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SECOND FIVE-YEAR REVIEW REPORT FOR BYRON BARREL & DRUM SUPERFUND SITE GENESEE COUNTY, BYRON TOWNSHIP, NEW YORK

Prepared by:
United States Environmental Protection Agency
Region 2
New York, New York

September 2012

Walter E. Mugdan, Director
Emergency and Remedial Response Division

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Date

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FIGURE

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ACRONYMS USED IN THIS DOCUMENT

ARAR	Applicable or Relevant and Appropriate Requirement
EVO	Emulsified Vegetable Oil
EPA	United States Environmental Protection Agency
MCLs	Maximum Contaminant Levels
µg/l	micrograms per liter
mg/kg	milligrams per kilogram
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation & Maintenance
PRP	Potentially Responsible Party
RD	Remedial Design
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
TAGM	Technical and Administrative Guidance Memorandum
UAO	Unilateral Administrative Order
VOCs	Volatile Organic Compounds
WQSGV	Water Quality Standards and Guidance Values

EXECUTIVE SUMMARY

This is the second five-year review for the Byron Barrel & Drum Superfund site, located in the Town of Byron, Genesee County, New York. The injection of emulsified vegetable oil into the groundwater as part of a treatability study to evaluate means to facilitate the bioremediation of the contaminants in the groundwater has interfered with the groundwater sample preparation at the laboratory. As a result, many of the aqueous samples needed sample dilution before the analyses could be run. As a consequence of the dilution, the analytical detection limits for contaminants of concern were often higher than their respective groundwater quality standards. Injections need to be suspended and samples that are not impacted by the injection compound need to be collected. In addition, a full capture analysis cannot be performed due to insufficient data and additional monitoring wells downgradient and east of the trench are necessary. A protectiveness determination for this site cannot be made until this information is obtained. It is anticipated that these actions will take eighteen months to complete, at which time a protectiveness determination will be made.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Byron Barrel & Drum Superfund Site		
EPA ID: NYD980780670		
Region: 2	**State:** NY	**City/County:** Town of Byron/ Genesee County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): George Jacob
Author affiliation: USEPA
Review period: 09/24/2007 – 09/4/2012
Date of site inspection: 05/08/2012
Type of review: Policy
Review number: 2
Triggering action date: 09/24/2007
Due date *(five years after triggering action date)*: 09/24/2012

Issues/Recommendations

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

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 01	Issue Category: Remedy Performance			
	Issue: A full capture analysis cannot be performed due to insufficient data.			
	Recommendation: Additional monitoring wells downgradient and east of the trench need to be installed and sampled.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	12/31/13

OU(s): 01	Issue Category: Monitoring			
	Issue: Emulsified vegetable oil was injected into the groundwater as part of a treatability study to evaluate means to facilitate the bioremediation of the contaminants in the groundwater. While it is possible that the injections have resulted in the groundwater reaching standards, this cannot be confirmed. In the monitoring wells most affected by the amendment injections, many of the aqueous samples needed sample dilution before the analyses could be run. As a consequence of the dilution, the analytical detection reported limits for contaminants of concern were often higher than their respective required groundwater quality standards.			
	Recommendation: Injections should be suspended and samples that are not impacted by the injection compound need to be collected over two consecutive quarters. If the injections have not resulted in the groundwater achieving water quality standards, an alternative treatment technology needs to be selected.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	12/31/13

OU(s): 01	Issue Category: Institutional Controls
	Issue: Institutional controls related to prohibiting the residential use of this property, the installation of groundwater wells for drinking or irrigation until groundwater standards are achieved, and evaluating the vapor intrusion pathway for new construction overlying the groundwater contaminant plume are needed.
	Recommendation: Implement institutional controls

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	09/30/13

Protectiveness Statement(s)

Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
01	Protectiveness Deferred	03/31/14

Protectiveness Statement:

A protectiveness determination for this site cannot be made until additional information is obtained. It is expected that a report addendum containing a protectiveness statement will be issued within eighteen months of the date of this report.

Sitewide Protectiveness Statement (if applicable)

For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.

Protectiveness Determination:	*Addendum Due Date (if applicable):*
Protectiveness Deferred	*03/31/14*

Protectiveness Statement:

A protectiveness determination for this site cannot be made until additional information is obtained. It is expected that a report addendum containing a protectiveness statement will be issued within eighteen months of the date of this report.

I. Introduction

This five-year review for the Byron Barrel & Drum site, located in the Town of Byron, Genesee County, New York, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM) George Jacob. The review 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 five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the site decision documents. This report will become part of the site file.

This is the second five-year review for the Byron Barrel & Drum Superfund site. The trigger for this five-year review is the signature date of the first five-year review report, which was September 24, 2007. The first five-year review was triggered by the signature of the Preliminary Close-Out Report, because upon completion of the remedial actions, hazardous substances, pollutants, or contaminants will not remain on-site above levels that will allow for unlimited use and unrestricted exposure, but will take more than five years to complete.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery to the present.

