FIFTH FIVE-YEAR REVIEW REPORT

For

Strasburg Landfill Superfund Site

Newlin & West Bradford Townships

Chester County, PA

April 2015

PREPARED BY:

U.S. Environmental Protection Agency, Region III
Philadelphia, Pennsylvania

Approved by:

Date:

Cecil Rodrigues, Director
Hazardous Site Cleanup Division

4/27/2015

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List of Acronyms

BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ICs	Institutional Controls
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operations and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PCE	Perchloroethene (also known as Tetrachloroethene)
PCOR	Preliminary Closeout Report
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-Volatile Organic Compounds
SI	Site Investigation
SSC	State Superfund Contract
TAL	Target Analyte List
TCL	Target Compound List
TCE	Trichloroethene
UECA	Uniform Environmental Covenants Act
VOC	Volatile Organic Compounds
VI	Vapor Intrusion

Executive Summary

EPA has issued four Records of Decision (RODs) for the Strasburg Landfill Site (Site). The Site is located in Newlin and West Bradford Townships, Chester County, PA (Figure 1). The first ROD, dated June 29, 1989, addressed contaminated residential wells and leachate releases into surface water and groundwater near the landfill. Under this first interim action, leachate was collected, treated, and discharged on-Site and point-of-use carbon treatment units for contaminated residential wells were installed. The second ROD dated June 28, 1991, addressed Site access and security. Under this action, the landfill portion of the Site was enclosed by a security fence and additional warning signs were posted. The third ROD, dated March 31, 1992, addressed the landfill itself and the leachate emanating from it. The landfill was regraded and capped with a multilayer impermeable cap. A new treatment plant was constructed to treat the collected leachate. This treatment plant also utilizes a flare system for landfill gases that are collected from an active venting system. The areas surrounding the landfill were regraded with topsoil and reseeded (Figure 2). The fourth ROD dated September 27, 1999, dealt specifically with the groundwater associated with the Strasburg Landfill Site. EPA issued a "no action" decision for groundwater in the 1999 ROD.

The Site achieved construction completion with the signing of the Preliminary Close Out Report (PCOR) on September 27, 1999. Under the terms of a Superfund State Contract (SSC), the Pennsylvania Department of Environmental Protection (PADEP) has been conducting operation and maintenance as well as routine sampling since September 30, 2001. No results have been observed since that time to indicate any adverse risk.

The trigger for this Five-Year Review was the signature date of the fourth Five-Year Review, April 28, 2010. The assessment of this Five-Year Review found that the remedies were constructed in accordance with the RODs and are functioning as designed. The remedial objectives for the Site, to minimize migration of contaminants to ground and surface waters and to prevent direct contact with, or ingestion of contaminants, have been achieved by the implementation of the landfill cap, landfill leachate collection system, the landfill gas collection and flare system, and the landfill fencing and warning signs. The remedies have been implemented at this Site and are protective of human health and the environment. Institutional controls (ICs) were identified and selected in the September 4, 2012 Second ESD for the Site and are being implemented through an Environmental Covenant recorded December 27, 2013, and additionally, through Chester County Health Department regulations relating to well installation. These ICs will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the remedies (cap, fence, leachate collection and treatment system, etc.). However, the Site operation and maintenance and sampling plans should be updated to reflect changes in site operations, maintenance and sampling that are not consistent with current Site conditions.

Executive Summary (cont.)

GPRA Measure Review

As part of this Five-Year Review the Government Performance and Results Act (GPRA) Measures have also been reviewed. The GPRA Measures and their current status are provided as follows:

Environmental Indicators
Human Health: HEUC, Human Exposure Under Control.
Groundwater Migration: GMUC, Groundwater Migration Under Control

Sitewide RAU: The Site is Site-Wide Ready for Anticipated Use (SWRAU). SWRAU was documented in a March 25, 2014 memo.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Strasburg Landfill		
EPA ID: PAD000441337		
Region: 3	**State:** PA	**City/County:** Newlin Twp., Chester County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**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): Charlie Root
Author affiliation: EPA, RPM
Review period: 08/01/2014 – 04/27/2015
Date of site inspection: 09/22/2014
Type of review: Statutory
Review number: 5
Triggering action date: 04/28/2010
Due date *(five years after triggering action date)*: 04/28/2015

Five-Year Review Summary Form (continued)

The table below is for the purpose of the summary form and associated data entry and does not replace the two tables required in Section VIII and IX by the FYR guidance. Instead, data entry in this section should match information in Section VII and IX of the FYR report.

Issues/Recommendations

OU(s) with Issues/Recommendations Identified in the Five-Year Review:
OUs: 1, 2, 3, 4

Issues and Recommendations Identified in the Five-Year Review:

OUs: 1, 2, 3, 4	**Issue Category: Operations and Maintenance**			
	Issue: O&M and Sampling Plan out of date			
	Recommendation: Update O&M and Sampling Plan			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	EPA/State	EPA/State	12/30/2015

To add additional issues/recommendations here, copy and paste the above table as many times as necessary to document all issues/recommendations identified in the FYR report.

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):*
1,2,3,4	**Protective**	Click here to enter date.

Protectiveness Statement:

The remedies have been implemented at this Site and are protective of human health and the environment. Institutional controls were identified and selected in the September 4, 2012 Second ESD for the Site and are being implemented through an Environmental Covenant recorded December 27, 2013, and additionally, through Chester County Health Department regulations relating to well installation. These ICs will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the

remedies (cap, fence, leachate collection and treatment system, etc.). The Site operation and maintenance and sampling plans should be updated to reflect any changes in site operations, maintenance and sampling that are not consistent with current Site conditions.

Five-Year Review Summary Form (continued)

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: **Protective**	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedies have been implemented at this Site and are protective of human health and the environment. Institutional controls were identified and selected in the September 4, 2012 Second ESD for the Site and are being implemented through an Environmental Covenant recorded December 27, 2013, and additionally, through Chester County Health Department regulations relating to well installation. These ICs will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the remedies (cap, fence, leachate collection and treatment system, etc.). The Site operation and maintenance and sampling plans should be updated to reflect changes in site operations, maintenance and sampling that are not consistent with current Site conditions.	

