

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750) Migration of Contaminated Groundwater Under Control

Facility Name: Federated Metals Corporation
Facility Address: 150 St. Charles Street, Newark, New Jersey 07101
Facility EPA ID#: NJD079320495

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA Corrective Action program, the EIs are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determination status codes should remain in the RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information:

Federated Metals Corporation (Federated) is situated on approximately 13.2 acres in the primarily industrial Ironbound Section of Newark, New Jersey, and was originally known as the American Smelting

and Refining Corporation/Federated Metal Division. Federated conducted operations at this site from 1943 to 1984. The facility manufactured metal alloys used in radiator manufacturing, including alloys of brass, copper, lead, tin, aluminum, zinc, and other white metals. Other products manufactured include magnesium, aluminum, and zinc cathode protection anodes used on steel structures. Buildings at the site formerly housed a chemical laboratory, shower/locker rooms, maintenance operations, ingot operations, receiving, and a furnace department (at which soil from hearth excavations was stockpiled prior to disposal). The property is currently leased to tenants engaged in a variety of commercial and light-industrial operations, including a recycling facility (paper, glass, and plastics), a freight distributor, a reator, and a precision tool manufacturer. The property is managed by Bridgeview Management Company, Inc. (Bridgeview), which is located in Perth Amboy, New Jersey. The entire property is covered either by asphalt or buildings with the exception of a small landscaped area located along St. Charles Street. A declaration of environmental restriction (DER) has been filed for the entire property and for the closed lagoon (SWMU 1) to ensure that the site remains non-residential and that the facility-wide asphalt cap is not disturbed. In addition, a groundwater classification exception area (CEA) has been developed to restrict groundwater use at the site and in potential areas where groundwater contamination may migrate.

Federated Metals received a RCRA Closure and Post-Closure Permit on February 1, 1993. The permit requires 30 years of groundwater monitoring at the site.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

 X If yes - check here and continue with #2 below.

_____ If no - re-evaluate existing data, or

_____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified at the Federated Metals facility to date are described below. A site map, identifying the approximate current or former location of each SWMU and AOC, is attached as Attachment 1.

SWMU 1, Surface Impoundment/Lagoon: This unit consisted of an unlined earthen settling pond located on the eastern portion of the site that received emission control dust and sludge decant from secondary lead smelting (K069 listed waste). In addition, the lagoon received spent phosphoric acid quench water and storm water runoff. This unit was in operation from 1954 to 1983. Discharges to the lagoon resulted in heavy metals contamination of soil and groundwater. In 1985, all liquids and sludges were removed from the lagoon, along with an additional 2.5 feet of soil from the lagoon bottom and one foot of soil from each of the sidewalls. Groundwater has been regularly monitored for heavy metals since June 1985. Final closure of the lagoon was initiated in December 1992 and completed in July 1993. Closure activities included draining of additional standing water, backfilling with clean fill, capping with two 36-mil geomembrane liners, and placement of an asphalt cap over the area. A Closure Permit was issued by NJDEP on February 18, 1993. On November 21, 1994, NJDEP determined that no further action was required for the lagoon, except for groundwater monitoring. (Reference No. 15, pg. 4.) Ongoing groundwater monitoring is required pursuant to New Jersey Pollutant Discharge Elimination System (NJPDES) Permit No. NJ0099058 and the facility's EPA-issued Hazardous and Solid Waste Amendment (HSWA) permit. The HSWA permit also requires periodic inspection and maintenance of the asphalt cap.

SWMU 2, Thermal Treatment Furnace/Incinerator: This unit was located in the Furnace Department Building in the central portion of the property. This unit was used to recover metals from waste materials. This unit ceased operations in 1984, while still under RCRA interim status, and a permit was never issued for the unit. No known releases occurred from this unit. Closure of the unit included demolition and disposal of approximately 50 tons of concrete and brick. Based on the Final Cleanup Report from January 1994, NJDEP determined that no further action was required for this unit. (Reference No. 15, pg. 5.) On page II-2 of the HSWA Permit, EPA concurs that no further action was required for the SWMU.

SWMU 3, Container Storage Area: This unit was located in the Ingot Building in the northern portion of the property, just south of the former Solid Waste Landfill (SWMU 4). This unit was used to store containers of cadmium oxide dust, as well as laboratory and baghouse wastes. This unit was closed in

1984 by removal of all material and physical decontamination of the concrete pad upon which containers were stored. A Closure Certification submitted by Federated was approved by NJDEP on April 30, 1987. (Reference No. 15, pg. 5.) Based on the Final Cleanup Report from January 1994, NJDEP determined that no further action was required for this unit. On page II-2 of the HSWA Permit, EPA concurs that no further action was required for the SWMU.

SWMU 4, Solid Waste Landfill: This unit is located in the most northern portion of the property and encompassed approximately 2.5 acres. The unlined landfill received magnesium slag waste from reverberatory smelting operations, classified by the Bureau of Hazardous Waste Classification as non-hazardous industrial waste. This unit has been inactive since 1980, and NJDEP approved the associated closure and post-closure activity on December 12, 1989. A Landfill Closure Certification was issued by NJDEP on April 18, 1991. Historical disposal of waste in this landfill has resulted in contamination of soil and groundwater by several heavy metals. A groundwater monitoring program has been in place since June 1985 to monitor metals concentrations in groundwater. In 1996, NJDEP determined that no further action was required with respect to soils within the closed landfill unit. (Reference No. 15, pg. 5.) Ongoing post-closure activities include groundwater monitoring and periodic inspection and maintenance of the asphalt cap. The landfill is enclosed by a fence and is currently used as a parking lot.

AOC A, Low Level PCB Area: This AOC consisted of a staging area adjacent to the former Chemical Laboratory Building. According to the Final Clean-Up Report from January 1994, remedial activities were conducted at this AOC in 1990, and no further action is required.

AOC B, Bulk Oil Impoundment: This AOC consisted of a tank area on the eastern portion of the site where approximately 300,000 gallons of No. 2 fuel oil were stored. According to the Final Clean-Up Report, impacted soil was removed from this area, and the AOC was decommissioned in the 1980s. No further action is required.

AOC C, Light Oil Impoundment: This AOC was located in the central portion of the site, south of the former container storage area (SWMU 3), and contained a tank area where approximately 36,000 gallons of No. 2 fuel oil were stored. According to the Final Clean-Up Report from January 1994, this area was decommissioned and confirmation samples were collected in 1990. Based on available analytical data, no further action is required for this AOC.

In summary, all SWMUs and AOCs at the Federated site, except for SWMUs 1 and 4, require no further action. SWMUs 1 and 4 are both inactive and closed, but previous activity at these two units have been associated with heavy metals impacts to soil and groundwater. Contaminated soil has been addressed via installation of a facility-wide asphalt cap. Groundwater contamination associated with these two SWMUs is being addressed through ongoing groundwater monitoring as part of the required post-closure activities outlined in the HSWA Permit which was issued to the facility in 1995.