III. Background

The Byron Barrel and Drum site is located on Transit Road in Byron Township, Genesee County, New York. See Figure 1 for a site plan. The site is set back approximately 1,000 feet from east side of Transit Road. The major roadways in this area include Route 98 and Route 24.

Physical Characteristics

The site occupies approximately 2 acres of an 8-acre parcel that was used as a salvage yard for heavy construction equipment. Heavily-wooded areas and farmland border the site.

A large, metal former maintenance building is located in the northern portion of the property, an unoccupied (abandoned) house (the property owner's former residence) is located to the west, and a large metal building is located to the southwest. All three structures may not be structurally sound.

The closest body of water is Oak Orchard Creek, which is located within a one-half mile of the site. A small storm water drainage ditch, which flows to the creek, runs along the northern property boundary of the site.

The access road entry area is fenced and gated.

Site Geology/Hydrogeology

The site's geology consists of a surface overburden of drained highly organic (muck) soil (now developed as onion fields) with incorporated sand and silt, which averages 20 feet in thickness. The soil was developed from a Pleistocene age former glacial lake bottom. A glacial esker occurs over the soil at the southern part of the site. The esker was formed by the filling of a meltwater channel at the bottom of the retreating glacier, by sand, gravel and boulders derived from the glacier. It is the site of the local gravel pit. The lake developed during glacial retreat on top of a compact, dense and impermeable glacial till, which averages 65 feet in thickness. The till, consisting of a poorly sorted sandy, silty clay, with some coarser debris, was deposited on bedrock. This highly impermeable till averages about 50 feet thick. The bedrock is an argillaceous (clayey) limestone, with some intermittent dolostone (high magnesium limestone) of Silurian age. The bedrock has an undulating surface, slight fracturing, and no visible porosity. The fractures are infilled with calcium carbonate.

Site monitoring wells have been drilled into the relatively impervious till and bedrock and screened within the shallower sand, gravel and silt deposits of the old glacial lake bottom. The water table, encountered at as shallow as 4 feet below ground surface, varies from 11 to 18 feet in thickness. The property around the site is artificially drained in order to support farming. Surface water at the site flows away from the esker and discharges into the Oak Orchard Creek via swales and ditches approximately 1,000 feet to the west of the site. The groundwater flow direction is north-northwest. There is no evidence of a perched water table. The groundwater velocity in the overburden ranges from 1.40 to 266 feet per year. The till and bedrock are both relatively impervious and, therefore, act as aquicludes (aquitards).

Land and Resource Use

The site is abutted by heavily wooded areas and is directly adjacent to an active vegetable farm. The agricultural land originated from swamp deposits and is locally referred to a "muckland." This land has been classified as prime agricultural land by the State of New York.

With respect to water use, groundwater is used as a potable water source by local residents and as a source of irrigation water by farmers.

History of Contamination

The site which, at the time, was being used as a salvage yard for heavy construction equipment, was discovered in early July 1982, when an unidentified individual reported the disposal of "approximately 400 55-gallon steel barrels that were filled with noxious-smelling chemicals" to the New York State Police Major Crimes Unit. As a result of this report, a police investigation was initiated. A helicopter flight over the area revealed the presence of a number of drums on the property. Further investigation revealed that Darrell Freeman, Jr., who owned the property, did not possess a permit

from either the New York State Department of Environmental Conservation (NYSDEC) or EPA for the storage or disposal of hazardous waste.

As a result of the investigation, a search warrant was issued. Two drum storage areas were located. The first area contained 121 barrels and the second area contained 98 barrels. NYSDEC representatives obtained 11 drum waste samples during the search.

In late July 1982, various parties were interviewed regarding waste disposal activities at the site. A former employee of Mr. Freeman reported that he first noted approximately 80 drums on the Freeman property in spring 1978. These drums were located off the east side of the dirt road that runs through the Freeman property. The source further indicated that two more shipments of drums arrived at the site in summer 1979. These drums were unloaded and deposited at a site off to the west side of the dirt road behind a small clump of trees. These drum storage locations correspond to those identified during the police search. The source further reported that a fourth load of drums arrived sometime that summer. He did not witness their arrival, but noted that they were piled in front of two cement trucks in an area just south of the second disposal site. The source also indicated that sometime in fall 1980, Mr. Freeman instructed him to go to the site of the fourth load of barrels and bury them. Apparently, Mr. Freeman instructed this individual to rip the drums open with a backhoe and bury them and mix them in with the dirt.

Initial Response

Wehran Engineering and Camp Dresser & McKee submitted a preliminary investigation report to NYSDEC in September 1983.

In August 1984, in response to a request from NYSDEC, EPA removed 219 drums and approximately 40 cubic yards of contaminated soil and debris from the site for off-site disposal.

On June 10, 1986, the Byron Barrel and Drum site was placed on the Superfund National Priorities List.

In 1987, EPA's contractor, Ebasco Services, Inc., commenced a remedial investigation and feasibility study (RI/FS). The RI/FS revealed three areas of concern at the site—Source Area 1, a former drum storage and waste disposal area; Source Area 2, a solvent disposal area and maintenance building; and Source Area 3, a shallow ravine containing construction debris and fill material.

