

**Fifth Five-Year Review Report
FMC Dublin Road Superfund Site
Townships of Ridgeway and Shelby, Orleans County, New York**



Prepared by

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

Approved by:

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**Eric Wilson, Acting Director
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A handwritten date in blue ink, "March 31, 2020", is written over a horizontal line.

Date

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LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
ARP	Approved Remedial Plan
ARARS	Applicable or Relevant and Appropriate Requirements
BHHRA	Baseline Human Health Risk Assessment
BHC	Benzene hexachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DDT	Dichlorodiphenyltrichloroethane
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
ICs	Institutional Controls
MCL	Maximum Contaminant Level
mg/L	milligrams/Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
PPB	Parts per billion
PPM	Parts per million
PRP	Potentially Responsible Party
RADS	Remedial Action Detection Limits
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
ROD	Record of Decision
RI/FS	Remedial Investigation/Feasibility Study
SPHEM	Superfund Public Health Evaluation Manual
SMP	Site Management Plan
TCLP	Toxicity Characteristic Leaching Procedure
TI	Technical Impracticability
ug/L	micrograms/Liter
VI	Vapor Intrusion
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leaching Procedure
UU/UE	Unlimited Use and Unrestricted Exposure
VOCs	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in 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 Oil and Hazardous Substances Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the fifth FYR for the FMC Dublin Road Superfund Site (Site), located partly in the Town of Ridgeway and partly in the Town of Shelby, Orleans County, New York. The triggering action for this statutory review is the signing date of the previous FYR Report, September 30, 2015. The FYR has been prepared since hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit, which is addressed in this FYR.

The FMC Dublin Road Superfund Site FYR was led by Isabel Fredricks, EPA Remedial Project Manager. Participants included Liana Agrios, EPA hydrogeologist, Marian Olsen, EPA human health risk assessor, and Julie McPherson, EPA ecological risk assessor. The potentially responsible party (PRP) for the Site, was notified of the initiation of the FYR. The review began on 9/30/2015.

Site Background

The Site is in northwestern New York in Orleans County, and is situated partly in the Town of Ridgeway and partly in the Town of Shelby. The 30-acre property originally consisted of a rectangular portion of approximately 21 acres lying north of Dublin Road, and a triangular portion of approximately nine acres lying south of Dublin Road. The northern section is partially wooded and contains a wetland, a drainage swale, and two inactive rock quarries. Jeddo Creek runs in a northerly direction through the northeast corner of the Site. The southern portion of the Site contains a waste pile, a rectangular pond and a swampy area; it is bounded by the New York State Barge Canal to the south and west, Dublin Road to the north, and a municipal landfill to the east (see Appendix A - Site map).

From 1933 to 1968, approximately nine acres of the southern portion of the Dublin Road Site were used for disposal of coal ash cinders, industrial debris, lime-sulfur solution residues from a filtration process, and other materials, primarily from the Niagara Sprayer/FMC manufacturing plant in Middleport, New York. These waste materials were placed in the Waste Pile, which consisted of a surface pile and a below-grade burial zone.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: FMC Dublin Road		
EPA ID: NYD 00511857		
Region: 2	State: NY	City/County: Towns of Ridgeway and Shelby, Orleans County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	Has the Site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA <i>[If "Other Federal Agency", enter Agency name]:</i>		
Author name (Federal or State Project Manager): Isabel Fredricks		
Author affiliation: EPA		
Review period: 9/30/2015 – 2/6/2020		
Date of Site inspection: 10/25/2019		
Type of review: Statutory		
Review number: 5		
Triggering action date: 9/30/2020		
Due date (five years after triggering action date): 9/30/2020		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

An Administrative Order on Consent (AOC) was entered into between the New York State Department of Environmental Conservation (NYSDEC) and the potentially responsible party (PRP) FMC Corp in 1982, whereby FMC agreed to conduct a field investigation. The Site was added to the National Priorities List (NPL) on June 1, 1986. FMC and NYSDEC entered into a second Consent Order in February 1988 under which FMC agreed to further define the extent of contamination at the Site, complete the Remedial Investigation/Feasibility Study (RI/FS) and perform the remedial action. The 1988 Consent Order superseded and replaced the 1982 Order. The RI, including a supplemental field investigation, was completed in May 1989 and was approved by NYSDEC in June 1990. The FS was approved in January 1991.