References:

- (1) Letter from Daniel Chen, Princeton Aqua Science, to K. Savage, Federated Metals Corporation, Re: Soil Analysis in "Baseball Diamond" slag area – March 20, 1984.
- (2) Preliminary Assessment/Visual Site Inspection Report, prepared by EPA – April 1986.
- (3) Walk Through Inspection Report, prepared by NJDEP – July 14, 1986.

- (4) Letter from Ernest J. Kuhlwein, Jr., NJDEP to Barry C. Harris, Bridgeview Management Company, Inc. and Federated Metals Corporation, Re: Closure Certification Approval in Storage of Hazardous Waste in Containers – April 30, 1987.
- (5) Letter from Kenneth Siet, NJDEP, to Barry Tornick, EPA, Re: Lagoon Closure – August 26, 1988.
- (6) Letter from Irene Kropp, NJDEP to Barry C. Harris, Bridgeview Management Company, Inc. and Federated Metals Corporation, Re: Issuance of Final NJPDES-DGW Permit No. NJ0099058 – February 18, 1993.
- (7) Final Clean-Up Report, prepared by JMZ Geology – January 1994.
- (8) Letter from Thomas Spiesman, Porzio, Bromberg & Newman, to Bennett Barnes, NJDEP, Re: Revised Draft Declaration of Environmental Restrictions - August 31, 1994.
- (9) Statement of Basis/Fact Sheet, prepared by EPA – September 25, 1995.
- (10) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Request for Minor Modifications of NJPDES Permit NJ0099058 regarding Groundwater – December 18, 1995.
- (11) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1996 Sampling Round – June 17, 1996.
- (12) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Review of Final Remedial Action Report – May 1, 1997.
- (13) Letter from Theresa Pagodin, NJDEP, to Joel Golumbek, USEPA, Re: O&M Report for Federated Metals Corp., Newark, Essex County – June 10, 1997.
- (14) Letter from Linda Taylor, NJDEP, to Thomas Spiesman, Esq., Porzio, Bromberg & Newman, Re: Inspection Results – February 24, 2000.
- (15) Letter from Vincent Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Application for Renewal of HSWA Permit to Federated Metals Corporation – June 8, 2000.
- (16) Region 2 RCRA Cleanup Fact Sheet, prepared by EPA – undated.
- (17) Region 2 RCRA Corrective Action Site Fact Sheet, prepared by EPA – undated.

2. Is **groundwater** known or reasonably suspected to be “**contaminated**”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

 X If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

 If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

 If unknown - skip to #8 and enter “IN” status code.

Ratio nale :

Available documentation indicates that groundwater beneath and immediately downgradient of the Federated Metals site has been impacted by heavy metals associated with on-site activities at SWMUs 1 and 4, and chloride due to salt water intrusion.

Heavy metals presenting the most concern for both soil and groundwater at the Federated Metals site include arsenic, cadmium, fluoride, lead, selenium, and zinc. Surface and subsurface soil at SWMU 1 was found to be contaminated with heavy metals, including arsenic, cadmium, lead, and selenium above relevant NJ screening criteria. In 1985, two and one-half feet of soil was removed from the bottom of the lagoon and one foot from each side. Despite this remedial action, levels of heavy metals were still present above relevant NJ screening criteria in the lagoon area and in background samples. Although wastes in the landfill were classified as non-hazardous, soil samples collected at SWMU 4 contained elevated levels of arsenic and cadmium. In addition, industrial fill material used throughout the Newark region for grading of low lying areas appears to have contributed to a widespread soil contamination problem both on site and off site. Facility documentation indicates that approximately 120,000 cubic yards of this fill material was brought to the Federated site. The fill layer at Federated extends approximately ten feet below ground surface (bgs). Analysis of this material revealed elevated levels of antimony, arsenic, beryllium, cadmium, copper, lead, zinc, base neutral compounds, and petroleum hydrocarbons.

Groundwater samples from the Federated site have historically reported six inorganic parameters (arsenic, cadmium, fluoride, lead, selenium, zinc) above the NJDEP Class IIA Groundwater Quality Criteria (GWQC). Contaminant concentrations in groundwater, as documented in the facility’s HSWA permit from 1995, are shown in Table 1. (Reference No. 15, pgs. III-26 and 27.) Detected levels of chloride are also presented for informational purposes, although this contamination appears to be unrelated to site activity. Furthermore, while there was also some initial concern over elevated gross beta levels in several wells, these results were found to be related to the radioactive isotope K-40 (found in all natural

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

potassium and associated with sea water intrusion and heavy use of road salt for de-icing).

Table 1
Contaminant Characteristics in Groundwater

Constituent	Concentration (ug/L) Reported in Permit	Maximum Concentration Observed (ug/L)	Higher of GWQC or PQL (ug/L)
Arsenic	27.6	130	8
Cadmium	316	4,670	4
Chloride	515,918	3,050,000	250,000
Fluoride	14,400	67,500	2,000
Lead	5.5	154	10
Selenium	11.6	139	50
Zinc	4,724	118,000	5,000

Based on current contaminant levels, the relatively slow rate of natural attenuation and dilution, and the fact that inorganic compounds are not subject to decay, concentrations of chloride and several of the identified inorganic contaminants of concern are anticipated to exceed applicable GWQC in at least some of the on-site wells for the foreseeable future.

The map in Attachment 1 shows the location of existing on-site monitoring wells in relation to the SWMUs and AOCs. Based on the well configuration, it can be determined that previous activities at SWMUs 1 and 4 have impacted groundwater to some degree. Groundwater samples from the shallow wells immediately downgradient of SWMU 1 (MW-5R and MW-12S) contained higher concentrations of arsenic, cadmium, fluoride, and zinc than did samples from well MW-3, located immediately upgradient of the unit. Wells immediately downgradient of SWMU 4 report higher concentrations of fluoride, lead, and selenium than upgradient well MW-4. Well MW-13 also indicates higher concentrations of cadmium and zinc, as compared to the upgradient wells. Nevertheless, there also appears to be evidence of upgradient off-site contamination sources: upgradient well MW-3 shows consistent concentrations of several heavy metals (i.e., arsenic, cadmium, and fluoride) above the relevant screening criteria, and upgradient well MW-4 also shows elevated levels of arsenic and cadmium. (Reference 28.)

An understanding of the groundwater contamination at the site must include consideration of the regional groundwater quality. Numerous off-site potential and known sources of contamination exist in the area, and regional groundwater quality has been degraded by human activity. For this reason, it is difficult to determine the extent of contamination solely attributable to the site, and the effectiveness of addressing groundwater concerns on a site-by-site basis in the Newark metropolitan area. This conclusion is supported by information presented in the Groundwater Quality Assessment Plan Report from February 1989 (Reference No. 3, pgs. 2-20, 2-26, and 5-1), a National Groundwater Association article on groundwater in the Newark area from October 1992 (Reference No. 10), and the CEA Application dated

March 26, 1999 (Reference No. 26, pgs. 10 and 11). The HSWA Permit Renewal Application from June 2000 specifically notes that arsenic, lead, nickel, and zinc were found at other upgradient sources within the Ironbound section of Newark at concentrations equal to or greater than those observed at the Federated site (Reference No. 34, pg. 2). Furthermore, on pg. III-4, the current HSWA Permit (Reference No. 15) acknowledges that "Groundwater contamination consisting of heavy metals, inorganics, and chlorides has been documented throughout the site and off site within proximity to the facility. There exist numerous off-site potential and known sources of groundwater contamination in the area around the site, including many industrial facilities upgradient of the site and major transportation routes adjacent to the facility."