Basis for Taking Action

The RI detected volatile organic compounds (VOCs) in the soils in Source Areas 1 and 2. Chromium and lead were detected in a few surface soil samples from Source Area 3 (organic contamination was not detected in this area) and no groundwater impacts were observed. Groundwater underlying Source Areas 1 and 2 was contaminated with VOCs. Hydrogeologic and groundwater quality investigations determined that VOC-impacted groundwater had not migrated to or impacted area drinking water supply wells. The risk assessment concluded that surficial soils contamination posed a minimal risk to human

receptors. Also, groundwater, based on residential use, posed an unacceptable risk if developed for potable use.

Oak Orchard Creek was also evaluated during the RI. It was noted that the aquatic ecosystem appeared healthy (based on visual observations), no stressed flora or fauna were noted. It was concluded that no unacceptable ecological risks were present at the site.

IV. Remedial Actions

Remedy Selection

In 1989, based upon the results of the RI/FS, EPA selected a remedy for the site, which was documented in a Record of Decision (ROD). The following remedial action objectives were established for the site:

- Ensure protection of groundwater and surface water from the continued release of contaminants from soils.
- Restore groundwater to levels consistent with state and federal standards.

The selected remedy included:

- Dismantling, and decontamination, if necessary, of the maintenance building, with disposal of the debris off-site.[1]
- Extraction and treatment of groundwater, via precipitation, sedimentation, and filtration to remove the heavy metals, and air stripping and carbon adsorption to remove volatile organics underlying the site.
- Reinjection of treated groundwater to the aquifer and, if necessary, discharge of excess treated water to the closest surface water body.
- Further evaluation of elevated surface soil inorganic concentration in Source Area 3, where organic contamination is not present, to determine its ultimate disposition.
- Disposal of the groundwater treatment residuals at an off-site RCRA Subtitle C disposal facility.
- Appropriate environmental monitoring, including monitoring of residential wells, to ensure the effectiveness of the remedy.

The remedy also included institutional controls[2].

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[1] Because it was believed that contaminated soil extended beneath the maintenance building, the ROD called for the dismantling and decontamination of the building, if necessary.

[2] The ROD called for the imposition of deed restrictions to prevent excavation in areas of subsurface soil contamination. The 1996 Consent Decree between EPA and the Potentially Responsible Parties (PRPs) related to the performance of the design and implementation of the selected remedy incorporated institutional controls to protect the integrity of the remedy and to prevent the use of contaminated groundwater for drinking or irrigation until cleanup levels have been met.

Remedy Implementation

In 1990, EPA issued a Unilateral Administrative Order (UAO) to a group of PRPs that EPA had been able to identify, for the performance of the design and construction of the selected remedy (the UAO was superseded by a Consent Decree in 1996).

Post-RI/FS groundwater quality data indicated a downward trend of VOC concentrations in Source Area 1. Specifically, TCE decreased from 3,300 micrograms per liter (µg/l) to 7 µg/l and trichloroethane (TCA) decreased from 860 µg/l to 57 µg/l (the cleanup levels specified in the ROD for TCE and TCA are 5 µg/l and 50 µg/l, respectively). It is believed that the levels of contamination diminished in the groundwater as a result of the removal of the source of the groundwater contamination (*i.e.*, the drums and contaminated soil and debris) in combination with natural attenuation (dilution, dispersion, and degradation) of the VOC contamination in the groundwater.

The Source Area 3 investigation called for in the ROD consisted of the collection and analysis of 64 soil samples. The results of this investigation showed that the mean chromium and lead concentrations in this area were below the lesser of the ROD cleanup objectives or the New York State's soil Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM) objectives[3] for these constituents and that there was no significant difference between total chromium and lead concentrations in Source Area 3 soils and background soils[4].

Since the results of the above investigations indicated that the contaminant concentrations in the groundwater in Source Area 1 were only marginally above the cleanup levels specified in the ROD and that the levels of inorganic contaminants in the surface soil in Source Area 3 were consistent with background concentrations, it was concluded that further action in these two areas was not warranted. The contamination in Source Area 2, however, still required remediation. Therefore, it was decided to proceed with the remedy selected for Source Area 2, namely, in-situ soil flushing, and long-term monitoring. Based upon a pre-design investigation which evaluated the characteristics of the contaminated soil, it was determined that the treated water would not be able to properly percolate through the surface soil. Therefore, to enhance the

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[3] *Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels*, Division of Hazardous Waste Remediation, January 24, 1994.

Since no federal or state Applicable or Relevant and Appropriate Requirements (ARARs) existed for soil at the time that the ROD was signed, the action levels for the organic and inorganic contaminants in the soil were determined through a site-specific analysis. This analysis used fate and transport modeling to determine levels to which contaminants in soils should be reduced in order to ensure no leaching of contaminants to groundwater above Maximum Contaminant Levels (MCLs). Subsequently, NYSDEC developed soil TAGM objectives. TAGM objectives are the more stringent cleanup level between a human-health protection value and a value based on protection of groundwater as specified in the TAGM. Since TAGM objectives were available when the Source Area 3 investigation was performed, TAGM objectives were used to assess the soils in this area.