Pathways evaluated in the risk assessment comprised of: surface water for an on-Site intruder; surface water and groundwater for future residents at the Site boundary; groundwater for the nearest current

potential receptor; and surface water and soil for the Dublin Road user. The risk assessment report was prepared in 1988 and used the "Superfund Public Health Evaluation Manual" (SPHEM, 1986) as guidance. The risk assessment followed the process outlined in SPHEM for groundwater and surface water exposures and compared exposure concentrations to Applicable or Relevant and Appropriate Requirements (ARARs). In later guidance such as the "Risk Assessment Guidance for Superfund" (RAGS, 1989), baseline evaluations are not considered complete based on comparisons to ARARs. The contaminants of concern at the site were arsenic, copper, lead, mercury, zinc, BHC (alpha, beta, and gamma) and DDT, DDE and DDD. The cancer risk calculated using RAGS for ingestion of overburden groundwater contaminated with arsenic at the Site would have exceeded EPA's acceptable risk range of (10^{-4} to 10^{-6}) and HI = 1 based on the maximum concentration of arsenic in groundwater at the waste pile area (e.g., 366 ug/l).

In the ecological risk assessment, a comparison was conducted between estimated exposure point concentrations and ARAR values corresponding to protectiveness of the resident aquatic and terrestrial biological communities. Additional chemical, physical and biological data and information were obtained through site-specific sampling and a literature search to assess bioaccumulation potential and environmental impacts. A habitat-based assessment was completed. The rectangular pond had contaminant concentrations exceeding water quality standards for all contaminants of concern. The remaining water bodies at the site exceeded the water quality standards for several COPCs. The sediments exceeded the criteria for pesticides in all the surface water bodies.

Response Actions

Remedy Selection

In March 1993, NYSDEC and EPA issued a joint Record of Decision (ROD) selecting a remedial action for the Site. The ROD listed Remedial Action Objectives (RAOs) which are specific objectives to protect human health and the environment. These objectives are based on available information and standards, such as ARARs. The following RAOs were established:

- Adequately protect against ingestion of, or contact with, contaminated soil;
- Minimize damage to and provide adequate protection of the saturated zone from contaminants migrating from soil;
- Minimize damage from and adequately protect against the spread of the contaminated groundwater;
- Adequately protect against future ingestion of, or contact with, contaminated groundwater;
- Adequately protect against contamination of surface water and sediments in the Site vicinity; and
- Adequately protect against contaminated dust emissions into ambient air.

To address these RAOs, the 1993 ROD called for a number of remedial actions to mitigate exposures and restore the environment. The major elements of the 1993 remedy are presented below.

- Excavation, screening, and stabilization of all contaminated materials (soil and sediments) from the Waste Pile, Rectangular Pond, Swamp, Drainage Swale, the Quarries, and other areas contaminated above cleanup levels;
- Stabilization of materials that failed the toxicity characteristic leaching procedure (TCLP);
- Construction of a customized on-Site containment cell complete with a leachate collection system and permanent cap designed to meet the New York States Landfill Regulations at 6NYCRR Part 360;
- Deposition of stabilized material and other soil/sediment contaminated above cleanup levels in the on-Site containment cell;
- Collection of contaminated groundwater via a series of extraction wells;
- Treatment of contaminated runoff water, construction water, and groundwater in an on-Site groundwater treatment system;
- Restoration of the wetlands that existed on-Site;
- Installation of permanent fencing around the Site;
- Placement of deed restrictions on the property at the completion of remediation; and
- Performance of a long-term operation, maintenance, and monitoring plan (OM&M) at the Site.

To address risks posed by the Site, the ROD identified soil/groundwater cleanup levels for arsenic, copper, zinc, lead, benzene hexachloride (BHC (4 isomers)), and dichloro-diphenyl-trichloroethane (DDT (and 2 metabolites)). Refer to Appendix B for cleanup levels for Chemicals of Concern (COCs). Although the concentration of mercury was not significant in the 1988 data, a cleanup level for mercury was specified in the ROD.

An ESD was issued in July 1995, which amended the ROD and addressed the a greater quantity of contaminated soils that needed to be placed into the containment cell than contemplated in the 1993 ROD.