References:

- (1) Letter from Daniel Chen, Princeton Aqua Science, to K. Savage, Federated Metals Corporation, Re: Soil Analysis in "Baseball Diamond" Slag Area – March 20, 1984.
- (2) Letter from Kenneth Siet, NJDEP, to Barry Tornick, EPA, Re: Lagoon Closure – August 26, 1988.
- (3) Groundwater Quality Assessment Plan Report, prepared by The Earth Technology Corporation – February 8, 1989.
- (4) Letter from Edward A. Hogan, Porzio, Bromberg & Newman, to Irene Kropp, NJDEP, Re: NJPDES Permit No. NJ0099058 and Regional Groundwater Conditions – November 6, 1989.
- (5) Letter from Irene Kropp, NJDEPE to Thomas Speisman, Porzio, Bromberg & Newman, Re: Federated Metals Corporation NJPDES Permit Number NJ009058 – March 15, 1990.
- (6) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Joseph Ludvico, NJDEPE, Re: Planned Cap Maintenance – February 8, 1993.
- (7) Letter from Irene Kropp, NJDEPE to Thomas Speisman, Porzio, Bromberg & Newman, Re: Subclassification to a Less Restrictive Use for Groundwater and Lagoon Closure – February 18, 1993.
- (8) Letter from Irene Kropp, NJDEPE to Barry C. Harris, Bridgeview Management Company, Inc. and Federated Metals Corporation, Re: Issuance of Final NJPDES-DGW Permit No. NJ0099058 – February 18, 1993.
- (9) Final Clean-Up Report, prepared by JMZ Geology – January 1994.
- (10) Letter from J. Mark Zdepski, FMZ Geology, to Mike Kramer, EPA, Re: Area Groundwater Conditions (including National Groundwater Association article from October 1992 entitled Industrial Development, Urban Land-Use Practices, and Resulting Groundwater Contamination in Newark, New Jersey) – November 8, 1994.
- (11) Final Declaration of Environmental Restrictions, prepared by Thomas Speisman, Porzio, Bromberg & Newman – November 10, 1994.
- (12) Letter from Douglas Stuart, NJDEP, to Edward Hogan, Porzio, Bromberg & Newman, Re: ISRA Case #84193 – March 27, 1995.
- (13) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Bennett Barnes, NJDEP, Re: Evaluation of Elevated Gross Beta Levels in Monitoring Wells – July 27, 1995.
- (14) Statement of Basis/Fact Sheet, prepared by EPA – September 25, 1995.
- (15) HSWA Permit Issued to Federated Metals Corporation, EPA ID Number NJD079320495 – September 25, 1995.
- (16) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Request for Minor Modifications of NJPDES Permit NJ0099058 regarding Groundwater –

- December 18, 1995.
- (17) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1996 Sampling Round – June 17, 1996.
 - (18) Letter from Stephen Maybury, NJDEP, to Thomas Spiesman, Porzio, Bromberg & Newman, Re: Review of Final Remedial Action Report – May 1, 1997.
 - (19) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1997 Sampling Round – May 15, 1997.
 - (20) Letter from Theresa Pagodin, NJDEP, to Joel Golumbek, USEPA, Re: O&M Report for Federated Metals Corp., Newark, Essex County – June 10, 1997.
 - (21) Letter from Michael A. Justiniano, NJDEP, to Thomas Spiesman, Porzio, Bromberg & Newman., Re: Groundwater Monitoring Report Dated May 8, 1997 – December 10, 1997.
 - (22) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Peter Latimer, NJDEP, Re: NJPDES Permit Application for Renewal – January 6, 1998.
 - (23) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Peter Latimer, NJDEP, Re: December 10, 1997 NJDEP Letter – January 6, 1998.
 - (24) Letter from Stephen Maybury, NJDEP, to Thomas Spiesman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Sampling Plan – April 13, 1998.
 - (25) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1998 Sampling Round – May 21, 1998.
 - (26) Proposed Groundwater Classification Exception Area Report, prepared by JMZ Geology – March 26, 1999.
 - (27) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1999 Sampling Round – June 11, 1999.
 - (28) Classification Exception Area and Well Restriction Area Fact Sheet, prepared by NJDEP – June 17, 1999.
 - (29) Letter from Linda Taylor, NJDEP, to Thomas Spiesman, Porzio, Bromberg & Newman., Re: Proposed Groundwater Classification Exception Area – June 28, 1999.
 - (30) Letter from Thomas Spiesman, Esq., Porzio, Bromberg & Newman, to Bennett Barnes, NJDEP, Re: Classification Exception Area Notification Comments Letter – July 27, 1999.
 - (31) Letter from Linda Taylor, NJDEP, to Thomas Spiesman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Classification Exception Area Response Letter – October 18, 1999.
 - (32) Letter from Thomas Spiesman, Esq., Porzio, Bromberg & Newman, to Michael Festa, County of Essex Health Department, Re: Classification Exception Area Notification – November 29, 1999.
 - (33) Letter from Linda Taylor, NJDEP, to Clifford Ng, EPA, Re: RCRA Requirements for Former Lagoon Area and Groundwater Classification Exception Area – February 29, 2000.
 - (34) Letter from Vincent Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Application for Renewal of HSWA Permit to Federated Metals Corporation – June 8, 2000.
 - (35) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 2000 Sampling Round – June 14, 2000.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”² as defined by the monitoring locations designated at the time of this determination)?

 X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the “existing area of groundwater contamination”²).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”²) - skip to #8 and enter “NO” status code, after providing an explanation.

_____ If unknown - skip to #8 and enter “IN” status code.

Rationale:

The determination that migration of contaminated groundwater at the Federated Metals site is stabilized is based on the following site-specific characteristics: (a) there is a hydrologic feature downgradient from the site which limits the migration of groundwater flow and (b) the groundwater contamination from the site is stabilizing or reducing while it exists in the presence of regional background groundwater contamination.

To understand the site groundwater contamination, an understanding of the region’s hydrogeology is in order.

Local Hydrogeology

The Federated Metals site is underlain by up to seven feet of fill material. Beneath the fill layer is a sequence of undisturbed glacial deposits and Pleistocene fluvial deposits composed of interbedded, stratified, medium-to-fine-grained sand, with lesser amounts of silt and clay. These deposits extend to the top of bedrock at a depth of approximately 90 feet below grade at the site. Monitoring wells at the site are screened in this uppermost water-bearing zone. The permeability of this unit is moderate with considerable surface infiltration. (Reference No. 1, pgs. 2-8, 2-9, and 3-5.) Seepage velocity has been estimated at 205 feet per year, based on a hydraulic conductivity value of 8×10^{-4} feet per second. Boring logs and field permeability testing indicate that unconsolidated sediments beneath the site can be separated into three distinct hydrostratigraphic layers with distinct hydraulic conductivity values (as shown on Attachment 2). Within this three-layer sequence, grain size (and therefore hydraulic conductivity)

² “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

decreases with depth. Beneath the unconsolidated material is the Brunswick shale of the Triassic Passaic Formation.