[4] The mean hexavalent chromium concentration was 1.39 milligrams per kilogram (mg/kg) and the mean lead concentration was 15.71 mg/kg, while the soil cleanup objectives are 50 mg/kg and 400 mg/kg, respectively.

ability of the treated groundwater to infiltrate and flush the contaminated soil, the remedial design (RD) called for the excavation of several feet of contaminated soil and the construction of an infiltration gallery, consisting of perforated pipe and gravel. The findings related to Source Areas 1 and 3 and the modification to the remedy for Source Area 2 were documented in an August 2000 Explanation of Significant Differences. The RD, prepared by Blasland, Bouck, & Lee, Inc., on behalf of the PRPs, was completed in June 2000. In August 2000, a contract was awarded by the PRP Group to ERM C & O Services (presently, ECOR Solutions, Inc.) for the implementation of the remedy.

Soil Excavation

On June 11, 2001, equipment and personnel were mobilized to the site. Following the clearing of vegetation and the construction of an access road, approximately, 500 cubic yards of contaminated soil (approximately an area of 2,555 square feet to a depth of 5 feet) were excavated for the construction of the infiltration gallery. The excavated soil was stockpiled for testing; the analysis of this soil indicated that it met the TAGM objectives. Therefore, the soil was used as fill above the infiltration gallery.

Because it was believed that contaminated soil extended beneath the on-site maintenance building in Source Area 2, the ROD called for the dismantling and decontamination, if necessary, of the building, with the disposal of the debris off-site. Since the post-excavation side wall sampling in the vicinity of the maintenance building indicated that the soil contamination did not extend beneath the building, the building was not dismantled. The building was, however, decontaminated (see below).

Building Decontamination

The maintenance building was decontaminated in November 2001 by ECOR Solutions, Inc. The decontamination activities included the removal and off-site disposal of approximately 200 individual containers of paint, thinners, solvents, and other paint-related material followed by the spray washing of the building. In total, 5 cubic yard boxes of paint waste, 3 drums of rinse water, and 5 drums of hazardous waste were transported by Hazmat Environmental Group, Inc. to Ensco, an approved treatment, storage, and disposal facility located in Arizona.

Infiltration Gallery

Approximately 200 linear feet of 2-inch slotted PVC pipes were installed at the bottom of the excavation described in the "Remedy Implementation" section, above. The pipes were wrapped in a geomembrane covering (to filter out soil particles) and placed in a 1-foot thick gravel bed. The excavation was then backfilled with the previously-excavated soils.

Groundwater Extraction Well Installation

During the performance of design investigation work in 1999, one groundwater recovery well was installed for a pump test. This well was converted to an extraction well and two additional extraction wells were installed. All three wells are screened at 25 feet below grade. Submersible pumps rated at 3 – 10 gallons per minute (gpm) at 210 to 70 feet of head were installed in all three wells. The average groundwater extraction rate is 20 gpm.

Groundwater Treatment System Installation

The groundwater treatment system includes a bag filter which removes solids greater than 50 microns. After the bag filter, the groundwater is routed through a low-profile air stripping unit (150 standard cubic feet per minute), which removes the VOCs from the groundwater. Following air stripping, the groundwater can be directed either to surface water or to a combination of surface water and the infiltration gallery for in-situ flushing of the unsaturated soils. Discharges to Oak Orchard Creek and the infiltration gallery must meet New York State Pollutant Discharge Elimination System requirements.

The construction of the groundwater treatment system was completed on July 15, 2001. An interim remedial action (RA) report for the groundwater remedy was approved on September 30, 2002.

To date, more than 20 million gallons of groundwater have been treated and approximately 35.5 pounds of dissolved-phase total VOCs have been recovered.

Soil Flushing

During its operation, approximately 1 gpm of treated groundwater was discharged through the infiltration gallery to flush the contaminants from the unsaturated zone soils. The reminder of the treated groundwater (approximately 19 gpm) was discharged to Oak Orchard Creek.

On August 14, 2002, soil samples were collected from the area undergoing soil flushing. The analytical results from the soil sampling indicated that the soil has achieved the lesser of the ROD's cleanup objectives or the TAGM objectives[5]. At that time, soil flushing through the Infiltration ceased and all of the treated groundwater was discharged to surface water. On September 30, 2002, an RA report for the soil was approved.

Institutional Controls Implementation

The ROD called for the imposition of deed restrictions to prevent excavation in areas of subsurface soil contamination. The 1996 Consent Decree incorporated institutional controls to protect the integrity of the remedy and to prevent the use of contaminated groundwater for drinking or irrigation until cleanup levels have been met.

Since the contaminated soils were remediated to levels that protect human health and the groundwater, they are suitable for unlimited use and unrestricted exposure; the soil-related deed restrictions called for in the ROD are no longer needed.

