

**FOURTH FIVE-YEAR REVIEW REPORT FOR
FLORENCE LAND RECONTOURING LANDFILL SUPERFUND SITE
BURLINGTON COUNTY, NEW JERSEY**



Prepared by

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

A handwritten signature in black ink, appearing to read "P. Evangelista", is written over a horizontal dashed line.

**Pat Evangelista, Acting Director
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9/25/19

Date

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BCRRFC	Burlington County Resource Recovery Facilities Complex
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
LEL	Lowest Effects Level
MUA	Municipal Utilities Authority
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJGWQS	New Jersey Groundwater Quality Standards
NPL	National Priorities List
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RDCSRS	Residential Direct Contact Soil Remediation Standards
ROD	Record of Decision
RPM	Remedial Project Manager
SVI	Soil Vapor Intrusion
SVOC	Semi-Volatile Organic Compound
SWQS	Surface Water Quality Standards
TBC	To be Considered
UU/UE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compound

I. INTRODUCTION

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

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

This is the fourth FYR for the Florence Land Recontouring Landfill Superfund site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

This State-lead site consists of one operable unit (OU1), and OU1 will be addressed in this FYR. OU1 addresses the potential release of contaminants from the landfill.

The Florence Land Recontouring Landfill Superfund site FYR was led by Grisell V. Díaz-Cotto, Remedial Project Manager from the Environmental Protection Agency (EPA). Other participants, also from EPA, included: Rachel Griffiths, hydrogeologist; Lora Smith, Human Health Risk Assessor; Michael Clemetson, Ecological Risk Assessor; and Pat Seppi, Community Involvement Coordinator. Steve Wohleb, Project Manager, and Chad VanSciver, Field Sampler, from the New Jersey Department of Environmental Protection (NJDEP) also participated. The review began on October 1, 2018.

Site Background

The site is located on Cedar Lane, in the Townships of Florence, Mansfield and Springfield, in Burlington County, New Jersey. The property encompasses approximately 60 acres. Out of the 60 acres, the area which contains the actual landfilled wastes is 29 acres, along with two relatively small leachate collection lagoons. The site is bordered by farmland, the Assiscunk Creek, which is used for both recreational purposes and irrigation, the Burlington County Resource Recovery Facilities Complex (BCRRFC) and the Cedar Lane Extension. (Figures 1 and 2)

Florence Land Recontouring, Inc., operated as a landfill from 1973 to 1981. The site is now inactive with vegetation covering the entire site and is fenced off from the general public. The surrounding area is predominantly agricultural and light industrial. Adjacent to most of the site perimeter are lands owned by Burlington County where the BCRRFC is located.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Florence Land Recontouring Landfill		
EPA ID: NJD980529143		
Region: 2	State NJ:	City/County: Burlington County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: State <i>[If "Other Federal Agency", enter Agency name]:</i>		
Author name (Federal or State Project Manager): Grisell V. Díaz-Cotto		
Author affiliation: EPA		
Review period: 4/1/2014 – 9/20/19		
Date of site inspection: 2/8/2019		
Type of review: Statutory		
Review number: 4		
Triggering action date: 9/23/2014		
Due date (five years after triggering action date): 9/23/2019		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

During its operation, the landfill was permitted to accept sanitary and industrial (non-chemical) waste. Due to a history of environmental concerns, including observed leachate seeps, groundwater contamination and emissions to the atmosphere, a Consent Order was issued to Florence Land Recontouring, Inc. by the New Jersey Superior Court in January 1979. Elements of this Order included: a listing of permitted and prohibited waste types for acceptance at the facility; establishment of a sampling and analysis program for existing groundwater monitoring wells; specifications for site preparation, disposal limits, and operations; design and installation of a leachate collection system; pumping and removal of leachate to alleviate hydraulic head pressures; the construction of cutoff walls, dikes and waste fill gas vents; provisions for the control of litter, dust, odor, noise and fire protection; and, the establishment of the final elevation and depth of excavation. Compliance with the Order was sporadic. In September 1984, the site was added to the National Priorities List (NPL).