Documentation supporting the groundwater CEA provides significant detail regarding local hydrology. (Reference No. 14, pg. 5.) Groundwater beneath the Federated Metals site is encountered at depths from 1.5 to 12.5 feet below grade. The water table typically ranges from 3.5 to 8 feet above mean sea level. Surface water infiltration along the New Jersey Turnpike contributes to relatively high groundwater elevations and mounding east of the site. Water level measurements collected in April 1997 and April 1998 indicate a net groundwater flow at the facility from southeast to northwest in the shallow overburden, with a typical horizontal gradient in the range of 0.003 to 0.004 feet per foot. Furthermore, historic and current groundwater level measurements from on-site wells indicate a consistent direction and pattern of groundwater flow over the last fifteen years. (Reference No. 14, pg. 5.) Groundwater in the consolidated rock is dominated by fractured patterns, coincident with the regional strike. Groundwater in this deeper formation has been found to be affected by salt water intrusion.

Shallow wells on site have been advanced to depths ranging from approximately 15 to 30 feet bgs, screened across various depths from 3 to 30 feet bgs. The deep well, MW-12D, was screened from approximately 65 feet bgs to the bottom of the borehole at roughly 85 feet bgs. A negative head difference of 2.5 to 5 feet was noted between the shallow and deep well pair in the overburden at MW-12. Downward vertical flow within the overburden has been estimated at a maximum of 0.65 feet per day through the uppermost hydrostratigraphic layer, and less in the underlying layers.

Despite the vertical flow gradient however, NJDEP finds that site-related contamination is limited only to groundwater in the overburden to a depth of approximately 90 feet. (Reference No. 16.) As shown in Table 2 below, groundwater monitoring data shows significant contamination in MW-12S (the shallow well) and greatly reduced concentrations in MW-12D (the deep well). With the exception of chloride, sodium, and TDS (which are believed to be sourced off site), contaminant concentrations detected in deep well MW-12D between April 1993 and April 2000 have consistently been lower than the corresponding detections in shallow well MW-12S. Over the same period of time, the six heavy metal constituents of concern have been detected in well MW-12D almost exclusively at concentrations less than their applicable GWQC. (Reference No. 14.)

Table 2
Comparison of Contamination Levels in Shallow and Deep Groundwater at MW-12
(as reported in the last round of full suite samples from October 1995)

Constituent	Concentration in MW-12S (ug/L)	Concentration in MW-12D (ug/L)	Higher of GWQC or PQL (ug/L)
Arsenic	73.9	<1.7	8
Cadmium	2,420	<0.30	4
Fluoride	52,500	140	2,000
Lead	<2.3	<2.3	10

Selenium	11.3	<2.4	50
Zinc	76,100	101	5,000

Based on this comparison, the CEA fact sheet concludes that there is minimal risk of migration of contaminants into the underlying bedrock. (Reference No. 16.) Furthermore, pg. 3-10 of the Groundwater Quality Assessment Plan Report states that “the lack of metals contamination in MW-12D suggests that [the observed vertical gradient] is offset by impermeable silts and clays which occur 60 to 100 feet below grade.” (Reference No. 1.)

In addition, Section 2.3.2 of the Groundwater Quality Assessment Plan Report discusses immobilization of heavy metals (i.e., cadmium, lead, and zinc) by natural sand in the subsurface and close to on-site contamination sources. (Reference No. 1, pgs. 2-13 through 2-20.) In general, depending on pH conditions, metals tend to adhere to soil particles at relatively shallow depths and are precipitated as insoluble carbonate compounds. Soil sample analyses completed in 1987 suggest that soil and sand beneath the Federated Metals are capable of significantly reducing the mobility of heavy metal ions through soil adsorption and cation exchange. After reviewing this information, NJDEP approved the proposed CEA for groundwater in the overburden without requiring additional delineation of vertical flow components. (Reference No. 19.)

Federated Metals has been sampling the same ten groundwater wells (MW3, MW-4, MW-5R, MW-6, MW-9, MW-11, MW-12S, MW-12D, MW-13, and MW-14) since issuance of a NJPDES-DGW permit on March 1, 1993. Since that time, and based on their conclusion that vertical contaminant migration is negligible, NJDEP has not requested a modification of the well network to include additional deeper wells. (Reference Nos. 10 and 12.) The existing network of shallow monitoring wells is, therefore, considered adequate for monitoring the nature and extent of groundwater contamination beneath the Federated Metals site.

Current Groundwater Conditions

Attachment 3 to this EI presents a broader view of the Federated Metals property and surrounding features, including the Newark Branch Sewer Line northwest of the site. Federated Metals has also developed maps to show the estimated horizontal distribution of each of the six dissolved heavy metal constituents based on data obtained in 1998 for the ten wells currently being monitored; these maps were provided in Appendix C of the CEA application. (Reference No. 14.) These maps provide an estimate of concentration gradients in groundwater.

Of the six constituents of concern, the on-site plume delineated for fluoride has the largest lateral extent, as shown on Attachment 3. The fluoride impact area encompasses the plume footprint for each of the other five inorganic constituents. Groundwater contamination continues to move from southeast to northwest, toward the Newark Branch Sewer, approximately 330 feet outside of the property lines. All of the plumes are assumed to extend horizontally to the sewer line, as shown on Attachment 3. A groundwater CEA has been established between the site and the Newark Branch Sewer Line to address this impacted area, as shown on Attachment 3.

Groundwater in the vicinity of the Federated Metals facility is currently classified under the Class IIA criteria, but groundwater in the overburden is not known to be used as a source of drinking water. A well search conducted in 1995 with the NJDEP Bureau of Water Allocation, and documented in the CEA Application, uncovered no supply wells (public or private) within the CEA, and no other evidence of groundwater use from the area was found. A total of 28 wells were identified within a radius of two kilometers from the site: 26 industrial wells and two domestic wells which were actually issued to corporations. To prevent future tapping of the aquifer for groundwater withdrawal, a Well Restriction Area, colocated with the CEA, has also been established. Public water in the area is supplied by the City of Newark from surface reservoirs. Groundwater is not known to discharge into surface water in the vicinity of the Federated Metals site (other than into the Newark Branch Sewer line), and site-related groundwater contamination is not expected to impact other media in the area.

(a) Hydrologic feature downgradient from the site which limits the migration of groundwater flow.

Federated Metals filed a Classification Exception Area (CEA) with NJDEP. The CEA defines the horizontal and vertical extent of groundwater contamination and restricts groundwater use in the defined area. The CEA application includes a comprehensive evaluation of the nature and extent of groundwater contamination at the site. The CEA application was approved by NJDEP on October 18, 1999.