Five-Year Review Report
For
Strasburg Landfill Superfund Site
Newlin & West Bradford Townships, Chester County, Pennsylvania

I. Introduction

The purpose of the Five-Year Review is to determine whether the remedy at a Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this Five-Year Review report pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Section 121 of CERCLA states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 Code of Federal Regulations at Section 300.430(f)(4)(ii), which states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

This is the fifth Five-Year Review for the Strasburg Landfill Superfund Site. The triggering action for this statutory review is the date of the last Five- Year Review which was completed on April 28, 2010. The Five-Year Review is required due to the fact that hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This review was conducted by the EPA Remedial Project Manager (RPM) for the Site from August 2014 through April 2015.

II. Site Chronology

Table 1: Chronology of Site Events

Date	Event
1979	Strasburg Landfill Associates forms to operate landfill on former farm field.
1983	Landfill closed by State due to numerous operational problems.
March 1989	Strasburg Landfill added to the National Priorities List (NPL).
June 29, 1989	Record of Decision (ROD) issued selecting collection and treatment of landfill leachate.
June 30, 1990	PRPs begin operating limited (eastern slope only) leachate collection and treatment system.
January 3, 1990	First Explanation of Significant Differences (ESD) issued to change method of leachate treatment.
June 28, 1991	ROD issued selecting access security to landfill portion of property.
March 31, 1992	ROD signed calling for Landfill cap, active gas and leachate collection and treatment systems.
September 30, 1994	1st Five- Year Review recommends completion of remediation and continued monitoring.
September 27, 1999	ROD issued selecting no further action relating to groundwater.
September 27, 1999	Preliminary Close Out Report issued by EPA.
November 30, 1999	2nd Five -Year Review recommends continued monitoring.
September 30, 2001	In accordance with State Superfund Contract (SSC), PADEP assumes O&M responsibilities for the Site.

May 16, 2003 and November 8, 2004	EPA/PADEP joint Site Inspections.
February 2, 2005	3rd Five- Year Review recommends thorough review of Institutional Controls (ICs).
August 22, 2007	Parcels, including Strasburg Landfill and some adjacent parcels, transferred to new owners through Sheriff sale.
April 30, 2009	EPA, PADEP, Weston meet on Site to scope a pilot of leachate treatment and discharge changes. Pilot initiated in Summer 2009.
April 28, 2010	4th Five- Year Review recommends modify decision documents to provide for ICs and to implement the ICs.
September 4, 2012	Second ESD for ICs signed.
September 12, 2012	Following successful pilot study, Passive Leachate Treatment System adopted.
December 12, 2013	PADEP request to discontinue monitoring well sampling at the Site. Request evaluated by EPA as part of Five-Year Review.
December 27, 2013	Uniform Environmental Covenant Act (UECA) agreement signed implementing ICs on parcels associated with the landfill portion of Site.
April 28, 2014	PADEP requests to convert from active gas venting to passive gas venting. Request is currently being evaluated by EPA.
October 2014	Natural Lands Trust, Inc. accepts conservation easement from property owner.

III. Background

Physical Characteristics

The Strasburg Landfill Superfund Site includes a 24-acre inactive landfill located on two parcels totaling approximately 209 acres of undeveloped land south and slightly east of Strasburg Road in Newlin Township, Chester County, Pennsylvania. In addition to the 209 acres, the Site also includes an access road on a 14.5-acre parcel that provides access from Strasburg Road to the Site. The access road is located in Newlin and West Bradford Townships. The 209-acre portion of the Site

is comprised of tax parcels 49-1-15 and 49-1-17.2 (Figure 1), as identified by the Chester County Tax Assessors Office, located on Laurel Road in Newlin Township.

The topography of the area is characterized by a combination of steep and gentle hills. In general the land in the Site area slopes towards, and drains to the Brandywine Creek, or Briar Run a tributary. These streams form the eastern and western boundaries of the Site area. A small wetlands area has been created on the eastern side of the landfill along Briar Run. The wetlands receives the discharge from the Site's leachate collection system prior to ultimately discharging into Briar Run (Figure 2).

Land and Resource Use

Land use in the area is primarily suburban residential, with some residual agricultural areas. There are more than 300 single family residences within a one- mile radius of the Site. The drinking water to these residences is primarily supplied from groundwater. Most of the homes are served by private home wells. A 57- acre parcel adjacent to the two parcels on which the landfill is situated and abutting Strasburg Road, was acquired by West Bradford Township in August 2007 through a property sheriff sale (Figure 1, purple outline). The West Bradford parcel is currently used for township lawn waste composting.

History of Contamination

The Site began to accept municipal and industrial waste in 1978. The landfill operators were cited by the Pennsylvania Department of Environmental Protection (PADEP) for numerous operational violations, and the landfill was closed in 1984. During its period of operation, the landfill accepted approximately three million cubic yards of waste. Following closure, the landfill began discharging leachate into the surrounding area, including the Briar Run stream.

Initial sampling on and around the landfill showed elevated levels of vinyl chloride and trichloroethylene both in leachate seeps emanating from the landfill and also in home wells adjacent to the Site. Subsequent inspections and sampling showed that the existing landfill cap had failed in numerous locations and that contaminants were flowing both into nearby surface water streams and into the groundwater.

PADEP initiated an action to collect the leachate and transport it off-site for treatment at a nearby municipal sewage treatment plant. The leachate was collected for a number of months until the landfill operators gave notice that they were no longer providing funds for this operation. EPA took over operations of the temporary system at that time. The Site was listed on the National Priorities List on March 31, 1989.

EPA divided the cleanup of the Site into four operable units (OU). EPA has issued a series of Records of Decision (ROD) for the OUs, which selected the remedies necessary to protect human health and the environment from contaminants at the Site. The first ROD for OUl, dated June 29, 1989, addressed leachate releases into surface

water and groundwater near the landfill and provided for point-of-use carbon treatment for contaminated residential wells. Under this first interim action, leachate was collected, treated, and discharged on Site. In March 1990, a limited leachate collection system for the eastern side of the landfill was completed. The second ROD for OU2, dated June 28, 1991, addressed Site access and security. EPA installed a security fence with warning signs around the entire perimeter of the landfill. Pursuant to the ROD for OU3, dated March 31, 1992, EPA constructed a multi-layer cap over the landfill portion of the Site, a landfill subsurface leachate collection system, and a leachate treatment building, which was completed in September 1999.