In 1985/1986, a remedial investigation and feasibility study (RI/FS) indicated that the main source of environmental concern at the site was the reported deposition of hazardous waste, including phthalates, heavy metals and vinyl chloride. Sampling and analysis of leachate in monitoring wells located in the waste-fill area indicated the presence of volatile organic compounds (VOCs) and heavy metals. At that time, public health concerns at the site included:

- Contaminated groundwater beneath the landfill that had a potential to migrate into the adjacent aquifers.
- Potential for contaminants to migrate to the Assiscunk Creek via surface-water runoff and groundwater flow in the surficial aquifer. The creek was considered an exposure pathway through dermal contact and ingestion.
- Air emissions which presented an exposure pathway through inhalation.
- Hazardous substances potentially found near the ground surface in the landfill which presented an exposure pathway through dermal contact.

No ecological risk assessment was performed as part of the RI.

Response Actions

Following the NJDEP's January 1979 Consent Order, Florence Land Recontouring, Inc. closed the landfill and terminated operations by November 1981. In 1982, the waste fill area was capped with on-site clay-like material and revegetated. A leachate collection system was installed with the resulting leachate being placed into two lagoons constructed on another section of the property, and eventually disposed of at an off-site wastewater treatment plant. Carbon adsorption filters were placed on top of the leachate collection system manholes to collect VOCs and control odors.

EPA issued a comprehensive ROD for the site on June 27, 1986, with NJDEP concurrence. The objective of the remedy was to control the potential release of contaminants from the landfill. More specifically, the major components of the selected remedy were:

- Construction of a synthetic membrane and clay composite cap; construction of a circumferential soil/bentonite slurry containment wall.
- Construction of an up-gradient groundwater interceptor system; construction of a new storm water management system.
- Leachate treatment and disposal at a publicly owned treatment works (POTW).
- Gas collection and treatment; removal and disposal of lagoon liquids and sediments, and other surface debris.
- Construction of a fence with warning signs.
- Operation and maintenance (O&M) of the constructed remedy as well as providing supplemental sampling of groundwater, surface water, and sediments.

The Remedial Action Objectives (RAOs) were to:

- mitigate downgradient/off-site groundwater contamination;
- mitigate on-site surface water runoff contamination;
- mitigate off-site air contamination;
- mitigate the potential for health hazard exposure; and
- enhance on-site safety.

Status of Implementation

Lagoon dewatering began in March 1992, and was completed in June 1992. Dewatering of the leachate lagoons resulted in the removal of approximately 4,000 cubic yards of lagoon bottom sediments. The bottom sediments and other material were placed under the landfill cap, and the waste water was disposed of off-site. Following dewatering and removal, the lagoons were backfilled and graded.

Slurry wall construction began in June 1992, and was completed in November 1992. The slurry wall was installed to an average depth of 25 feet. Construction of the upgradient groundwater interceptor system was completed in June and July of 1992. Groundwater was successfully diverted around the site to reduce leachate production.

Construction of the leachate collection and treatment system began in September 1992, and was completed in March 1994. Leachate from the collection system is sent offsite to the Willingboro Municipal Utilities Authority.

Landfill cap construction, conducted by NJDEP, began in April 1993, and was completed in February 1994. Preparatory work included the placement of subgrade material, stabilization of landfill side slopes, and the installation of a landfill gas venting system. The areal extent of the cap is approximately 29 acres. The multi-layer cap includes layers of fill material, grading layers, gas collection layers for the gas venting system, filter fabric, an impermeable membrane, a drainage layer, a fill layer, and a topsoil layer. During construction of the cap, areas of the site were regraded to provide for surface water management. Following cap construction, the site was revegetated.

Site fencing was installed between February 1994, and August 1994. A final site Preliminary Closeout Report was approved by EPA in September 1998. In March of 2004, EPA deleted the site from the NPL.

Institutional Controls

Although the ROD did not require institutional controls (ICs) and EPA does not believe they are necessary at this site for the remedy to be protective, under its landfill closure and post-closure regulations (New Jersey Solid Waste Regulations, N.J.A.C 7:26–2A.9), NJDEP requires ICs, in the form of a deed notice. A deed notice would remain in effect in perpetuity, and require prior approval from the NJDEP before any future disturbance occurs. However, the former site owner is defunct and the site is not currently owned by a viable entity. Therefore, until an entity buys the property or one of the three townships take possession of the property, a deed notice cannot be placed on the property.