Contaminant migration at the Federated Metals site appears to have stabilized within the area established CEA boundaries, extending northwest to the Newark Branch Sewer line. (See Attachment 3.) The Newark Branch Sewer line was constructed prior to 1916, and most of the original brick structure is in use. The line is rectangular in cross-section, with nominal dimensions of 3.5 feet wide by 4.9 feet high. (Reference No. 14, pg. 6.)

Groundwater flow from the Federated Metals site has consistently been toward the northwest and toward the sewer line over the last fifteen years. (Reference No. 14, pg. 5.) A review of hydraulic data for the region shows that the direction of groundwater flow beyond the sewer line is to the southeast (opposite the direction of flow beneath the Federated site). A groundwater contour map was prepared in November 1987 for the area occupied by the Ironbound Recreation Center and the Celanese/Georgia Pacific properties, located northwest of the Newark Branch sewer line; this map is provided as Attachment 5 to this EI. (Reference No. 18.) The map provides water level measurements for five monitoring wells at the intersection of Berlin and St. Charles Streets and, according to the NJDEP, verifies that groundwater flow immediately beyond the sewer line flows east and southeast toward the sewer, which is opposite of the flow from Federated Metals site. (Reference Nos. 18 and 19.) According to information provided by the City of Newark Engineering Department, impacted groundwater infiltrates the sewer branch, where it mixes with sanitary wastewater and is routed via the East Branch Intercepting Sewer to the Passaic Valley Sewerage Commission (PVSC) facility for treatment. (Reference No. 14, pg. 6.) Topographic survey and underground utility maps prepared for the City of Newark indicate that the top of the Newark Branch Sewer is located at sea level and the base of the sewer lies

4.5 feet below sea level. Water level measurements taken over a ten-year period at downgradient monitoring wells MW-6, MW-11, and MW-13 show the water table ranging from 3.5 to 6.2 feet above sea level. Based on these data, the potential head difference between the top of the sewer and on-site water levels is typically 3 to 6 feet. The average distance between these wells and the sewer is approximately 400 feet. Corresponding to an overall hydraulic gradient from 0.0075 to 0.015 feet per foot from the Federated Metals property toward the Newark Branch Sewer line.

On October 18, 1999, NJDEP agreed with the facility's determination that the sewer line acts as a hydraulic "sink" for impacted groundwater in the area. (Reference No. 19.) This groundwater flow pattern limits the horizontal extent of expected plume migration and prevents further northwestward contaminant migration. The convergence of flow at the sewer line supports the facility's contention that, at a minimum, shallow groundwater flow from the Federated Metals site is being adequately controlled through discharge into the sewer. Furthermore, as stated previously, vertical migration of contamination in groundwater appears to be negligible, and significant site-related contamination at depth is not expected. Therefore, capture of the shallow aquifer contamination is the primary concern.

(b) Groundwater contamination from the site is stabilizing or reducing while it exists in the presence of regional background groundwater contamination.

For a proper perspective of the regional groundwater quality, it should be noted that the overall groundwater quality in the Newark region has been degraded by human activity to the degree where development of the groundwater as a viable potable water source is unlikely. At least 108 known groundwater contamination cases had been identified. (Reference No. 4.) Sources of contaminated groundwater upgradient of the Federated Metals site include: the T. Fiore Demolition Contractors site (NJD980769475), the Reichhold Chemicals Incorporated site (NJD986598126), and the Sun Refining and Marketing Company site (NJD001722511). Beyond the sewer line, groundwater contamination has been attributed to the Stanley Tools site (NJD002454049), the Tidewater Baling Corporation (NJD011534708), and the Peter Pan Industries site (ECRA case number 88020). While specific details on the nature and extent of groundwater contamination at these sites have not been determined for purposes of this EI, the presence of these other sites in proximity to the Federated Metals site supports the regional nature of groundwater impacts in this area.

As discussed in a National Ground Water Association publication from October 1992 (Reference No. 4), this background contamination is thought to be related to several activities:

Heavy industrial activity throughout the Newark area – This region was extensively developed for a variety of industrial operations (e.g., tanning; iron-working; meat packing; plastics production; landfilling; and manufacturing of shoes, tools, steam engines, jewelry, and chemical products).

Early development of the adjacent transportation corridor -- Railroad and highway construction required the use of fill material for grading. Typical fill materials included coal cinders, rubbish, slag, and other wastes.

Filling of low-lying areas with hydraulic dredge materials – Beginning in 1915, Newark Bay was dredged to establish shipping channels and upland terminal facilities. The resultant dredge material was used to fill low-lying marshy areas throughout the meadowlands. This dredge material has been found to release ammonia-nitrogen, nitrate-nitrogen, iron, manganese, lead, and possibly zinc to groundwater.

Salt water intrusion -- Salt water intrusion into deep Passaic Formation wells in the area has been historically documented, and is thought to have been the result of river dredging and over-pumping of groundwater.

In some instances, groundwater impacted beneath the Federated Metals site can be attributed to these region wide background contamination sources rather than to historic on-site activity. For example, according to the CEA Application from March 26, 1999, the highest concentrations of chloride, sodium, and total dissolved solids (TDS) at the facility are associated with the shallow upgradient wells (MW-3, MW-4, and MW-14) and deep well MW-12D. This pattern of detection suggests off-site sources, possibly including:

Salt water intrusion from the Passaic River estuary – The highest chloride concentration detected in MW-12D to date is 3,000 milligrams per liter, which falls within the range typically associated with the effects of salt water intrusion.

Infiltration of dissolved road salt – Halite rock salt is commonly used for de-icing on the New Jersey Turnpike, approximately 1,500 feet east (upgradient) of the site and may be entering the overburden via a series of vertical “sand drains.”

Furthermore, it is apparent that the high TDS values result from the combined presence of dissolved sodium and chloride. Because this contamination does not appear to originate on site, NJDEP approved a proposal in 1995 to discontinue monitoring of these parameters.

Because of known regional groundwater quality issues, the Groundwater Quality Assessment Plan Report from February 1989 (Reference No. 1) concludes that “it would be unrealistic to isolate the Federated Metals facility as a closed system, unaffected by surrounding conditions.” Furthermore, the justification for and effectiveness of treating a regional problem on a site-by-site basis is questionable. In the permit for construction of the Essex County Resource Recovery Plant, “[NJDEP] recognizes the need for a comprehensive plan for dealing with the contamination of groundwater resources in the Newark metropolitan area, [and that] application of long-term groundwater remediation by one facility in terms of accomplishing some regional water quality goal is not reasonable at this time.” Background groundwater quality issues have been referred to the NJDEP Bureau of Field Operation, Case Management Strategy Office, for appropriate future assignment and action. (Reference No. 16.) Conventional groundwater recovery and treatment options are not recommended for this site, as they may worsen