The leachate treatment system actively treated all leachate from the landfill until 2010. Following a successful pilot test in 2009-2010, the on-Site wetland now serves as a passive treatment system for the leachate. The leachate, after being distributed via underground level spreaders in the up gradient portions of the wetland, eventually discharges to Briar Run. A gas-flare system which collected and safely burned gases developed in the landfill has been operated since 1999. However, due to a decrease in the volume of gas generated by the landfill, operation of the flare has become difficult. PADEP has requested, and EPA is evaluating, a change to passive gas venting for the Site. Finally, on September 27, 1999, EPA issued a "No Action" decision for groundwater associated with the Site (OU4). This decision was based on groundwater data which demonstrated that Site-related contaminants were not migrating off-Site from under the landfill cap.

Under the terms of the SSC, PADEP has maintained and operated the Site remedies since 2001. EPA conducted and completed Five-Year Reviews, during 2005 and 2010. Both Five-Year Reviews found the remedies to be protective of human health and the environment in the short term. However, as a result of the 2010 Five- Year Review, it was determined that appropriate ICs needed to be identified, selected in a decision document and implemented, to protect the engineered remedies at the Site for the long term. As a result, on September 4, 2012, EPA issued an ESD, selecting ICs for the Site. The ICs described in the ESD are necessary to prevent exposure to waste remaining under the landfill cap and contaminated groundwater at the Site and to preserve the components of the selected remedies.

Initial Response

The Pennsylvania Department of Environmental Resources (which later became PADEP) in conjunction with EPA conducted periodic monitoring of residential drinking water wells, from September 1983 to approximately 1999 (see Appendix A of the Focused Groundwater Investigation found in the Site Administrative Record for results). The initial monitoring program results from the 1980s showed two residential wells southwest of the landfill contaminated with volatile organics. In August 1983, PADER's analyses of water from a monitoring well and of leachate from the witness drain, a small reservoir with a valve to allow leachate sample collection, revealed organic and inorganic contamination. In September 1983, analyses of water samples collected from the same well, the witness drain, and Briar Run revealed significant levels of organic chemicals. In

1989, EPA installed whole-house carbon filtration systems in two private residences down gradient of the Site. EPA monitored and maintained the systems until PADEP took over responsibility for operation and maintenance for the Site in 2001. No Site-related contaminants have been detected at levels exceeding the MCLs since 1995. PADEP maintained the carbon units and monitored the groundwater from the residential wells pre-filter and post-filter until 2010 when maintenance and monitoring of the residential systems was discontinued based on the many years of sampling results not exceeding MCLs.

Basis for EPA Action

Initial sampling on and around the Site showed elevated levels of vinyl chloride and trichloroethylene both in leachate seeps emanating from the landfill and also in home wells down gradient to the Site. Subsequent inspections and sampling showed that the existing landfill cap had failed in numerous locations and that site contaminants were flowing both into nearby surface water streams and into the groundwater. The surface stream (Briar Run to Brandywine Creek) is an intake source for drinking water for several downstream communities and the groundwater in the vicinity of the Site is used by residents for drinking water.

IV. Remedial Actions

Remedial Action Objectives

The remedial objectives for the Site, as spelled out in the Site decision documents, are to minimize migration of contaminants to ground and surface waters and to prevent direct contact with, or ingestion of contaminants.

Remedy Selection

EPA began work at this Site through a series of remedial actions to address the immediate risks. The first ROD dated June 29, 1989, addressed leachate releases into surface water and groundwater near the landfill as well as point-of-use carbon treatment for contaminated residential wells. Under this first interim action, leachate was collected, treated, and discharged on-Site. The second ROD dated June 28, 1991, addressed site access and security. Under this action, the landfill portion of the Site was enclosed by a security fence and additional warning signs were posted. During the period 1990 through 1993, EPA studied the Strasburg Landfill and determined that the landfill cover was ineffective. On March 31, 1992 a third ROD was issued to address the landfill cap, the leachate collection and treatment system, and the landfill gas collection and flare system (see Figure 2 for the location of the cap and leachate collection and flare system). The fourth ROD, dated September 27, 1999, dealt specifically with the groundwater associated with the Strasburg Landfill Site. EPA issued a "no action" decision for groundwater in the 1999 ROD. The No Action decision was based on groundwater data collected from on-Site monitoring wells and off-Site residential wells which indicated that Site-related contaminants were not migrating off-Site from under the landfill cap.

Remedy Implementation

The landfill was re-graded creating less steep slopes, which conformed to the current landfill grading practices. All of the weeds, brush, and small trees, which had grown up on the landfill, were removed and an impermeable liner was placed over the entire landfill area. Approximately 600,000 cubic yards of earthen material was placed on the landfill as part of this reconstruction. In addition, an active landfill gas system was installed which assists in the waste digestive process occurring within the landfill by pulling air through the wastes encouraging breakdown of the landfill waste. Several long trenches were installed around the perimeter of the landfill so that any leachate emanating from the landfill could be collected. A leachate treatment building was erected to treat leachate from the landfill. This treatment plant is augmented by a gas flare system to collect and destroy gases developed in the landfill. This system became operational in September 1999 (Figure 2).

System Operation and Maintenance

In accordance with the SSC, PADEP has been responsible for the maintenance and operation of the remedy components at the Site since September 2001. The leachate collection and treatment system has treated and discharged an approximate total of 6,153,000 gallons of leachate since PADEP assumed responsibility for operation and maintenance under the SSC. The mechanical leachate treatment system actively treated all leachate from the landfill until 2010. Because of significantly decreased flow and low levels of contaminants, following a successful pilot test in 2009-2010, the on-Site wetland now serves as a passive treatment system for removal of the low concentration contaminants from the leachate.