Systems Operations/Operation & Maintenance

O&M activities associated with the site continue to be conducted by NJDEP, in accordance with the 1994 O&M Plan. These activities include inspections of site security fencing and potential areas of landfill cap degradation. The following periodic environmental sampling has been performed:

- Groundwater sampling of upgradient and downgradient monitoring wells (biennially, except for MW-7S which is sampled annually).
- Surface water sampling (biennially).
- Sediment sampling (two events in the FYR period).
- Soil gas and water level measurements (annually).

Potential site impacts from climate change have been assessed, and the performance of the remedy may be impacted by the following climate change effects in the region and near the site:

- Increasing frequency of heavy precipitation events.
- Increasing intensity of storms (winds/precipitation).
- Increase in floods.
- Changes in temperature.

However, the O&M Plan addresses these impacts by conducting frequent inspections of the site that will detect and correct any damage sustained by the climate change effects mentioned above.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** FYR as well as the recommendations from the **last** FYR and the current status of those recommendations. The last FYR concluded that the implemented remedy was intact and in good repair and continued to protect the public and the environment from exposure to contaminated materials. The last FYR also noted that an O&M program was in effect to monitor the cap condition and gas emissions, in addition to biennial environmental sampling which indicated the remedy was functioning as intended.

Table 1: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy is protective of public health and the environment.

During the last FYR there were no issues identified that impacted protectiveness. It was recommended that the O&M program and the annual environmental sampling be continued, and that a minimum of two annual sediment sampling events be conducted over the next five years to evaluate the impact of the landfill on sediments. It was also recommended that data quality issues be addressed and that vinyl chloride and 1,4-dioxane continued to be monitored in MW-7S.

Table 2: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
1	To better evaluate the landfill impact on sediments	Sediment sampling events to be conducted at a minimum twice in the next five-year review period	Completed	Described below in "Recommendation #1"	7/28/2017
1	While both vinyl chloride and 1,4-dioxane are present in the landfill leachate, it is inconclusive whether they are a concern based on a detection in a single sampling event.	That vinyl chloride and 1,4-dioxane continue to be monitored in MW-7S.	Completed	Described below in "Recommendation #2"	8/21/2018

Recommendation #1 Status

Sediment data, during the previous five-year review (2010-2014) indicated exceedances of inorganics (arsenic, cadmium, chromium, manganese, nickel and zinc) in comparison to the lowest effect levels (LELs) with the most exceedances seen at location sed-6 which is adjacent to the landfill. These levels appeared to be elevated in comparison to the upgradient location and screening values. The monitoring plan only required one sediment sampling event every five years. Due to the elevated results collected to support the previous five-year review, it was recommended that a minimum of two sediment sampling events occur over the next five-year review period (2014-2019) to evaluate if elevated levels may be attributed to the landfill. Two sediment events occurred during this five-year review period. It is uncertain whether detected levels are attributed to the landfill or background conditions.

During this review period inorganics (arsenic and zinc) in sediment appear to be elevated in comparison to the upgradient location and screening values. Therefore, it is recommended that the sediment sampling continue twice during every five-year period to monitor any potential impacts to the benthic environment and additional upgradient sampling be conducted.

Recommendation #2 Status

Vinyl chloride and 1,4-dioxane were detected in groundwater monitoring well MW-7S above the New Jersey Groundwater Quality Standards (NJGWQS) and Interim Specific Groundwater Criterion, respectively, in 2012, but neither chemical was detected in 2013. While both vinyl chloride and 1,4-dioxane are present in the landfill leachate, it was inconclusive whether vinyl chloride and 1,4-dioxane were a concern based on a detection in a single sampling event.

At present, downgradient monitoring well MW-7S is the only monitoring location to exhibit exceedances of organic compounds. Specifically, 1,4-dioxane and vinyl chloride have been detected above their NJGWQS at that location. Trends indicate that concentrations of 1,4-dioxane may be increasing at this location, while vinyl chloride trends are stable to increasing. A detection in 2017 of 1,4-dioxane at location BV-6S (1,000 feet west of MW-7S and also on the downgradient side of the landfill) also supports the need for continued monitoring and evaluation of the leachate collection system.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2018, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 42 Superfund sites in New York, New Jersey, US Virgin Islands and Puerto Rico, including the Florence Land Recountouring Landfill Superfund site. The announcement can be found at the following web address: <https://www.epa.gov/aboutepa/fiscal-year-2019-five-year-reviews>. In addition to this notification, a public notice was made available by posting on the Florence, Mansfield and Springfield Townships' respective websites on July 23, 2019, stating that there was a FYR and inviting the public to submit any comments to EPA. The results of the review and the report will be made available on the site website (<https://www.epa.gov/superfund/florence-landfill>) and at the site information repository located at the