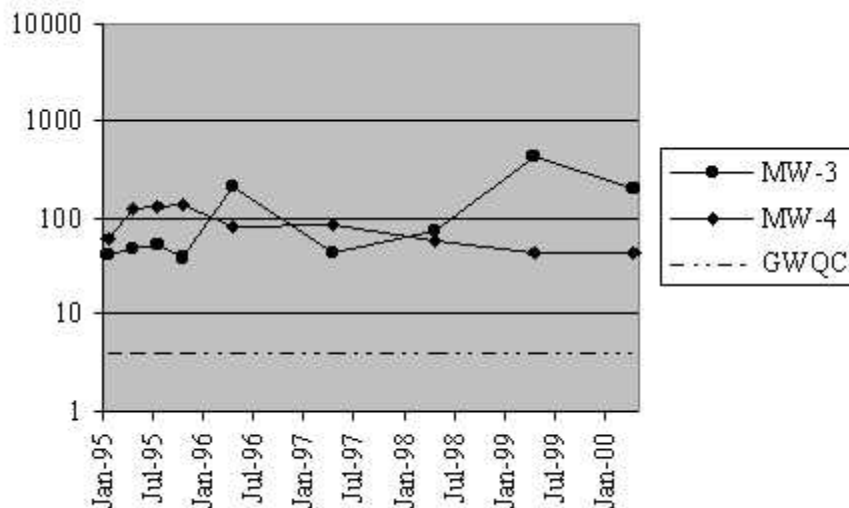
groundwater quality by accelerating salt water intrusion. Rather, it is anticipated that, over time, natural attenuation and dilution will reduce contaminant concentrations related to the Federated Metals site within the CEA.

Stabilization of Contaminant Concentrations

Contaminant concentrations at the Federated Metals facility appear to have stabilized, and an asphalt cap was installed over nearly all unpaved areas of the site to prevent infiltration of rainwater into soil and fill materials at the site that could subsequently introduce additional contaminants into groundwater. Although contamination remains elevated above relevant NJ screening criteria in at least some of the on-site groundwater monitoring wells, some contaminant concentration stabilization and reduction is evident. This finding is supported graphically for the six inorganic parameters by plotting concentrations over time, as developed for the CEA Application dated March 26, 1999. (Reference No. number 23.)

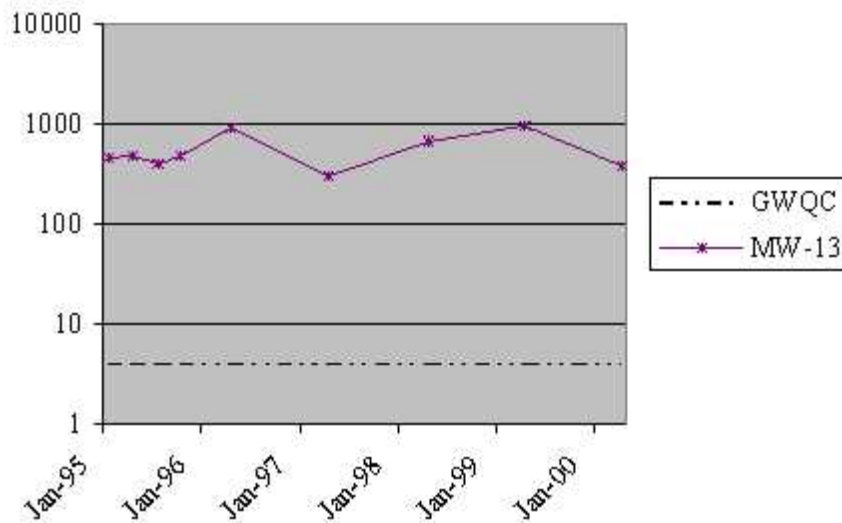
Upgradient concentrations of the six constituents of concern appear to remain fairly constant over time, which is consistent with region-wide groundwater quality concerns; greater variability in the data would be expected if the contamination were attributable to distinct upgradient sources of ongoing contamination. Cadmium results are presented in Figure 1 below to illustrate the observed stabilization of contaminant concentrations in the upgradient wells. Figure 1 also graphically indicates the presence of elevated contaminant concentrations in the upgradient areas.

Figure 1: Cadmium concentrations in Wells MW-3 and MW-4 at the up-gradient edge of the site; Samples were collected between 1995 and 2000. [Indicates elevated concentrations up-gradient.]



Contaminant concentrations in downgradient wells at the Federated Metals site are also following observable trends toward stabilization. Some heavy metal contaminants in downgradient monitoring wells (MW-6, MW-9, MW-11, and MW-13) are on a decreasing trend or falling below applicable GWQC standards. Cadmium concentrations in downgradient well MW-13, although expected to remain elevated, appear fairly stable, fluctuating by less than an order of magnitude over the past six years. (Reference No. 14.) See Figure 2.

Figure 2. Cadmium Concentrations in Downgradient Well MW-13, Samples Collected Between 1995 and 2000. [Indicates elevated concentrations, but appear to be stabilizing.]



Concentrations of lead and selenium appear to have generally decreased below their applicable GWQC (Reference No. 14). See Figures 3 and 4.

Figure 3: Lead concentrations in MW-6, MW-11, and MW-13 at down-gradient edge of site; Samples were collected between 1995 and 2000. [Indicates concentrations below PQL and appears to be stabilizing.]