The Passive Leachate Treatment System Pilot Study Assessment Report prepared by WESTON for PADEP dated September 12, 2012, describes the pilot study and modified passive wetlands treatment, including as-built drawings. The leachate, after being distributed via underground level spreaders in the up gradient portions of the wetland, eventually discharges to Briar Run. The NPDES equivalent discharge criteria was modified by PADEP's water program on August 02, 2013 for leachate discharge to Briar Run through the passive wetlands treatment system modifications. Approximately 1,724,677 gallons of leachate have been discharged through the passive wetland treatment system through December 2014. All NPDES equivalent discharge criteria have been attained since 2013 and no problems or issues have been identified with the passive wetlands treatment system to date. However, based on EPA's Biological Technical Assistance Group (BTAG) review for this five year, several items were identified which EPA believes should be addressed. These include: 1) an evaluation of the wetlands capacity over time to treat leachate using loading calculations for the treatment wetlands with ecologically protective values for metals; 2) the four sampling locations described in the Pilot program should be resampled periodically; and 3) monitoring at the wetlands should include assessment of vegetation relating to bog turtles, a state endangered species, which have been identified in Briar Run near the Site.

During this Five-Year Review period, in the spring, summer and fall months, the landfill cap was routinely mowed approximately 6-8 times per year. The landfill vegetative cover has maintained its integrity, with no major erosion issues. Based on EPA's BTAG review for this Five-Year Review, they recommended that PADEP consult with EPA on low maintenance caps planted with native vegetation to reduce/eliminate mowing and increase habitat for wildlife.

Potential site impacts from climate change including increased frequency and intensity of precipitation events, etc., have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site. In addition, routine maintenance of the perimeter fence and access road has been conducted.

Sampling of on-Site, and perimeter monitoring wells (Figure 3) was performed in April 2010 and March 2014 during this review period. There were no detections of any compound found to be greater than its MCL. Based on the most recent and historical data, PADEP has requested, by letter dated December 12, 2013, that EPA consider removing groundwater monitoring from PADEP's operation and maintenance obligations at the Site. EPA has evaluated PADEP's request as part of the Five-Year Review and determined that the frequency of sampling can be reduced from the Biannual sampling requirement of the current O&M sampling schedule to a frequency of one sampling event per Five-Year Review cycle to occur no later than the fourth year of the five year cycle. EPA will prepare a formal response letter to the PADEP request to reduce sampling.

A gas-flare system which collected and safely burned gases developed in the landfill has been operated since 1999. However, due to a significant decrease in the volume of gas generated by the landfill since the last Five-Year Review, operation of the flare has not been possible much of the time. The decreased gas volume has actually increased the need for Site visits to manually check for adequate gas collection to briefly allow for manually igniting the flare. EPA is currently evaluating a change to a passive gas venting system for the Site per a request from PADEP dated April 28, 2014.

V. Progress Since Last Five-Year Review

This is the fifth Five-Year Review for the Strasburg Landfill Superfund Site. The fourth Five-Year Review for the Site which was issued on April 28th, 2010 contained the following protectiveness statement: The remedies which have been implemented at this Site are protective of human health and the environment in the short term. In order to be protective in the long term, appropriate institutional controls need to be identified, selected in a decision document and implemented. These institutional controls will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the remedies (cap, fence, leachate collection and treatment system, etc.).

The Issues and Recommendations identified in the 2010 fourth Five-Year Review are as follows:

Table 2: Previous Five Year Review Issues

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current / Future	
Institutional Controls	Modify the decision document(s) to provide for Institutional Controls.	**EPA**	**EPA**	**12/31/2010**	**N**	**Y**
Institutional Controls	Implement Institutional Controls to prevent exposure to waste and contaminated ground water and to preserve the integrity of the components of the remedies.	**EPA**	**EPA**	**06/30/2011**	**N**	**Y**

The recommendation from the previous Five-Year Review that ICs needed to be selected in a decision document has been addressed. This was accomplished through EPA's selection of the required ICs for the Site in an ESD dated September 4, 2012. The ICs selected for the Strasburg Landfill Superfund Site in the September 4, 2012 ESD include prohibitions on the following activities:

1. Prohibit activities on the Site within or near the existing security fencing that would in any manner disturb or interfere with the remedial systems, including the landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures that prevent access to the landfill. Such prohibited activities include, but are not limited to, digging in the landfill cap or tampering with the hardware associated with the gas vents, monitoring wells, leachate collection and conveyance systems, or the security fencing.

2. Prohibit any use of landfill leachate unless approved by EPA in consultation with PADEP to avoid exposure to contaminants in the leachate via ingestion, vapor inhalation or dermal contact.

3. Prohibit installation of groundwater wells on the Site within the existing security fencing without notice and approval of EPA in consultation with PADEP to avoid exposure to contaminants in groundwater via ingestion, inhalation, or dermal contact.

4. Prohibit installation and pumping of new groundwater wells within a ¼ of a mile of the identified plume (See Figure 4) of the Site which may influence the Site hydrology without notice and approval of EPA in consultation with

PADEP to avoid the migration of contaminants from under the cap and exposure to contaminants in groundwater via ingestion, inhalation, or dermal contact.

The recommendation from the previous Five Year Review that IC's be implemented has been addressed through an Environmental Covenant recorded by the landfill property owner with the Chester County Recorder of Deeds on December 27, 2013. The Environmental Covenant describes the following activity and use limitations the property owner shall abide by:

(a) Any and all activity on the Property that could in any manner disturb or interfere with the selected remedial systems, including the landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures that prevent access to the landfill, is prohibited;
(b) Any and all contact, handling, or use of landfill leachate is prohibited without the prior written approval of the Agencies;
(c) The installation of groundwater wells on the property within the existing fencing is prohibited without the prior written approval of the Agencies; and.
(d) The installation and pumping of new groundwater wells on the Property within on-quarter mile of the identified plume is prohibited without the prior written approval of the Agencies.

In addition, the Natural Lands Trust, Inc. (NLT), a non-profit conservancy, entered into discussions with the landfill property owner regarding accepting a conservation easement for portions of the property to permanently protect natural features of the property including, deciduous woodlands, steep slopes, a cold water stream and breeding bird habitat, etc. In October 2014, NLT accepted a conservation easement from the property owner for portions of the property.