Attempts to effect deed restrictions to prohibit the residential use of this property and the installation of groundwater wells for drinking or irrigation until groundwater standards are achieved have not been successful. In 2001, ECOR Solutions, Inc. contacted the Town of Byron tax assessor's office to determine the ownership of the property so as to effect the necessary deed restrictions. The property's last known owner resided in Florida and

[5] Since TAGM objectives were available when the Source Area 2 soil sampling was performed, TAGM objectives were used to assess these soils.

had not paid taxes on the property for years. While possession of the property could be assumed by the County, due to the property's status as a Superfund site, the property ownership remains "undetermined." Since it was not feasible to expect that the site owner would be located or, if located, that he would cooperate in imposing institutional controls against the property[6], institutional controls were never implemented. These institutional controls are, however, still needed. Since it does not appear likely that a deed restriction with the property owner can be effected, EPA has determined that a notice to successors-in-title to be filed with the County Clerk would provide adequate protection[7]. The wording for this notice needs to be prepared by the PRPs, approved by EPA, and filed with the County Clerk.

Operation and Maintenance

The Operation and Maintenance (O&M) Manual for the site contains the procedures for operating, inspecting, and evaluating the groundwater extraction and treatment system along with the long-term monitoring of groundwater. Repairs are to be made, as necessary, to control the effect of any event that might interfere with the performance of the remedy.

Scheduled O&M activities include weekly overall site inspections and groundwater extraction, treatment (checking the bag filter for solids loading, gauging air flow through the stripper, and noting flow rates and totalized flow), and reinjection system inspections. Preventive maintenance items include monthly inspections of the air stripper blower and the air stripper trays for sediment and mineral deposits. The trays are cleaned on a quarterly basis as a preventative maintenance and system operation performance item.

Groundwater levels are measured on a quarterly basis at four on-site monitoring wells (MW- 10B, , PW-1, PW-2, and PW-3), three off-site monitoring wells (MW-1, MW-4 and MW-21), and at a water supply well associated with the abandoned residence on the property to determine the direction of groundwater flow. With the exception of side-gradient monitoring well MW-21 and the well located on the abandoned residence which are sampled on a yearly basis, groundwater quality monitoring is performed quarterly.

From 2001 to 2007[8], the groundwater extraction system removed approximately 20.5

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[6] The site owner failed to comply with a unilateral administrative order issued to him, a transporter, and two generators in 1991, requiring the performance of the RD/RA at the site. The site owner failed to provide access to the site in order to implement the RD/RA, so EPA sought and obtained access by court order. The site owner failed to reimburse EPA's response costs and failed to perform pursuant to an administrative order, so EPA sought and obtained a federal court judgment for CERCLA costs and for penalties, which judgment has remained unsatisfied since 1997.

[7] In addition to prohibiting the residential use of this property and the installation of groundwater wells for drinking or irrigation until groundwater standards are achieved, the notice to successors-in-title will also include a provision requiring the evaluation of the vapor intrusion pathway for new construction overlying the groundwater contaminant plume.

[8] In 2007, after groundwater concentrations had reached asymptotic levels, the groundwater extraction and treatment system was "temporarily" shut down to allow for the performance of a treatability study—the injection of emulsified vegetable oil (EVO)—in an attempt to facilitate

million gallons of groundwater and the treatment system removed approximately 38.0 pounds of dissolved-phase VOCs.

The inspections, maintenance, sampling, monitoring, data evaluation and reporting costs are approximately $65,000 on an annual basis; these costs are broken down in Table 2 (attached).

V. Progress Since Last Five-Year Review

The first five-year review, completed in 2007, concluded that the implemented actions at the site protect human health and the environment. While institutional controls for the groundwater have not been implemented the periodic presence of remediation personnel make it unlikely that the residential use of the property or the installation of groundwater wells for drinking or irrigation would go undetected. Therefore, the protection of public health is being achieved. Currently, there are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the engineered and access controls that are currently in place continue to be properly operated, monitored, and maintained. The groundwater is not currently being utilized at the site nor is it anticipated that groundwater will be used until groundwater standards are achieved.

In 2007, after groundwater concentrations had reached asymptotic levels, the groundwater extraction and treatment system was temporarily shut down to allow the performance of a treatability study to assess the viability of using bioremediation to address the contaminants in the groundwater. The groundwater extraction system remained off through a second amendment injection in November 2009 and has remained off to evaluate the results of the injections.

As noted above, attempts to implement institutional controls on the property continue to be unsuccessful. Implementation of the controls is currently being pursued through a notice to successors-in-title.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of George Jacob (RPM), Roberta McIntyre (hydrogeologist), and Charles Nace (ecological and human health risk assessor).

Community Involvement

The EPA Community Involvement Coordinator for the site, Michael Basile, published a notice in the *Batavia Daily News,* a local newspaper, on Friday April 06, 2012, notifying the community of the initiation of the second five-year review process. The notice indicated that EPA would be conducting a five-year review of the site to ensure that the site is protective of public health and the environment and that the implemented components of the remedy are functioning as designed. It also indicated that once the

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the bioremediation of the contaminants in the groundwater. The system has not been turned back on.

five-year review is completed, the results will be made available in the local site repository. In addition, the notice included the RPM's address and telephone number for questions related to the five-year review process or the site.