Florence Township Library
1350 Hornberger Avenue
Roebbling, New Jersey 08554
Phone: (609) 499-0143

and

EPA Region 2, Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
Phone: (212) 637-4308 (Call to make an appointment)

Data Review

Groundwater:

Environmental sampling was conducted in 2015, 2016, 2017, and 2018 to support this FYR. (Please refer to Figure 3 for a site map with monitoring well locations). The sampling program includes eight monitoring wells, BV-4D, BV-4S, BD-5D, BV-5S, BV-6D, BV-6S, MW-7S, and MW-8S, screened in both a shallow and deep interval. All monitoring wells are sampled biennially (2015 and 2017 in this review period) with the exception of downgradient well MW-7S, which is sampled annually. Groundwater samples are analyzed for VOCs, semi-volatile organic compounds (SVOCs), and inorganics/metals. Water level data is collected annually from each monitoring well, in addition to locations PZ-1, PZ-2, PZ-3, PZ-4, PZ-5, PZ-6, GS-3, GM-17S, GM-15D, and GM-22.

Inorganic constituents, including arsenic, barium, beryllium, nickel, chromium, cobalt, iron, manganese, and zinc are routinely detected site-wide at levels consistent with background/upgradient monitoring wells BV-4D and BV-4S. An isolated detection of chromium (80 ug/l) in exceedance of its NJGWQS of 70 ug/l was noted at upgradient location BV-4S in 2017. This well will continue to be monitored biennially to evaluate any significant trends, however, there is no indication that the monitoring well location is impacted by the landfill.

Groundwater monitoring data during the review period indicate that the majority of monitoring wells do not have impacts of VOCs and SVOCs above Class IIA NJGWQS. Vinyl chloride was detected in one well, MW-7S, in the last five years above the NJGWQS of 1 ug/l, at 1.2 ug/l in 2016, 2 ug/l in 2017, and 1.2 ug/l in 2017, as shown on the trend graph in Figure 4. 1,4-dioxane was not analyzed at the time of the ROD, but in the last five years it has been detected above the NJGWQS of 0.4 ug/l in MW-7S in 2016, 2017, and 2018 at 28 ug/l, 34 ug/l, and 28 ug/l, respectively. The NJGWQS value is based on a 10⁻⁶ cancer risk level. All detections are below the upper end of EPA's acceptable risk range of 10⁻⁴ (40 ug/l).

Downgradient monitoring well MW-7S, located outside of the landfill and leachate collection system, is the only monitoring location to exhibit exceedances of organic compounds. Trend analysis of data from this well indicates that concentrations of 1,4-dioxane have been increasing, while vinyl chloride trends are stable to increasing. Well BV-6S, approximately 1,000 feet north and also on the downgradient side of the landfill, had a 1,4-dioxane concentration of 0.14 ug/l in 2017, below its NJGWQS of 0.4 ug/l.

Historical analysis of landfill leachate confirms the presence of vinyl chloride in the leachate, however no samples have been collected recently or analyzed for 1,4-dioxane. Groundwater flow in the vicinity of MW-7S and BV-6S confirms an outward gradient from the landfill to downgradient locations on the southeast edge of the landfill boundary. There are no groundwater monitoring points downgradient of MW-7S to delineate the extent of contamination outside the landfill. Groundwater contamination outside the landfill will need further investigation.

With the exception of the southeast portion of the landfill, hydraulic gradients in the overburden aquifer at the site indicate that the slurry wall is functioning as intended. On the upgradient portion of the landfill (north), groundwater flow is into the landfill. The upgradient groundwater interceptor trench is functioning as intended and reducing the amount of groundwater entering the site. Hydraulic gradients on the southwest portion of the landfill are also inward. Two monitoring well pairs on the southeastern part of the landfill boundary (PZ-4/BV-6S and PZ-3/MW-7S) have outward gradients. Coupled with the presence of 1,4-dioxane at both MW-7S and

BV-6S and vinyl chloride at MW-7S, there is reason to suspect the slurry wall is not functioning as intended in this area.