Finally, via the 2012 ESD, EPA has also implemented ICs placing restrictions on installation and pumping of new groundwater wells within a ¼ of a mile of the identified plume through application of the Chester County Health Department (CCHD) regulations relating to installation of wells in the county (Figure 4). The CCHD regulations require a permit for any new supply wells prior to installation. The CCHD regulations also require sampling of any new well installed to demonstrate that it meets the drinking water standards before permission from the CCHD is granted to use the new well for drinking purposes.

VI. Five-Year Review Process

Administrative Components

The Five-Year Review for the Strasburg Landfill Superfund Site was conducted by Charlie Root, EPA Remedial Project Manager and supported by the EPA technical review team members, including Mindi Snoparksy, Hydrogeologist, Linda Watson,

Toxicologist and Bruce Pluta, BTAG. Carly Baker, PADEP, and Tim Cherry, PADEP also provided significant information for the Five-Year Review.

Community Involvement

Notice of this Five-Year Review was published in the Daily Local News on September 23, 2014. The notice informed the community that the review was being conducted to ensure that the cleanup conducted at the Site remains protective of human health and the environment. The notice also provided links to information regarding Five-Year Reviews, additional information on the Strasburg Landfill Site and a link to be used to access the Five-Year review when it becomes available. Lastly, the notice provided the contact information for the EPA Community Involvement Coordinator for the Site should members of the public have any additional Site related comments, information, or questions. EPA received no contacts from the community regarding the Five-Year Review notice.

Document Review

The Five-Year Review included a review of relevant documents, including all the RODs, the ESDs, the Preliminary Close-Out Report, previous Five-Year Reviews, leachate collection system influent/effluent monitoring data and groundwater monitoring data. The documents reviewed include the following:

April 2010 and May 2014 monitoring well data
Quarterly leachate influent and effluent data
June 29, 1989 Record of Decision
June 28, 1991 Record of Decision
March 31, 1992 Record of Decision
September 27, 1999 Record of Decision
September 1999 PCOR
First Five-Year Review, September 30, 1994
Second Five-Year Review November 30, 1999
Third Five-Year Review, February 2, 2005
Fourth Five-Year Review, April 28, 2010
Explanation of Significant Differences, September 4, 2012
Passive Leachate Treatment System Pilot Study Assessment Report prepared by WESTON for PADEP dated September 12, 2012
PADEP NPDES equivalent discharge criteria modified, August 2, 2013
Environmental Covenant, December 27, 2013

Data Review

Data from on-Site and perimeter monitoring wells (Figure 3), and influent and effluent of the leachate collection and treatment system has been collected since the last Five-Year Review. On-Site and perimeter monitoring wells were sampled in April 2010 and again in May 2014. In reviewing all the historic data, including the two most recent sampling events, it was determined that there has been no exceedances of any MCLs in

any of the wells since 2001. This remains consistent with EPA's No Action determination in the 1999 ROD and supports the determination that the other remedial actions are operating as intended.

The NPDES equivalent discharge criteria were modified on August 2, 2013 for leachate discharge to Briar Run through the passive wetlands treatment system modifications. The influent and effluent samples are analyzed for pH, total suspended solids, oil & grease, VOCs, semi-volatile organic compounds (SVOCs) and total metals, including mercury. Effluent limits were set for pH (within 6 – 9 range), total suspended solids (avg. monthly = 30 mg/l; maximum daily = 60 mg/l; instantaneous maximum = 75 mg/l), and oil & grease (avg. monthly = 15 mg/l; maximum daily = 30 mg/l; instantaneous maximum = 30 mg/l). VOCs, semi-volatile organic compounds (SVOCs) and total metals are evaluated on a monitor and report basis. Influent and effluent sampling for the reconfigured passive leachate collection and treatment system is conducted quarterly and compared against the substantive PADEP NPDES requirements for discharge. Except for one exceedance of the total suspended solids instantaneous maximum limit in August, 2011 there were no other exceedances of the NPDES effluent requirements of any contaminants in the effluent samples.

Site Inspection

A Site inspection was conducted on September 22, 2014. Participants included, Charlie Root of EPA, and Carly Baker, and Tim Cherry of PADEP. An inspection of the entire landfill, access roads, security fencing and passive leachate collection and treatment system and flare system was conducted. The passive leachate collection and wetlands treatment system was operating as intended during the inspection. The landfill gas collection and flare system was not operating during the inspection due to insufficient gas volume. EPA is currently evaluating a PADEP request to convert to a passive landfill gas venting system. The overall Site conditions, with regard to the perimeter fence and gravel road areas were good. The fence was intact and the gates appeared to be in good working condition. No signs of trespass were noted. There were no visible signs of subsidence, erosion or disturbance on the landfill cap areas. The on-site and perimeter monitoring wells, were inspected and were in good operational condition.

Interviews

A phone call was made and emails were sent to Newlin Township to notify them of the ongoing Five-Year Review and to determine if the Township had concerns, or comments regarding the Site. Gail Abel, Secretary/Treasurer of Newlin Township responded via email that the Strasburg Landfill Site Five-Year Review had been placed on the agenda for the township supervisors meeting on December 8, 2014, and if any questions or issues resulted from the discussion the Township would contact the Site RPM (whose attendance at the meeting was unnecessary). Following the township supervisor meeting, Gail Abel contacted the EPA RPM via email stating that the supervisors had discussed the Five-Year Review notice and they did not have any

questions or concerns. The email also thanked EPA for touching base with the Township regarding the Five-Year Review.

VII. Technical Assessment

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

Yes, the assessment of this Five-Year Review found that the remedies were constructed in accordance with the Records of Decision and are functioning as designed. The threats have been addressed and the remedies are protective. Monitoring of the groundwater indicates that the concentration of contaminants of concern in the groundwater near the perimeter of the landfill remains below MCLs. The constructed remedies are functioning as intended. There are no current exposure pathways and contamination emanating from the Site has been eliminated. The remedial objectives for the Site, to minimize migration of contaminants to ground and surface waters and to prevent direct contact with, or ingestion of contaminants, have been achieved by the implementation of the landfill cap, leachate collection and treatment system, the landfill gas collection and flare system, and the landfill fencing and warning signs.