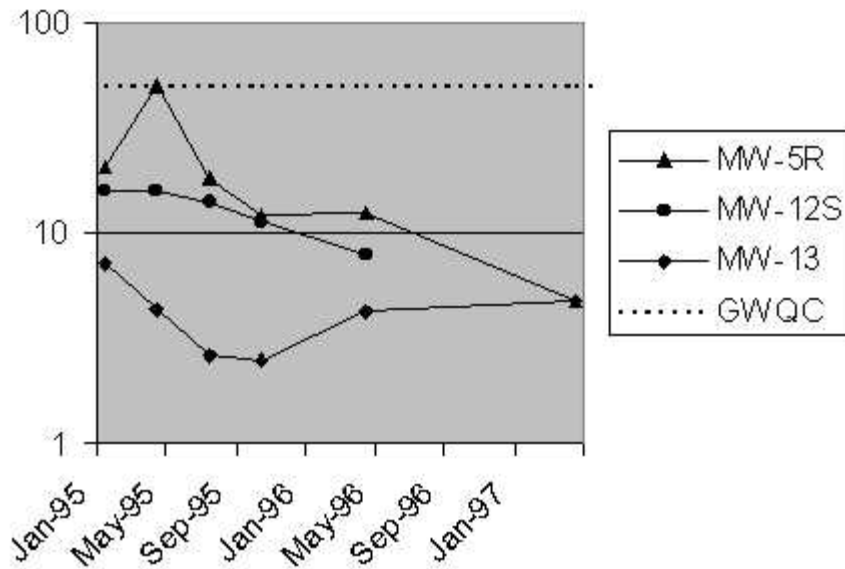
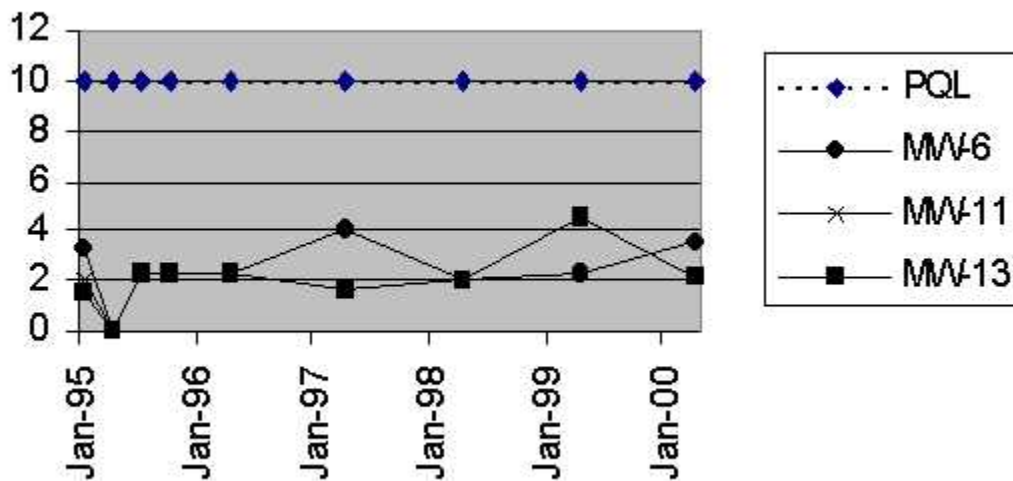
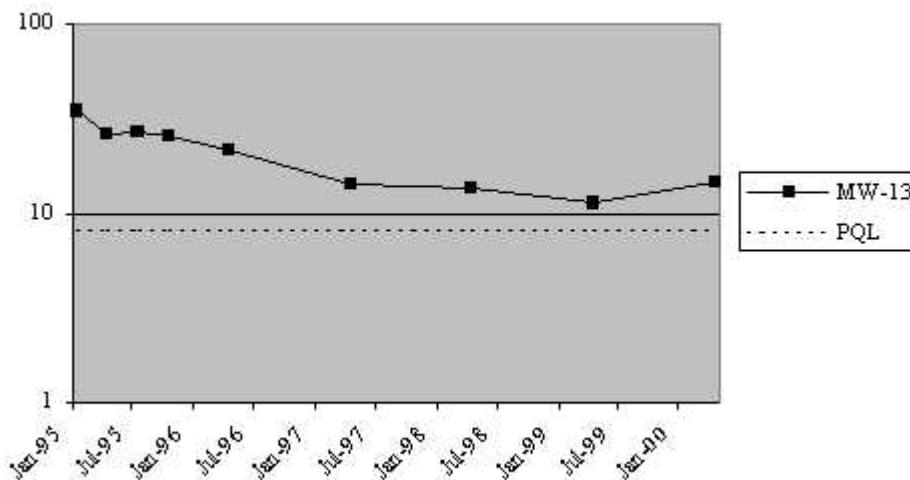


Figure 4. Selenium concentrations immediately down-gradient of lagoon (MW-5R and MW-12S) and at down-gradient edge of site (MW-13); Samples Collected Between April 1995 and April 1997. [Indicates decreasing concentrations and appears to be stabilizing.]



Arsenic concentrations, although remaining elevated, appear to be stabilizing. See Figure 5.

Figure 5: Arsenic Concentrations in Downgradient Edge of Site (Well MW-13), Samples Collected Between 1995 and 2000. [Concentrations elevated, but appears to be stabilizing.]



Because certain contaminant concentrations are likely to remain elevated for the foreseeable future, a groundwater CEA has been established with NJDEP which encompasses the Federated Metals site and the region between the site and the Newark Branch Sewer Line, as shown on Attachment 3. The CEA restricts groundwater use at the site and in downgradient areas where groundwater contamination may migrate. The Newark Branch Sewer Line, which coincides with the CEA boundary, also prevents contaminant migration beyond the sewer line due to the convergent flow pattern at either side of the sewer line.

References:

- (8) Groundwater Quality Assessment Plan Report, prepared by The Earth Technology Corporation – February 8, 1989.
- (9) Letter from Edward A. Hogan, Porzio, Bromberg & Newman, to Irene Kropp, NJDEPE, Re: NJPDES Permit No. NJ0099058 and Regional Groundwater Conditions – November 6, 1989.
- (10) Final Clean-Up Report, prepared by JMZ Geology – January 1994.
- (11) Letter from J. Mark Zdepski, FMZ Geology, to Mike Kramer, EPA, Re: Area Groundwater Conditions (including National Groundwater Association article from October 1992 entitled Industrial Development, Urban Land-Use Practices, and Resulting Groundwater Contamination in

- Newark, New Jersey) – November 8, 1994.
- (12) Final Declaration of Environmental Restrictions, prepared by Thomas Speisman, Porzio, Bromberg & Newman – November 10, 1994.
 - (13) Statement of Basis/Fact Sheet, prepared by EPA – September 25, 1995.
 - (14) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1996 Sampling Round – June 17, 1996.
 - (15) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Review of Final Remedial Action Report – May 1, 1997.
 - (16) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1997 Sampling Round – May 15, 1997.
 - (17) Letter from Theresa Pagodin, NJDEP, to Joel Golumbek, USEPA, Re: O&M Report for Federated Metals Corp. – June 10, 1997.
 - (18) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Peter Latimer, NJDEP, Re: December 10, 1997 NJDEP Letter – January 6, 1998.
 - (19) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Sampling Plan – April 13, 1998.
 - (20) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1998 Sampling Round – May 21, 1998.
 - (21) Proposed Groundwater Classification Exception Area Report, prepared by JMZ Geology – March 26, 1999.
 - (22) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1999 Sampling Round – June 11, 1999.
 - (23) Classification Exception Area and Well Restriction Area Fact Sheet, prepared by NJDEP – June 17, 1999.
 - (24) Letter from Linda Taylor, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Proposed Groundwater Classification Exception Area – June 28, 1999.
 - (25) Letter from Thomas Speisman, Esq., Porzio, Bromberg & Newman, to Bennett Barnes, NJDEP, Re: Classification Exception Area Notification Comments Letter – July 27, 1999.
 - (26) Letter from Linda Taylor, NJDEP, to Thomas Speisman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Classification Exception Area Response Letter – October 18, 1999.
 - (27) Letter from Thomas Speisman, Esq., Porzio, Bromberg & Newman, to Michael Festa, County of Essex Health Department, Re: Classification Exception Area Notification – November 29, 1999.
 - (28) Letter from Vincent Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Application for Renewal of HSWA Permit to Federated Metals Corporation – June 8, 2000.
 - (29) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 2000 Sampling Round – June 14, 2000.

4. Does “contaminated” groundwater **dis charge** into **surface water** bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

X If no - skip to #7 (and enter a “YE” status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater “contamination” does not enter surface water bodies.