Document Review

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

Data Review

Based upon a review of groundwater levels at four on-site monitoring wells, three off-site monitoring wells, and the water supply well associated with the abandoned residence on the property, it has been concluded that, under non-pumping conditions, groundwater flows to the north-northwest toward Oak Orchard Creek.

A full capture analysis cannot be performed due to insufficient data. Additional monitoring wells downgradient and east of the drainage ditch (east of MW-1 and MW-4) need to be installed and sampled.

Based on the comparison of groundwater data from September 2007 through March 2012, there appears to be a reduction in groundwater contamination; however, since the EVO compound which was used for the injections interfered with the analytical instruments in the laboratory, the samples had to be diluted and higher detection limits had to be used. This resulted in the data being reported with detection limits that are above the groundwater quality standards, restricting the evaluation of off-site migration and remedy performance at this time.

The injections should be suspended and samples that are not impacted by the injection compound need to be collected over two consecutive quarters. If the injections have not resulted in the groundwater achieving water quality standards, an alternative technology needs to be selected.

Site Inspection

On May 8, 2012, a five-year review-related site inspection was conducted by George Jacob, Roberta McIntyre, and Charles Nace of EPA, John Grathwol, NYSDEC project manager; Terry Etter, Unysis (PRP); Karin Klock, Garlock (PRP); Bill Stephens (PRP Attorney); and Matt Lapp (PRPs' contractor).

The inspection of the site revealed that three monitoring wells were missing locks. In addition, the entry gate lock was inoperable and the gates were open. These deficiencies were subsequently rectified by the PRPs.

Interviews

No interviews were conducted during the review period.

Institutional Controls Verification

As was noted above, since the contaminated soils have been remediated, the soil-related deed restrictions called for in the ROD are no longer needed. Institutional controls to protect the integrity of the remedy and to prohibit the residential use of this property and the installation of groundwater wells for drinking or irrigation until groundwater standards are achieved are not in place. Since it does not appear likely that a deed restriction or an environmental easement with the property owner can be effected, EPA has determined that a notice to successors-in-title to be filed with the County Clerk would be adequate protection. The wording for this notice needs to be prepared by the PRPs, approved by EPA, and filed with the County Clerk.

Other Comments on Operation, Maintenance, Monitoring and Institutional Controls

Table 4 (attached) presents comments and observations and offers suggestions to resolve them.

VII. Technical Assessment

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

The remedy identified in the ROD consisted of on-site extraction and treatment of groundwater with on-site reinjection, combined with on-site soil washing. The soil washing was terminated prior to the 2007 five-year review since the soil cleanup objectives were achieved. The on-site groundwater extraction and treatment system has been temporarily suspended while a pilot study involving in-situ injection of EVO is being conducted. The groundwater is being monitored during the pilot study to determine the effectiveness of the injections. Based on the groundwater data collected from September 2007 through March 2012, there appears to be a reduction in groundwater contamination. However, since the EVO compound which was used for the injections interfered with the analytical instruments in the laboratory, the samples had to be diluted and higher detection limits had to be used. This resulted in the data being reported with detection limits that are above the groundwater quality standards, restricting the evaluation of off-site migration and remedy performance at this time.

So that groundwater data can be properly analyzed, injections should be suspended and samples that are not impacted by the injection compound need to be collected.

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

The exposure assumptions and toxicity data were reviewed as part of this five-year review and they remain valid at this time.

Vapor intrusion was also evaluated during the previous five-year review. Given that there are VOCs present in the groundwater, an analysis was performed as part of that review to determine if the vapor intrusion pathway is currently a completed pathway. Although there are structures present on the property, they are all currently vacant and do not appear to be structurally sound. Since there are no current receptors and it does not

appear that there will be in the near future, the vapor intrusion pathway is not currently complete. Therefore, at this time, vapor intrusion is not an issue at this site. If the structures were to be occupied in the future, a more thorough evaluation would need to be completed to ensure that the vapor intrusion pathway is not a potential problem.

Since federal or state soil ARARs did not exist at the time that the ROD was signed, the action levels for the contaminants in the soil were determined through a site-specific analysis. Since TAGM objectives were available when the Source Area 2 post-remediation soil sampling was performed in 2002, TAGM objectives were used to assess these soils. Based upon the sample results, it was concluded that the soil had achieved the TAGM objectives. In December 2006, soil cleanup objectives were established pursuant to 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6. Based upon a comparison of the contaminant concentrations remaining in the soil at Source Area 2 with the Part 375 soil cleanup objectives for unrestricted residential use, it was concluded that the soil concentrations had been met.

The groundwater cleanup standards are federal and state MCLs. Since they have not changed since the last five-year review, they are still valid.

Based upon a review of the past and current data, combined with the site visit, the previous conclusion that there are no completed exposure pathways for ecological receptors is still valid.

The remedial actions objectives used at the time of the remedy selection are still valid.

The groundwater at the site is not currently being used as a drinking water source, there are no surface water discharges, and there are currently no completed exposure pathways at the site. In addition, private and agricultural wells are not impacted.