Since the last Five-Year Review, long-term protection has been achieved with the issuance of an ESD on September 4, 2012, requiring ICs for the Site. The ICs for the landfill property have been implemented through an Environmental Covenant recorded with the Chester County Recorder of Deeds on December 27, 2013, The ICs concerning installation of new groundwater wells beyond the landfill property (and within a ¼ mile of the identified plume) are being implemented through Chester County Health Department regulations relating to installation of wells in the county.

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

Changes in Standards and TBCs

Have standards identified in the ROD been revised, and does this call into question the protectiveness of the remedy? Do newly promulgated standards call into question the protectiveness of the remedy? Have TBCs used in selecting cleanup levels at the site changed, and could this affect the protectiveness of the remedy?

No changes in standards or items to be considered (TBCs) that adversely affect the protectiveness of the remedy were identified during this Five-Year Review.

Changes in Exposure Pathways

Has land use or expected land use on or near the site changed?

No.

Have human health or ecological routes of exposure or receptors been newly identified or changed in a way that could affect the protectiveness of the remedy? Are there newly identified contaminants or contaminant sources? Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents? Have physical site conditions or the understanding of these conditions changed in a way that could affect the protectiveness of the remedy?

No new routes of human exposure or receptors have been identified. However, implementation of passive treatment of leachate via the constructed wetlands should be evaluated using ecologically protective values. There is no indication that physical site conditions (such as hydrologic or hydrogeologic conditions) have changed in a way that could affect the protectiveness of the remedy.

Changes in Toxicity and Other Contaminants Characteristics

Have toxicity factors for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy? Have other contaminant characteristics changed in a way that could affect the protectiveness of the remedy?

Of the toxicity changes, some have increased while others have decreased, making it impossible to generalize about whether the risks would be higher or lower if recalculated today. Current toxicity values may change again in the coming years, and protectiveness is best assessed at the time when it is believed that groundwater cleanup has been achieved. Therefore, it is recommended that the groundwater be evaluated at the end of the remedy to ensure protectiveness at that time.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?

There have been significant changes in EPA's risk assessment guidance since 1987. These include changes in dermal guidance, inhalation methodologies, exposure factors, and a change in the way early-life exposure is assessed for vinyl chloride. In addition, residential Age-Dependent Adjustment Factors (ADAFs) are now required for mutagens, (e.g., TCE). Based on Site conditions, these changes are not expected to affect the protectiveness of the remedy.

Expected Progress towards Meeting RAOs

Is the remedy progressing as expected?

The remedy has achieved the RAO's established to address waste, soil, sediment, groundwater and surface water through installation of the cap, leachate and gas collection systems, and implementation of the land use restrictions.

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

No new information has come to light regarding the protectiveness of the remedy. However, several items were identified which EPA believes should be addressed. These include: 1) an evaluation of the wetlands capacity over time to treat leachate using loading calculations for the treatment wetlands with ecologically protective values for metals; 2) the four sampling locations described in the Pilot program should be resampled periodically; and 3) monitoring at the wetlands should include assessment of vegetation relating to bog turtles, a state endangered species, which have been identified in Briar Run near the Site. Additionally, based on the most recent and historical data, PADEP has requested, by letter dated December 12, 2013, that EPA consider removing groundwater monitoring from PADEP's operation and maintenance obligations at the Site. EPA has evaluated PADEP's request as part of the Five-Year Review and determined that the frequency of sampling can be reduced from the biannual sampling requirement of the current O&M sampling schedule to a frequency of one sampling event per Five-Year Review cycle to occur no later than the fourth year of the five year cycle. The Site operation and maintenance and sampling plans should be updated to reflect the above and any other changes in site operations, maintenance and sampling that are not consistent with current Site conditions.

Technical Assessment Summary

According to the data, monitoring reports and operating reports, and the Site inspection, the remedies were constructed in accordance with the RODs and ESDs and are functioning as designed. The remedial objectives for the Site, to minimize migration of contaminants to ground and surface waters and to prevent direct contact with, or ingestion of contaminants, have been achieved. Monitoring of the groundwater shows that contaminants of concern in the groundwater are below MCLs and are localized under the landfill. Long- term protection has been achieved with the issuance of an ESD on September 4, 2012, requiring ICs for the Site. The ICs have been implemented through an Environmental Covenant recorded with the Chester County Recorder of Deeds on December 27, 2013, and Chester County Health Department regulations relating to installation of wells in the county. These ICs will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the remedies (cap, fence, leachate collection and treatment system, etc.). However, several items were identified as described above which EPA believes should be addressed. The Site operation and maintenance and sampling plans should be updated to reflect the above and any other changes in site operations, maintenance and sampling that are not consistent with current Site conditions.

VIII. Issues:

Table 3: Issues			
Issues		Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1#	O&M Plan and Sampling Plan out dated.	N	N

IX. Recommendations and Follow-Up Actions:

Table 4: Recommendations					
Issue		Follow up Action	Party Responsible	Oversight Authority	Due Date
1#	O&M Plan and Sampling Plan out dated.	Update the O&M Plan and Sampling Plan to reflect current Site conditions.	USEPA/PADEP	USEPA/PADEP	12/30/2015

X. Protectiveness Statement

The remedies have been implemented at this Site and are protective of human health and the environment. Institutional controls were identified and selected in the September 4, 2012 Second ESD for the Site and are being implemented through an Environmental Covenant recorded December 27, 2013, and additionally, through Chester County Health Department regulations relating to well installation. These ICs will be used to prevent exposure to waste and contaminated groundwater and to preserve the integrity of the components of the remedies (cap, fence, leachate collection and treatment system, etc.). The Site operation and maintenance and sampling plans should be updated to reflect changes in site operations, maintenance and sampling that are not consistent with current Site conditions.

XI. Next Review

The next Five- Year Review for the Strasburg Landfill Site is to be completed within five years from the completion of this Five-Year Review Report. The completion date is the date of signature on the front of this report.

Attachments

Strasburg Landfill Area

Figure 1.