Surface Water:

Surface water data suggest that concentrations are decreasing. In 2015, there remained a few exceedances for arsenic, up to 4.1 J ug/l at SW-7. The NJDEP Surface Water Quality Standard (SWQS) is 0.017 ug/l for protection of human health from consumption of biota, but below the aquatic chronic value of 150 ug/l. There were also exceedances for thallium, up to 2.8 J at SW-5; the SWQS for human health is 0.24 ug/l. In 2017, there were no exceedances for thallium and the maximum arsenic concentration was 2.0 ug/l at SW-7.

Sediment:

New Jersey has not promulgated sediment standards, therefore Residential Direct Contact Soil Remediation Standards (RDCSRS) were used as a conservative comparison for the recreational pathway. Two rounds of sediment samples have been collected from Assiscunk Creek (adjacent to the FLR site) in the last five years. In 2015, arsenic exceeded the RDCSRS of 19 mg/kg at three locations: sed-1 (42.7 mg/kg), sed-7 (21.5 mg/kg), and sed-10 (26.2 mg/kg). However, in 2017 there was only one minor exceedance in sed-7 (19.8 mg/kg).

The only other inorganic contaminant detected in 2015 above its RDCSRS of 78 mg/kg was vanadium, at sed-1, with 377 mg/kg. Vanadium was not detected above this conservative standard in the 2017 sampling round. As in groundwater and surface water, VOCs were not a concern in sediment. SVOCs, pesticides and PCBs were also not a concern in sediment.

Sediment concentrations have decreased in 2017, compared with 2015, but continued monitoring will determine whether this trend continues. As previously mentioned, New Jersey's soil remediation standards were used for comparison, not compliance. They are conservative as it is unlikely someone would have as much direct contact with sediment as they would soil and these values are based on residential exposure which is far more frequent than recreational exposure. Further, many of these contaminants are likely regional and not site-specific contaminants though specific COCs were not identified in the ROD.

Regarding ecological receptors, most of the sediment samples (i.e., five locations in two sampling rounds) exceeded the Sediment Screening Criteria Lowest Effects Level (LEL) for arsenic of 9.8 mg/kg with concentrations up to 42.7 mg/kg at sed-1 in 2015. In 2017, concentrations decreased to 16.8 mg/kg and 14.4 mg/kg at this location. Both of these concentrations are below the NJDEP background levels for soils.

Site Inspection

The inspection of the site was conducted on February 8, 2019. In attendance were Grisell V. Díaz-Cotto, Remedial Project Manager from EPA, and Chad VanSciver, Field Sampler, from NJDEP (Lead agency). The purpose of the inspection was to assess the protectiveness of the remedy.

- Groundwater Monitoring Wells - There are a number of wells on the site and off-site that are part of the sampling plan. All wells inspected were undamaged and were determined to be in good working order. These wells will continue to be inspected throughout the sampling program, as needed. If there is a need to decommission any wells in the future, the appropriate actions will be taken.
- Security Fencing - Upon inspection, no deficiencies were noted regarding the site security fencing. Fencing was visible around the perimeter of the former landfill area, ending near the access gate.
- On-site Drainage System - The drainage system located in the center and along the northern portion of the site was inspected. No blockages or debris were noted and water was flowing through the system.

- Off-site Creek Area – The areas where Assiscunk Creek approaches the site were inspected. Nothing out of the ordinary was noted.
- The landfill was adequately covered by grass, and some surface puddling was noted during the heavy rain event that occurred during the inspection.

V. TECHNICAL ASSESSMENT

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

The landfill cap, slurry wall, and upgradient groundwater interceptor trench are generally operating effectively and preventing leachate contamination of groundwater outside of the landfill boundary. Based on hydraulic gradients and contamination trends observed southeast of the landfill, migration of the leachate outside of the slurry wall is occurring. Further investigation is required on the southeast portion of the site in the vicinity of MW-7S and BV-6S, and repairs or upgrades to the slurry wall and leachate collection system should be considered.

Surface water sampling data show that the landfill is not impacting the adjacent Assiscunk Creek. However, the most recent sediment sampling event indicated minor exceedances in comparison to the Sediment Screening Criteria LELs with the most exceedances seen at location sed-6, which is adjacent to the landfill. It is recommended that an additional round of sediment samples be collected and evaluated during the next FYR.