***Question C**: Has other information come to light which could affect protectiveness of remedy?*

A pilot study involving in-situ injection of EVO is being conducted. The groundwater is being monitored during the pilot study to determine the effectiveness of the injections. The compound which was used for the injections interfered with the analytical instruments in the laboratory. This resulted in the data being reported with detection limits that are above the groundwater quality standards, restricting the evaluation of off-site migration and remedy performance at this time.

Technical Assessment Summary

Based upon the results of the second five-year review, it has been concluded that:

- There is no evidence of trespassing or vandalism.
- A full capture analysis cannot be performed due to insufficient data. Additional monitoring wells downgradient and east of the trench need to be installed and sampled.
- The compound which was used for the pilot study injections interfered with the analytical instruments in the laboratory, resulting in the data being reported with detection limits that are above the groundwater quality standards (restricting the evaluation of off-site migration and remedy performance at this time). Injections

should be suspended and samples that are not impacted by the injection compound need to be collected over two consecutive quarters. If the injections have not resulted in the groundwater achieving water quality standards, an alternative technology needs to be selected.

VIII. Recommendations and Follow-Up Actions

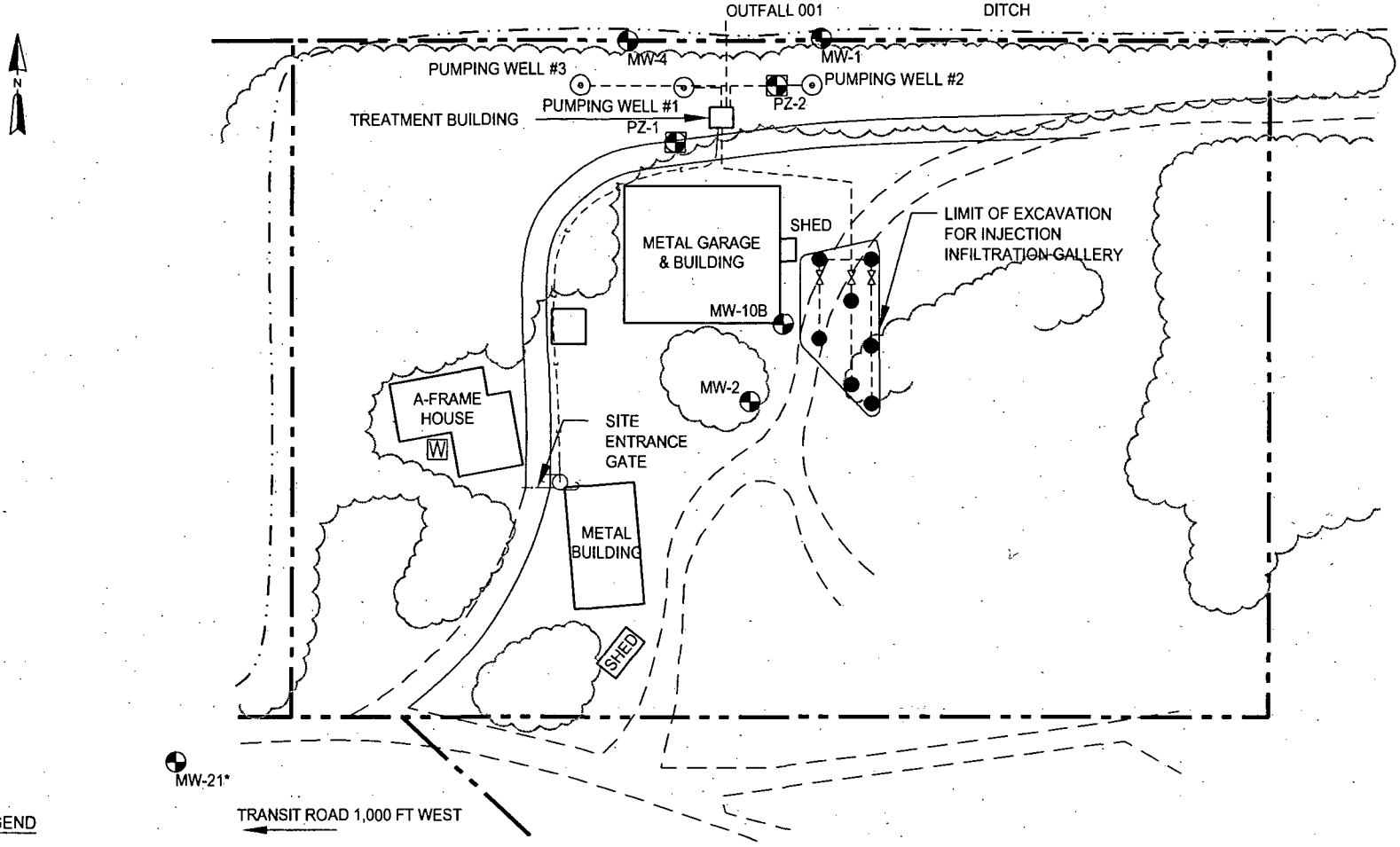
Table 5 (attached) summarizes recommendations and follow-up action stemming from this five-year review.