Landfill Parcels
West Bradford Twp
Land Parcels
Municipalities

0 0.25
Miles

CCHD

Map Created: 3/4/2010

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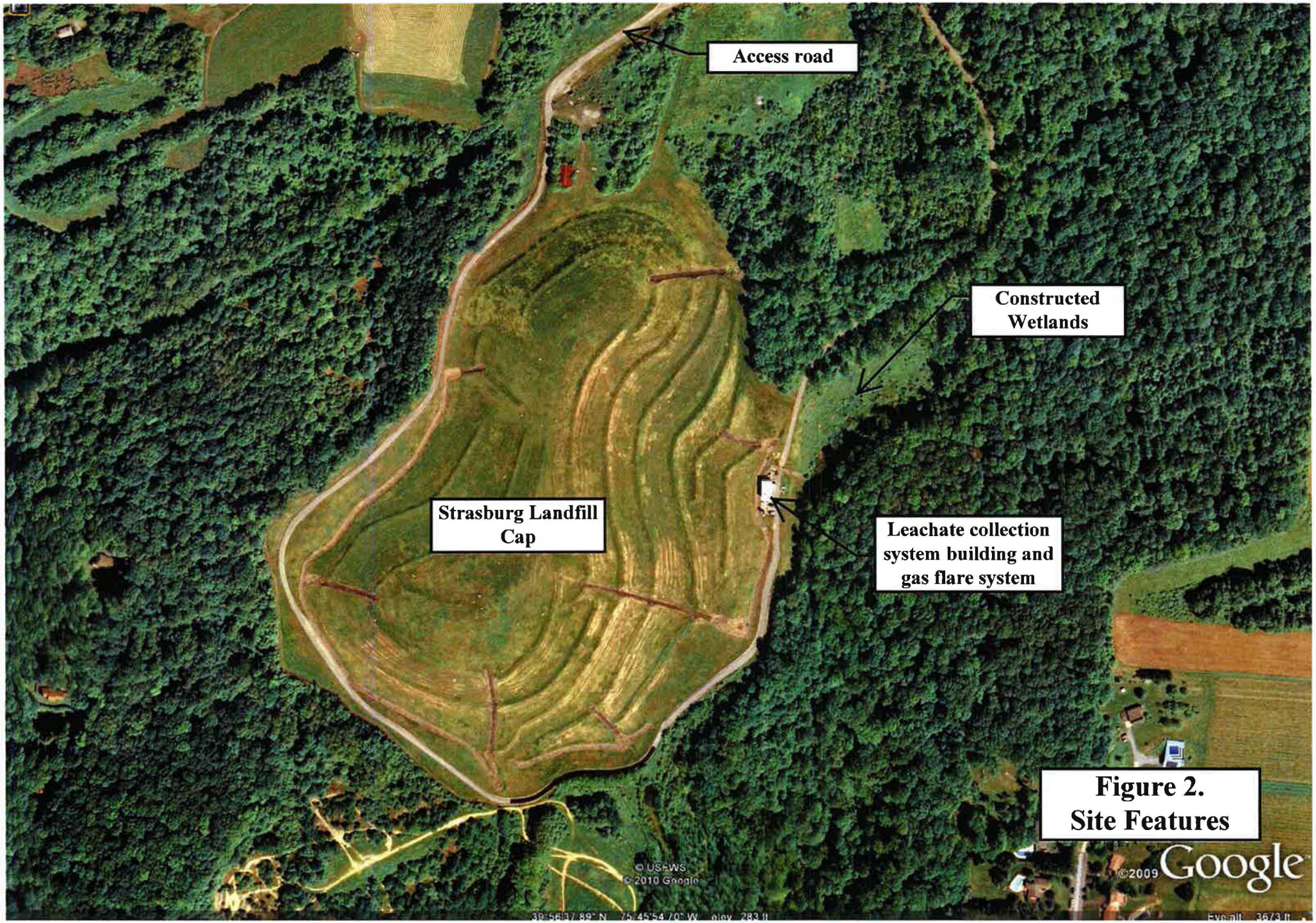