Status of Implementation

The remedial design for this Site was completed and approved in May 1994. The remedial action began in May 1994 and construction was completed in September 1996. The entire Site was cleared of trees and vegetation except for a small area north of Dublin Road. The wood was chipped, stockpiled, and later used as road bed material on-Site. In 1994, excavation work began in the Waste Pile area and proceeded to the Rectangular Pond, Swamp, Quarries and exclusion zones. Contaminated soils passing TCLP analysis were directly deposited into the containment cell. Excavated material that failed TCLP were treated through stabilization and then placed directly in the containment cell. Material requiring stabilization was temporarily stockpiled until stabilization was completed. The total volume of contaminated material excavated in 1994 was 44,931 cubic yards. In 1995, materials were excavated from the entire area south of Dublin Road. The depth of excavation varied, but most areas were excavated

down to bedrock. The roadbed of Dublin Road was also excavated. A NYSDEC Part 360 cap was placed over the containment cell. The total volume of contaminated soil excavated in 1995 was 25,947 cubic yards. In 1996, the quarries and the areas between them were sampled. Sample results showed that the material exceeded cleanup levels. The quarries were dewatered, sediments were removed, soil between them was excavated, and the material was disposed of off-Site at the Chemical Waste Management facility in Model City, New York. The total volume of contaminated sediment disposed of off-Site was 771 cubic yards. A new wetland was constructed north of Dublin Road and the area south of Dublin Road was graded and a soil layer placed over the bedrock. The disturbed areas were then seeded, and the Site was enclosed by a fence. Surface water run-off from the controlled areas was collected, treated, and discharged to Jeddo Creek and later to the on-Site containment cell.

In 1995, the groundwater extraction system was installed, and the treatment plant was constructed. In the fall of 1996, the groundwater extraction and treatment systems were placed into operation. The groundwater extraction system is comprised of eleven extraction wells and sumps. The treated groundwater was being discharged to the on-Site wetland in accordance with the established discharge limits.

In 1996, the wetlands were restored. The former drainage swale north of Dublin Road was restored as an open water impoundment between the original Swamp and the East Quarry. Isolated vegetation, peninsulas, and island habitat were incorporated in this wetland design.

EPA documented completion of construction activities in the Preliminary Closeout Report dated May 29, 1997.

In August 2005, FMC submitted a proposal to EPA and NYSDEC for the shutdown of the groundwater extraction system at the Site and for modifications of the Site monitoring program based on data. By letter dated August 28, 2006, the Agencies provided comments to FMC and advised that for purposes of the evaluation by the Agencies relative to discontinuing or modifying the groundwater extraction remedy, FMC should perform a Technical Impracticability (TI) Evaluation based on EPA guidance. Ultimately, because of decreasing concentrations of groundwater in containment cell monitoring wells and perimeter monitoring wells located outside of the containment cell, the report did not provide a rationale for a TI waiver at the Site, instead it simply provided the justification that continued operation of the groundwater treatment system was no longer necessary. On May 29, 2012, NYSDEC approved the TI report and the operation of the groundwater extraction and treatment system was terminated on May 29, 2012.

Institutional Control Implementation

The ROD included recommendations for limiting future use of the Site and the groundwater through deed restrictions, to insure that the remedial measures taken on the Site will not be disturbed and that the Site will not be used for purposes incompatible with the completed remedial action. The deed restrictions were implemented on June 17, 2015.

IC Summary Table

Table 1: Summary of Planned and/or Implemented Ics

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater, Surface Water and Soils	Yes	Yes	Entire Site	No activities to disturb or interfere with the containment cell, wetlands and the groundwater	Environmental Protective Easement and Declaration of Restrictive Covenants, June 17, 2015

Systems Operations/Operation & Maintenance

The Site Management Plan (SMP) includes operation and maintenance of the leachate collection system and maintenance of the containment cell. The groundwater treatment system was not operated during this FYR period, and no treated water was discharged to either the on-Site wetlands or to Jeddo Creek. The treatment building continues to be maintained in accordance with the SMP in the event that the treatment system must be restarted. The SMP also includes periodic groundwater and surface water monitoring. Currently groundwater is sampled on a semi-annual basis and surface water is sampled annually to assess performance of the remedy and/or surface and groundwater conditions at the Site. The groundwater monitoring well network consists of monitoring wells both up-gradient and down-gradient of the Site, as well as wells inside the containment cell.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

Table 1: Protectiveness Determinations/Statements from the 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy for the Site protects human health and the environment.

