintenance and monitoring activities as part of the selected remedy. As was anticipated by the decision documents, these activities are subject to routine

modification and adjustment. This report did not identify any issue or make any recommendation for the protection of human health and/or the environment which was not included or anticipated by the site decision documents.

IX. Protectiveness Statement

The remedy at the Forest Glen Subdivision Superfund Site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks, and none are expected as long as the engineered controls currently in place continue to be properly operated, monitored and maintained.

X. Next Review

The next Five-Year Review for the Site will be completed before September 2012, five years from the date of this review.

Approved:

William McCabe

George Pavlou, Director
Emergency and Remedial Response Division

9-26-07
Date

TABLE 1: CHRONOLOGY OF EVENTS	
ACTIVITY	**DATE**
Niagara County Health Dept soil-sample analysis detected phenolic resins	1980
Site referred to EPA	1987
EPA sampling detects volatile and semi-volatile organics & metals	1987-1988
ATSDR Pubic Health Advisory determined significant threat to human health for the residents of the subdivision.	July 1989
Temporary Relocation begins	August 1989
Site listed on the National Priorities List	November 1989
Focused Feasability Study and Proposed Plan	November 1989
Record of Decision for OU1 (Relocation)	December 1989
Permanent Relocation begins	June 1990
Final resident relocated from the Site	December 1992
EPA begins Remedial Investigation	June 1994
Feasability Study for Soil conducted	August 1997
First Five-Year Review conducted	September 1997
Proposed Plan for OU2 (Soil) Issued	October 1997
Record of Decision for OU2 (Soil) issued	March 1998

TABLE 1: CHRONOLOGY OF EVENTS	
ACTIVITY	**DATE**
Supplemental Groundwater Feasability Study conducted	June1998
Zoning changed from residential to commercial/light industrial	January1999
Proposed Plan for OU2 & OU3 (Soil & Groundwater) issued	April 1999
Record of Decision for OU2 & OU3 (Soil & Groundwater) issued	September 1999
Remedial Design for soil approved by EPA	July 2002
Remedial Action Work Plan approved by EPA	July 2002
Remedial Action begins	July 19, 2002
Second Five-Year Review conducted	September 2002
Remedial Design for groundwater approved by EPA	April 2003
Construction Completion	September 2003
Remedial Action Completion for Soil completed	September 2004
Third Five-Year Review conducted	September 2007

TABLE 3: LIST OF DOCUMENTS REVIEWED
1999 Record of Decision for OU2 & OU3 (Soil & Groundwater)
Second Five-Year Review
Remedial Action Report
O&M Manual
2004 Annual Groundwater Monitoring Report
2005 Annual Groundwater Monitoring Report
2006 Annual Groundwater Monitoring Report

TABLE 4. Comparison of Maximum Concentration to the EPA MCL and the NYS Class GA Groundwater Standards

Chemical	EPA MCL (mg/l)	NYSDEC Class GW Standard * (mg/l)	Maximum Concentration, Location & Date	Comparison Result
Shallow Well Samples				
1,1-Dichloroethane	NA	0.005	0.190 MW-05S 11/17/2004	Exceeds NYSDEC Class GW Standard
Vinyl Chloride	0.002	0.002	0.380 MW-05S 7/30/2003	Exceeds EPA MCL and NYSDEC Class GW Standard
1.1.1-Trichloroethane	0.200	0.005	0.148 MW-05S 9/7/2005	Exceeds NYSDEC Class GW Standard
1,1-dichloroethene	0.007	0.005	0.021 MW-05S 11/17/2004	Exceeds EPA MCL and NYSDEC Class GW Standard
cis-1,2-dichloroethene	0.070	0.005	2.100 MW-05S 4/20/2005	Exceeds EPA MCL and NYSDEC Class GW Standard
Methylene chloride	0.005	0.005	0.060 MW-05S 5/19/2004	Exceeds EPA MCL and NYSDEC Class GW Standard
Trans-1,2 dichloroethene	0.100	0.005	0.018 MW-05S 9/7/2005	Exceeds NYSDEC Class GW Standard
Trichloroethylene	0.005	0.005	0.294 MW-05S 9/7/2005	Exceeds EPA MCL and NYSDEC Class GW Standard
Acetone	NA	0.050	0.101 MW-05S 9/7/2005	Exceeds NYSDEC Class GW Standard

* values from HTTP://www.dec.ny.gov/regs/4590.html

TABLE 4. continued	**Comparison of Maximum Concentration to the EPA MCL and the NYS Class GA Groundwater Standards**			
Chemical	EPA MCL (mg/l)	NYSDEC Class GW Standard * (mg/l)	Maximum Concentration, Location & Date	Comparison Result
Deep Well Samples				
1,1-Dichloroethane	NA	0.005	0.031 MW-05D 2/25/2002	Exceeds NYSDEC Class GW Standard
Vinyl Chloride	0.002	0.002	0.380 MW-07D 5/16/2002	Exceeds EPA MCL and NYSDEC Class GW Standard
1.1.1-Trichloroethane	0.002	0.005	0.027 MW-06DD 9/6/2005	Exceeds EPA MCL and NYSDEC Class GW Standard
cis-1,2-dichloroethene	0.070	0.005	0.046 MW-06D 11/15/2005	Exceeds NYSDEC Class GW Standard
Total Xylenes	10	0.005	0.005 MW-07DD 2/4/2004	Exceeds NYSDEC Class GW Standard
Benzene	0.005	0.001	0.00123 MW-07DD 11/16/2005	Exceeds NYSDEC Class GW Standard

* values from HTTP://www.dec.ny.gov/regs/4590.html

TABLE 2: ANNUAL OPERATION & MAINTENANCE COSTS	
Sampling and Analysis	$300,000
Site Operation/Inspection/Maintenance	$1,200,000
Total Estimated Annual Monitoring Costs	$1,500,000