IX. Protectiveness Statement

A protectiveness determination for this site cannot be made until additional information is obtained. It is expected that a report addendum containing a protectiveness statement will be issued within eighteen months of the date of this report.

X. Next Review

The next five-year review for the Byron Barrel and Drum site should be completed within five years of the date of this review.



LEGEND

- MONITORING WELL
- FORMER RESIDENTIAL WELL
- PIEZOMETER WELL
- INJECTION GALLERY PIEZOMETER WELL
- INJECTION GALLERY VALVE
- PUMPING WELL
- UTILITY POLE
- PROPERTY LINE
- FENCE
- TREELINE
- NEW GRAVEL ROAD
- PRE-EXISTING GRAVEL ROAD
- DITCH
- ELECTRIC & PHONE LINE
- REINJECTION PIPIING

*NOTE: MW-21 IS 200 FEET WEST OF PROPERTY LINE

SOURCE: ERM C&O SERVICES

SITE PLAN

BYRON BARREL AND DRUM
AREA 2 SITE
BYRON, NY

Sustainable Resources Group, Inc.
440 Creamery Way, Suite 150, Exton, PA 19341

SCALE IN FEET	DATE	FIGURE
0 — 80	07-25-06	1

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Table 1: Chronology of Site Events

Event	Date(s)
Discovery of drum disposal locations	1982
EPA Removal Action	1984
Site placed on National Priorities List	1986
Remedial Investigation/Feasibility Study Performed	1986-1987
Record of Decision (ROD) signed	1989
Unilateral Administrative Order issued to potentially responsible parties by EPA	1990
Consent Decree supersedes Unilateral Administrative Order	1996
Remedial Design	1990-2000
Explanation of Significant Differences	2000
Groundwater Remedial Action commences	2000
Soil Remedial Action	2000-2002
Preliminary Close-Out Report	2002
First Five- Year Review Report	2007
Pilot Testing	2008-present

Table 2: Annual Operation, Maintenance, & Monitoring Costs

Sampling and Analysis (including reporting)	$60,000
Site Operation/Inspection/Maintenance	$5,000
Total Estimated Annual OM&M Costs	$65,000

Table 3: Documents, Data, and Information Reviewed in Completing the 2nd Five-Year Review

Document Title (Author)	Submittal Date
Remedial Investigation/Feasibility Study, Ebasco Services, Inc.	1987
Record of Decision, EPA	1989
Final Design Report, Blasland, Bouck, & Lee, Inc.	2000
Operation and Maintenance Monitoring Manual, ECOR Solutions, Inc.	2001
Preliminary Close-Out Report, EPA	2002
Annual Monitoring Reports	2007-2011
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD	

Table 4: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

Comment	Suggestion
The three structures located on the property may not be structurally sound and may present a physical hazard to trespassers or remedial site workers.	It may be prudent to evaluate the integrity of the structures and determine whether they should be demolished.
At the time of the inspection, three monitoring wells were missing locks. In addition, the entry gate lock was inoperable and the gates were open. These deficiencies were subsequently rectified by the PRPs.	The integrity of the monitoring wells and the gates and its lock need to be maintained.
New York State now requires annual certifications that institutional controls that are required by RODs are in place and that remedy-related operation and maintenance (O&M) is being performed.	On an annual basis, the site will need to be inspected to determine whether any groundwater wells have been installed at the site. The fourth quarter O&M report should include a certification that remedy-related O&M is being performed. Once the institutional controls are put into place, the fourth quarter O&M report should include a certification that the institutional controls are in place, as well.

Table 5: Recommendations, and Follow-Up Actions

Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
A full capture analysis cannot be performed due to insufficient data.	Additional monitoring wells downgradient and east of the drainage ditch (east of MW-1 and MW-4) need to be installed and sampled.	PRPs	EPA	12/13	N	Y
Institutional controls related to prohibiting the residential use of this property, the installation of groundwater wells for drinking or irrigation until groundwater standards are achieved, and evaluating the vapor intrusion pathway for new construction overlying the groundwater contaminant plume are needed.	Since it does not appear likely that a deed restriction with the property owner can be effected, EPA has determined that a notice to successors-in-title to be filed with the County Clerk would be adequate protection. The wording for this notice needs to be prepared by the PRPs, approved by EPA, and filed with the County Clerk.	PRPs	EPA	09/13	N	Y
Emulsified vegetable oil was injected into the groundwater as part of a treatability study to evaluate means to facilitate the bioremediation of the contaminants in the groundwater. While it is possible that the injections have resulted in the groundwater reaching standards, this cannot be confirmed. In the monitoring wells most affected by the amendment injections, many of the aqueous samples needed sample dilution before the analyses could be run. As a consequence of the dilution, the analytical detection reported limits for contaminants of concern were often higher than their respective required groundwater quality standards.	Injections should be suspended and samples that are not impacted by the injection compound need to be collected over two consecutive quarters. If the injections have not resulted in the groundwater achieving water quality standards, an alternative technology needs to be selected.	PRPs	EPA	12/13	N	Y