There were no issues and recommendations identified in the last FYR.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2019, EPA Region 2 posted a notice on its web site indicating that it would be reviewing Site cleanups and remedies at Superfund Sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the FMC Dublin Road Site. The announcement can be found at the following web address: <https://www.epa.gov/aboutepa/fiscal-year-2020-five-year-reviews>.

In addition, to this notification, a notice of the commencement of the FYR was sent to local public officials. The notice was provided to the town of Medina by email in December 2019, with a request that the notice be posted in municipal offices and on the respective town and village webpages. The purpose of the public notice was to inform the community that the EPA would be conducting a FYR to ensure that the remedy implemented at the Site remains protective of human health and the environment and the remedy is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the Site.

Once the FYR is completed, the results will be made available on EPA's FMC Dublin Road Site webpage (www.epa.gov/superfund/fmc-dublin-road). Site files are available at the Middleport Public Library at 8 Vernon Street in Middleport, N. Y. or EPA's Region 2 office located at 290 Broadway, 18th Floor, NY, NY 10007 between the hours of 9:00 AM to 5:00 PM Monday through Friday.

No interviews were conducted as part of the FYR.

Data Review

The network of monitoring wells has been installed to monitor groundwater conditions both upgradient and downgradient of the Site. The network consists of containment cell and perimeter wells.

Containment Cell Monitoring Wells

The containment cell wells are intended to monitor the integrity of the containment cell and the potential to impact groundwater quality at the Site. The containment cell is monitored by three overburden wells (M27, MW92, and MW93) and four wells installed in the upper bedrock (MW40, MW 89M, W90, MW91). These wells were sampled in November 1996 to establish baseline conditions. In accordance with the requirements in the Site Management Plan (SMP), the containment cell monitoring wells are currently sampled semi-annually for pesticides (4 BHC isomers) and metals (arsenic, copper, lead and zinc). Samples from MW-93 could not be collected during the October 2018 sampling event due to insufficient water volume within the well.

Analytical results from groundwater collected at the containment cell monitoring wells during this FYR period were all non-detect or were detected or estimated at concentrations below respective groundwater cleanup levels for all parameters analyzed. Monitoring of these wells will continue.

Perimeter Wells

The Site perimeter wells are intended to assess if contaminated groundwater is migrating off-Site. The Site perimeter is monitored by five wells: overburden well MW20, upper bedrock wells MW24, MW42, and MW61, and lower bedrock well MW60. Overburden monitoring well MW20 is located at the northeast corner of the Site hydraulically downgradient from the remedial area. Upper bedrock monitoring wells MW24 and MW42 are located at the downgradient perimeter of the Site near Jeddo Creek. Lower bedrock monitoring well MW60 and upper bedrock monitoring well MW61 are located on the northeast corner of the Site near Jeddo Creek. In accordance with the requirements in the SMP, the perimeter monitoring wells were sampled semi-annually for pesticides (4 BHC isomers) and metals (arsenic, copper, lead, and zinc). Samples from MW24 could not be collected semi-annually due to insufficient water yield within the well.

Analytical data results from groundwater samples collected at the perimeter monitoring wells during this five year review period were all non-detect or were detected or estimated at concentrations below the respective groundwater cleanup levels for all parameters analyzed. Monitoring of these wells will continue.

Surface Water Quality Sampling

In accordance with the requirements in the SMP, surface water monitoring of the on-Site wetland and East and West quarries is performed to assess potential migration of residual contaminated groundwater to surface water. Surface water monitoring was performed semi-annually in 2014 and then annually from 2015-2018. The surface water samples were collected from three locations at the Site (the wetland [SW-1], East quarry [SW-2] and West quarry [SW-3]) and analyzed for pesticides (4 BHC isomers) and metals (arsenic, copper, lead, and zinc). In 2014, surface water samples were also analyzed for mercury.

Analytical data results from surface water samples analyzed during this FYR period indicated no exceedances of surface water cleanup levels for all parameters. Monitoring of these surface water locations will continue.

Wetlands, Quarries and Drainage Culverts

Observations of the Site ditches and culverts indicated that they are all free of debris and are free flowing. Also, observations made during routine visits revealed no problem with wetland vegetation or the integrity of the dike associated with wetlands.