Sediment exceedances were also located at sed-1 and sed-7 on the downgradient end of Assiscunk Creek. Additional downgradient samples should be considered to be certain that site-related contamination is being fully characterized. It is recommended that additional upgradient samples be collected to determine which contaminants are site-related.

The security fence with warning signs was constructed around the entire landfill. To date, the fencing continues to be inspected on a frequent basis by NJDEP and there was no evidence of trespassing during the February 8, 2019, inspection. The fence maintenance will continue indefinitely.

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

The 1986 ROD was signed prior to the implementation of the Risk Assessment Guidance for Superfund used currently by EPA. However, the process that was used remains valid.

The RI/FS revealed that the main source of environmental concern at the site was the reported deposition of hazardous waste, including phthalates, heavy metals and vinyl chloride monomers. As a result, groundwater, surface water and sediment samples are analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganics/metals. No specific contaminants of concern (COCs) or remedial goals were identified in the ROD.

Exposure pathways evaluated as indicated in the ROD included:

- Ingestion of contaminated groundwater as drinking water downgradient of the site (residential).
- Dermal contact and/or incidental ingestion of sediment and/or surface water in Assiscunk Creek that may have been contaminated via surface water runoff and groundwater flow from the site (recreational).
- Inhalation of on-site air emissions (workers/trespassers).
- Dermal contact with hazardous substances potentially found near the ground surface in the landfill (workers/trespassers).

The RAO for the site is to control the potential release of contaminants from the landfill. Based on the general exposure pathways, more specific objectives were established: mitigate downgradient off-site groundwater contamination; mitigate on-site surface-water runoff contamination; mitigate off-site air contamination; and, mitigate the potential for health hazard exposure and enhance on-site safety. These RAOs remain valid.

Inorganics in groundwater are no longer a concern at the Site as only chromium was detected in one well, BV-4S in 2017 at 80 ug/l above its Class IIA New Jersey Groundwater Quality Standard (NJGWQS) of 70 ug/l. Groundwater monitoring data during the review period indicates that the majority of monitoring wells also do not have impacts of VOCs or SVOCs above NJGWQS. Vinyl chloride was detected in one well, MW-7S in the last five years above the NJGWQS of 0.4 ug/l at: 1.2 ug/l in 2016, 2 ug/l in 2017 and 1.2 ug/l in 2017. 1,4-dioxane was not analyzed at the time of the ROD but in the last five years has been detected above the Groundwater Quality Criteria set by NJDEP of 0.4 ug/l in MW-7S in 2016, 2017 and 2018 at 28 ug/l, 34 ug/l, and 28 ug/l, respectively. This value 0.4 ug/l is based on 10^{-6} cancer risk level. All detections are below the upper end of the acceptable risk range of 10^{-4} (40 ug/l).

Soil vapor intrusion (SVI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. Based on the minimal VOC detections reported in groundwater above, the vapor intrusion pathway remains incomplete at the FLR Site.

As mentioned previously, sediment concentrations have decreased in 2017, when compared 2015 sediment data, and many of these contaminants are likely regional and not site-specific contaminants.

The 1986 ROD remedy was successful in removing the pathway for direct contact with contaminated landfill soil and debris and contaminated lagoon sediments, since they were all placed under the landfill cap.

It appears that migration of the leachate outside of the slurry wall is occurring in one area towards the southeast. The extent of 1,4-dioxane and vinyl chloride contamination to the southeast of the landfill should be further delineated and impact to potential receptors to the south of the Assiscunk Creek should be evaluated, including any domestic wells that may be present in this area.

Based on the provided data, it appears that very little site-specific contamination is migrating into surface water or sediment; however, continued monitoring will confirm. Landfill gas is collected and treated, minimizing the migration of off-site air contamination. Continued monitoring will insure that humans are not exposed to unacceptable levels of risk.

Although a formal ecological risk assessment was not included in the 1986 ROD, the remedy remains protective of both terrestrial and aquatic receptors by eliminating the exposure pathway. While the surface water data are below ecological criteria, inorganics (arsenic and zinc) in sediment appear to be elevated in comparison to the upgradient location and screening values. Therefore, it is recommended that the sediment sampling be continued at the frequency of twice every five-year period to monitor any potential impacts to the benthic environment.

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

The extent of 1,4-dioxane and vinyl chloride contamination in groundwater to the southeast of the landfill should be further delineated. Impact of this contamination to potential receptors to the south of the Assiscunk Creek should be evaluated.