Figure 2. Site Features

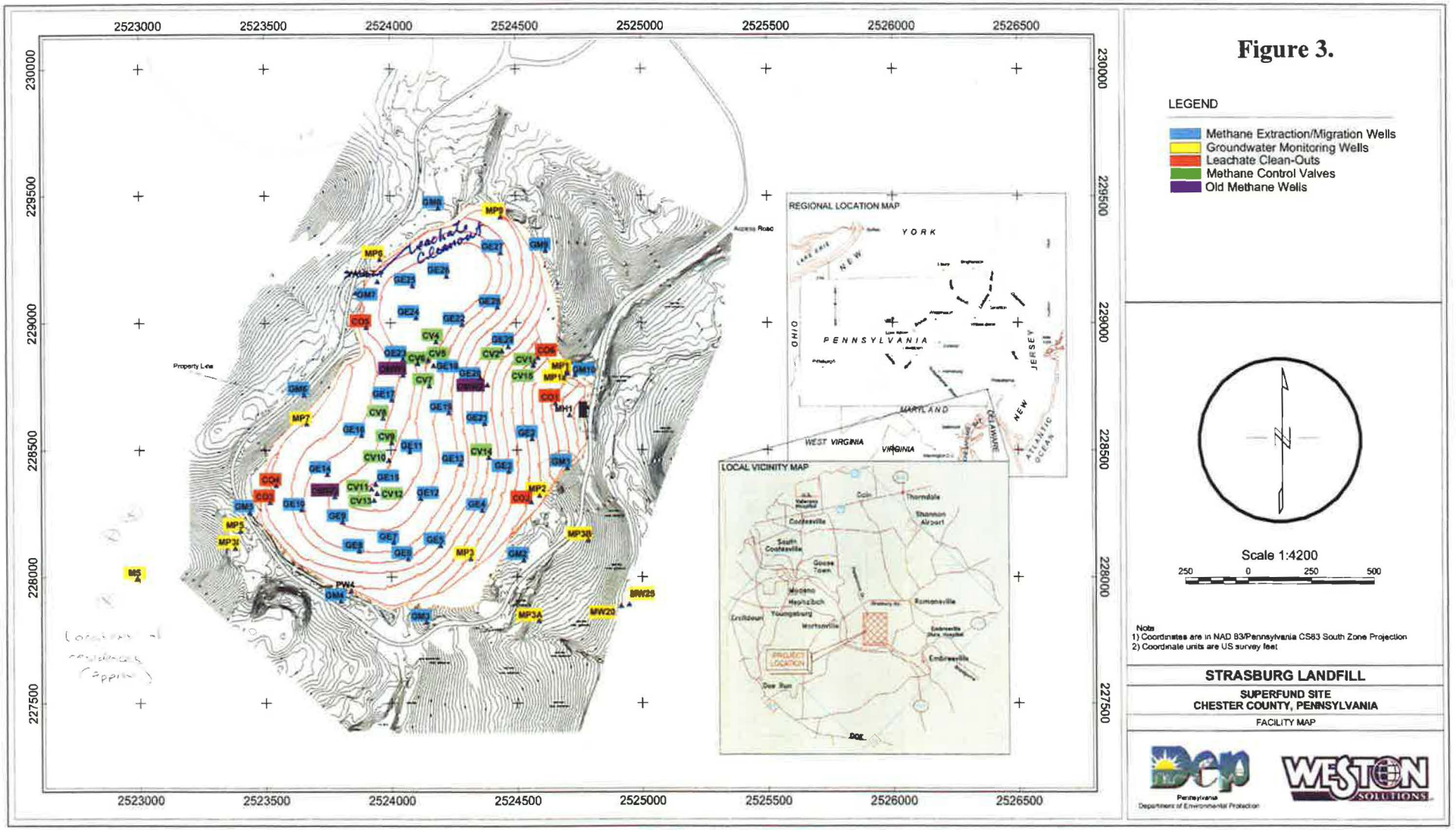

Figure 3.

LEGEND

- Methane Extraction/Migration Wells
- Groundwater Monitoring Wells
- Leachate Clean-Outs
- Methane Control Valves
- Old Methane Wells

Scale 1:4200

250 0 250 500

Note
1) Coordinates are in NAD 83/Pennsylvania CS83 South Zone Projection
2) Coordinate units are US survey feet

STRASBURG LANDFILL

SUPERFUND SITE
CHESTER COUNTY, PENNSYLVANIA

FACILITY MAP

Pennsylvania Department of Environmental Protection

WESTON SOLUTIONS

Strasburg Landfill

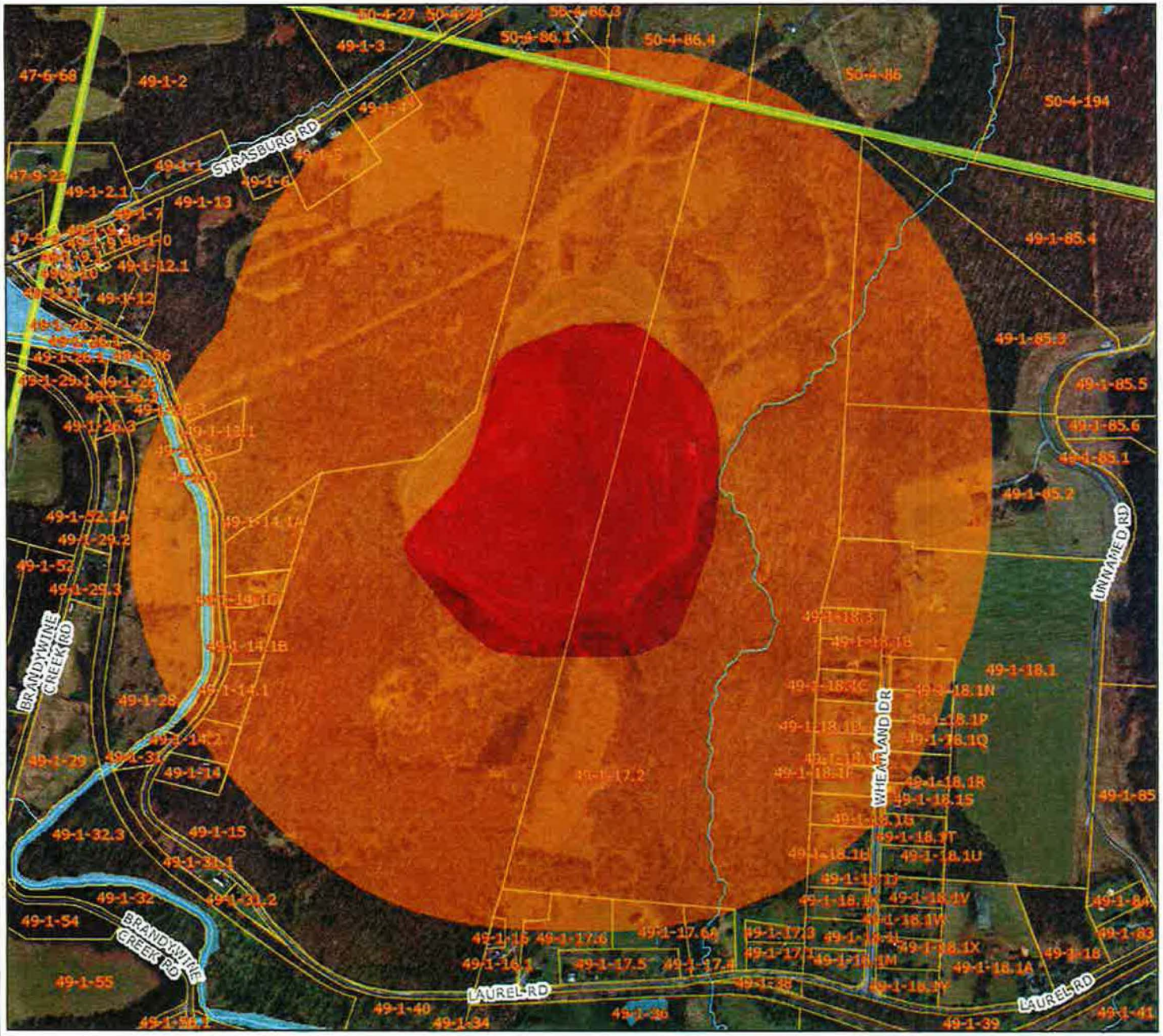

Figure 4.

Approximate Plume

Area of Well Permit Notification to EPA

0 500 1,000

Feet

Map Created: 12/19/2011

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