Fencing

Monthly inspections of the fencing are performed. Any deficiencies encountered are repaired.

Groundwater Extraction and Treatment System

Operation of the groundwater extraction and treatment system was discontinued on May 29, 2012, following NYSDEC approval of the TI report. The system was not operated during this FYR period, and no treated water was discharged to either the on-Site wetlands or to Jeddo Creek.

Site Inspection

The inspection of the Site was conducted on 10/25/2019. In attendance were Jeffrey Poulsen, Project Manager for Parsons, the consultant for FMC and Sherrel Henry, a Remedial Project Manager from EPA. The purpose of the inspection was to assess the integrity of the remedy.

During the Site inspection, there were no problems or deviations observed with respect to the ongoing operation and maintenance activities.

V. TECHNICAL ASSESSMENT

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

The primary objectives of the ROD were to stabilize contaminated materials in a customized containment cell, hydraulically contain groundwater by extraction, and treat on-Site water. EPA's review of Site documents, results of past groundwater and surface water data, and results of past Site inspections indicate that the ROD goals continue to be met by remedial activities.

Performance data collected for the startup of the groundwater extraction and treatment system, while operational, indicated that system functioned as intended and captured contaminated groundwater. Since 2013, groundwater analytical results from the containment cell and perimeter monitoring wells were below groundwater cleanup level concentrations. Operation of the groundwater extraction and treatment system was discontinued on May 29, 2012, following NYSDEC approval of the 2011 TI Evaluation of Groundwater Restoration at the FMC Dublin Road Site Report. Since the termination of the system, water-quality data derived from containment cell monitoring, perimeter monitoring, and surface-water monitoring do not show any groundwater issues resulting from the system shutdown.

The integrity of the cap has been maintained and the 12 containment cell collection sumps are operating as designed and maintain water levels at the prescribed levels beneath the cell. The cap is fully vegetated with no signs of erosion. The grass cover serves as a barrier to potential exposures to contaminants below the cover. Site fencing was observed to be in good condition and repairs were made when necessary. All wells were clearly marked. Surface water control structures (e.g., swales, wetland, and quarries) are in place and functioning. These structures prevent or limit erosion and potential exposures to the surface water.

The remedy has eliminated exposure to ecological receptors by excavating contaminated sediments from the swamps, quarry and rectangular pond and placing these materials along with contaminated soils in an on-Site containment cell with a leachate collection system and a cap which meets 6 NYCRR Part 360 regulations. There has been no change to the wetland vegetation or the integrity of the dike associated with the wetlands. Surface water locations in the wetland area near the east and west ends of the quarry are monitored to ensure that concentrations of contaminants of concern do not exceed the Site-specific surface water cleanup levels. The surface water data collected and analyzed during this FYR period indicated no exceedances of surface water cleanup levels for all parameters.

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

Human Health Risk Assessment

There have been no changes in the physical conditions and land use of the Site over the past five years that could affect the protectiveness of the remedy. In general, the Site has limited access based on location within an industrial area with fencing and the canals surrounding the Site also further limiting on-Site access.

Soil

Soil use at the Site has not changed in the past five years and is not expected to change during the next five years covered by this review. The designation “industrial” land use, and potential exposure pathways considered in the baseline human health risk assessment have not changed since the original assessment. Consistent with the remedy identified in the ROD, direct exposure to soils were interrupted by the excavation, stabilization and screening of all contaminated materials in soil and sediments from the waste pile, rectangular pond, swamp, drainage swale, and the quarries. Other areas of the Site contaminated above soil cleanup levels and material that failed TCLP toxicity characteristics were stabilized under the NYSDEC Part 360 cap in the on-Site containment cell.

Ground Water

Potential exposures identified in the human health risk assessment include: on-Site trespasser and on-Site intruder exposed to surface water; future on-Site residents at the Site boundary exposed to surface water and groundwater; and current off-Site residents exposed to groundwater.

Comparison of the analytical containment well data to the Site RAOs and the Remedial Action Detection Limits (RADs) indicates there were no exceedances of either limit during the 2017 monitoring year.

Comparison of the analytical perimeter well groundwater results to the Site RAOs and the RADs indicates the all pesticide data were below ROAs or non-detects during the 2017 monitoring year. All metals data are below the RAO for groundwater for this same period.