Further, a majority of sediments exceedances were located at sed-1 and sed-7 on the downgradient end of Assiscunk Creek. Perhaps additional downgradient samples should be collected to be certain we are capturing anything that may be site-related. It would also be worthwhile to collect additional upgradient samples to determine which contaminants appear to be regional and not site-related.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the Five-Year Review:	
<i>None</i>	

Issues and Recommendations Identified in the Five-Year Review:
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OU(s): OU1	Issue Category: Remedy Performance			
	Issue: Contaminants have been detected downgradient of the landfill above NJGWQS, and a well in this area is exhibiting increasing trends. Hydraulic gradients in the area confirm outward flow of groundwater from the landfill.			
	Recommendation: (1) Groundwater contamination exceeding NJGWQS for 1,4-dioxane and vinyl chloride in the vicinity of MW-7S must be delineated. (2) The source, either the leachate collection system or slurry wall, needs to be evaluated to optimize and increase capture, and decrease the outward flow gradient. (3) Location BV-6S should be added to the annual sampling program to monitor for any changes in contaminant concentrations, given that this side-gradient location exhibits the same hydraulic properties as MW-7S, though contaminant detections remain below NJGWQS. (4) Leachate samples should be analyzed for site constituents at least once during the next review period.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	State	State	9/1/2022

In addition, the following suggestions do not affect protectiveness, but would be helpful in interpreting the sediment data. The data qualifier (P) for PCB analysis of sediment indicated uncertainty associated with the PCB analytical results. Additional quality control of the analytical methodology may provide greater confidence in PCB sediment sample analysis results. Sediment samples should continue to be collected twice in the five-year period. Consideration should be given to locating samples further upstream and downstream to ensure that upgradient sources are considered and the full range of potential impacts from the landfill are captured.

VII. PROTECTIVENESS STATEMENTS

Protectiveness Statement(s)	
<i>Operable Unit:</i> 1	<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The OU1 remedy currently protects human health and the environment in the short term because all human and ecological risks are currently under control and no unacceptable risks are occurring. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: (1) Groundwater contamination exceeding NJGWQS for 1,4-dioxane and vinyl chloride in the vicinity of MW-7S must be further delineated. (2) The source, either the leachate collection system or slurry wall, needs to be evaluated to optimize and increase capture, and decrease the outward flow gradient. (3) Location BV-6S should be added to the annual sampling program to monitor for any changes in contaminant concentrations, given that this side-gradient location exhibits the same hydraulic properties as MW-7S, though contaminant detections remain below NJGWQS. (4) Leachate samples should be analyzed for site constituents at least once during the next review period.	

Sitewide Protectiveness Statement
<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The OU1 remedy currently protects human health and the environment in the short term because all human and ecological risks are currently under control and no unacceptable risks are occurring. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: (1) Groundwater contaminants, 1,4-dioxane and vinyl chloride need to be further delineated in the vicinity of MW-7S. (2) The source of 1,4 dioxane and vinyl chloride in groundwater, either the leachate collection system or slurry wall, needs to be evaluated to optimize and increase capture, and decrease the outward flow gradient. (3) Location BV-6S should be added to the annual sampling program to monitor for any changes in contaminant concentrations, given that this side-gradient location exhibits the same hydraulic properties as MW-7S, though contaminant detections remain below NJGWQS. (4) Leachate samples should be analyzed for site constituents at least once during the next review period.

VIII. NEXT REVIEW

The next FYR report for the Florence Land Recontouring Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Reference	Date
Record of Decision	1986
First FYR	2004
Second FYR	2009
Third FYR	2014
Groundwater Summary Report	May 12, 2015
Surface Water and Sediment Sampling Memo Revised	March 17, 2015
Analytical Data Package Review Memo, Sediments	March 17, 2015
Analytical Data Package Review, Surface Water	March 17, 2015
Sediment Sampling Supplement Memo	April 29, 2015
Groundwater Summary Report	December 5, 2016
Surface Water Analytical Data Report Package	July 27, 2017
Analytical Report, Surface Water and Sediment	July 28, 2017
Analytical Report, Groundwater and Surface Water	August 3, 2017
Analytical Report, Monitoring Wells	August 22, 2018

APPENDIX B

Figure 1



Figure 2



Figure 4