As indicated in the previous FYR, the cleanup level for arsenic in groundwater is listed as 0.025 mg/L while the maximum contaminant level (MCL) for arsenic is currently 0.01 mg/L. As described in the data review section, groundwater concentrations of arsenic in monitoring wells are below the current arsenic MCL of 0.01 mg/L.

In general, the treatment of soils and implementation of the extraction and treatment system effectively reduced contaminant concentrations in groundwater. Long term groundwater monitoring will continue.

Surface Water

As described above, surface water samples were collected from three locations at the Site (the wetland (SW-1), East quarry (SW-2) and West quarry (SW-3)). The results showed concentrations were non-detect and below the use criteria or cleanup levels and RAD limits. Long-term surface water monitoring will continue as memorialized in an update to the SMP.

Toxicity Values

Since the last FYR, several toxicity values were identified for updates through the Integrated Risk Information System (IRIS), EPA's database of toxicity values. Currently, the toxicity values for arsenic and copper are being updated through the IRIS process; however, since all exposure routes have been interrupted, a change in toxicity values would not affect the protectiveness of the remedy.

Vapor Intrusion

Soil vapor intrusion based-groundwater concentrations were evaluated in the previous FYRs. The results from the current analysis are consistent with previous analyses that vapor intrusion is not considered to be a concern at this Site.

Ecological Risk Assessment

Although the exposure assumptions and toxicity assessment conducted to support the 1989 Ecological Risk Assessment may not necessarily reflect the current methodology, the remedy is protective of ecological resources as contaminated sediments and soil were dredged/excavated and contained within a secure covered landfill. Furthermore, surface water indicated that the concentrations are below current surface water cleanup levels which are protective of ecological receptors.

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

No additional information has come to light that would call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

No additional issues or recommendations.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The remedy is protective of human health and the environment.		

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protective	<i>Planned Addendum Completion Date:</i> Click here to enter a date
<i>Protectiveness Statement:</i> The implemented remedy for the Site is protective of human health and the environment.	

VIII. NEXT REVIEW

The next FYR for the FMC Dublin Road Site is required five years from the completion date of this review.

REFERENCE LIST

Table 1: Chronology of Site Events	
Event	Date(s)
Administrative Order on Consent (AOC)	1982
Remedial Investigation	1982
Proposal to NPL	1984
Final Listing on NPL	1988
Remedial Investigation/Feasibility Study completed by PRP	1989
Record of Decision	1993
Remedial Design performed by PRP	1994
Explanation of Significant Differences (ESD)	1995
Remedial Action performed by PRP	1994-1996
Preliminary Close-out Report	1997
First Five-Year Review conducted by EPA	2000
Second Five-Year Review conducted by EPA	2004
Third Five-Year Review conducted by EPA	2010
Fourth Five-Year Review conducted by EPA	2015

Table 2: Documents, Data and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	Date
Record of Decision	1993
First Five-Year Review	2000
Second Five-Year Review	2005
Third Five-Year Review	2010
Fourth Five-Year review	2015
Periodic Review Report	2015-2018
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	

[illegible]

Appendix B – Cleanup Goals

Remedial goals were based on State ARARS or State RAOs for soil, sediment, groundwater, and surface water. Cleanup goals by media are listed below.

Soil cleanup goals included: arsenic (35 mg/kg), copper (25 mg/kg); mercury (0.1 mg/kg); zinc (30 mg/kg); DDT and DDE 8.8 mg/kg; DDD (12.4 mg/kg); lead (93 mg/kg); alpha-BHC (0.46 mg/kg); beta-BHC (1.6 mg/kg); and gamma BHC (2.3 mg/kg).

Sediment cleanup goals included: arsenic (5 mg/kg); copper (19 mg/kg); lead (27 mg/kg); mercury (0.11 mg/kg); and zinc (85 mg/kg).

Groundwater cleanup goals include: arsenic (0.25 mg/l); copper (0.2 mg/l); lead (0.015 mg/l); and zinc (0.3 mg/l).

Surface water cleanup goals include: arsenic (0.19 mg/l); copper (0.027 mg/l); lead (0.011 mg/l); BHC (total) (0.0005 mg/l); and DDT, DDE, and DDD (0.0001 mg/l).