_____ If unknown - skip to #8 and enter “IN” status code.

Surface Water: Newark Bay is located approximately one mile east of the site. The Passaic River is located approximately one mile north of the site. Due to the distance of the surface water bodies from the site, contaminant mobility via surface runoff into these water bodies is not a concern. Discharge of contaminated groundwater to surface water also does not appear to be a concern due to the Newark Branch Sewer that runs approximately 330 feet to the northwest of this site. The sewer branch acts as a hydraulic sink, capturing contaminants migrating from the site and halting the migration of contaminants toward surface water bodies. Site-related contamination has not been documented to have impacted surface water quality in the area.

References:

- (1) Letter from J. Mark Zdepksi, FMZ Geology, to Mike Kramer, EPA, Re: Area Groundwater Conditions - November 8, 1994.
- (2) Statement of Basis/Fact Sheet, prepared by EPA - September 25, 1995.
- (3) Letter from J. Mark Zdepksi, FMZ Geology, to Mike Kramer, EPA, Re: NJPDES Permit Modification Request - January 16, 1996.
- (4) Proposed Groundwater Classification Exception Area Report, prepared by JMZ Geology – March 26, 1999.
- (5) Classification Exception Area and Well Restriction Area Fact Sheet, prepared by NJDEP – June 17, 1999.
- (6) Letter from Linda Taylor, NJDEP, to Thomas Spiesman, Porzio, Bromberg & Newman., Re: Proposed Groundwater Classification Exception Area – June 28, 1999.
- (7) Letter from Thomas Spiesman, Esq., Porzio, Bromberg & Newman, to Bennett Barnes, NJDEP, Re: Classification Exception Area Notification Comments Letter – July 27, 1999.
- (8) Letter from Linda Taylor, NJDEP, to Thomas Spiesman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Classification Exception Area Response Letter – October 18, 1999.

5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

----- If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

----- If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

----- If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

This question is not applicable. See response to question #4.

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

----- If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment⁵, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

----- If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

----- If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

This question is not applicable. See response to question #4.

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater?”

 X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the “existing area of groundwater contamination.”

_____ If no - enter “NO” status code in #8.

_____ If unknown - enter “IN” status code in #8.

Ratio nale :

The Federated Metals facility has been subject to a NJPDES groundwater monitoring program since 1981. The program was instituted in connection with closure of a RCRA-regulated lagoon and various remedial activities being conducted pursuant to the Environmental Cleanup Responsibility Act (ECRA) and the Industrial Site Recovery Act (ISRA). Groundwater monitoring at the Federated Metals site will continue for the prescribed 30-year post-closure care period until at least the year 2023. This monitoring program is intended to provide for prompt identification of any changes in the nature and extent of groundwater contamination beneath the facility.

A total of 15 well points have been installed within the facility boundaries (not counting replacement wells) since inception of the monitoring program. One well, MW-2, has been sealed and abandoned. Thirteen shallow wells and one deep well are presently in place and screened in the overburden beneath the facility.

Since 1981, over 60 groundwater sampling events have been performed at the Federated Metals property. The suite of analytes has included metals, organic compounds, and radiological parameters. Samples were initially collected on a quarterly basis. Various modifications to the groundwater monitoring program have been made with respect to the number of wells sampled, required analytical parameters, and the frequency of sample collection. The current groundwater monitoring program was established in conjunction with the final HSWA permit issued to Federated Metals and a letter issued to the facility by NJDEP on December 18, 1995. (Reference No. number 4.) Several letters from NJDEP have subsequently made minor additional modifications to the sampling program.

Groundwater samples are currently collected annually from ten on-site wells. Upgradient wells currently being sampled include MW-3, MW-4, and MW-14. Downgradient wells included in the current sampling program include MW-5R, MW-6, MW-9, MW-11, MW-12S, MW-12D, and MW-13. The samples are then analyzed for a variety of parameters which, depending on the source well, may include arsenic, cadmium, chloride, fluoride, lead, selenium, sodium, zinc, pH, TDS, and specific conductivity. Analytical data generated from the groundwater monitoring program is provided to EPA and NJDEP for evaluation.

References:

- (1) Groundwater Quality Assessment Plan Report, prepared by The Earth Technology Corporation – February 8, 1989.
- (2) Letter from Irene Kropp, NJDEPE to Barry C. Harris, Bridgeview Management Company, Inc. and Federated Metals Corporation, Re: Issuance of Final NJPDES-DGW Permit No. NJ0099058 – February 18, 1993.
- (3) Statement of Basis/Fact Sheet, prepared by EPA – September 25, 1995.
- (4) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Request for Minor Modifications of NJPDES Permit NJ0099058 regarding Groundwater – December 18, 1995.
- (5) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1996 Sampling Round – June 17, 1996.
- (6) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman, Re: Review of Final Remedial Action Report – May 1, 1997.
- (7) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1997 Sampling Round – May 15, 1997.
- (8) Letter from Theresa Pagodin, NJDEP, to Joel Golumbek, USEPA, Re: O&M Report for Federated Metals Corp., Newark, Essex County – June 10, 1997.
- (9) Letter from Michael A. Justiniano, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman., Re: Groundwater Monitoring Report Dated May 8, 1997 – December 10, 1997.
- (10) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Peter Latimer, NJDEP, Re: NJPDES Permit Application for Renewal – January 6, 1998.
- (11) Letter from Stephen Maybury, NJDEP, to Thomas Speisman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Sampling Plan – April 13, 1998.
- (12) Letter from Barry C. Harris, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1998 Sampling Round – May 21, 1998.
- (13) Proposed Groundwater Classification Exception Area Report, prepared by JMZ Geology – March 26, 1999.
- (14) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 1999 Sampling Round – June 11, 1999.
- (15) Classification Exception Area and Well Restriction Area Fact Sheet, prepared by NJDEP – June 17, 1999.
- (16) Letter from Linda Taylor, NJDEP, to Thomas Speisman, Porzio, Bromberg & Newman., Re: Proposed Groundwater Classification Exception Area – June 28, 1999.
- (17) Letter from Thomas Speisman, Esq., Porzio, Bromberg & Newman, to Bennett Barnes, NJDEP, Re: Classification Exception Area Notification Comments Letter – July 27, 1999.
- (18) Letter from Linda Taylor, NJDEP, to Thomas Speisman, Esq., Porzio, Bromberg & Newman, Re: Groundwater Classification Exception Area Response Letter – October 18, 1999.
- (19) Letter from Linda Taylor, NJDEP, to Clifford Ng, EPA, Re: RCRA Requirements for Former Lagoon Area and Groundwater Classification Exception Area – February 29, 2000.

- (20) Letter from Vincent Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Application for Renewal of HSWA Permit to Federated Metals Corporation – June 8, 2000.
- (21) Letter from Vincent L. Wildman, Bridgeview Management Company, Inc., to Conrad Simon, USEPA, Re: Groundwater Analysis and Monitoring Well Reports for April 2000 Sampling Round – June 14, 2000.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

 X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the former Federated Metals Corporation facility, EPA ID Number NJD079320495, located at 150 Saint Charles Street, Newark, New Jersey. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

 NO - Unacceptable migration of contaminated groundwater is observed or expected.

 IN - More information is needed to make a determination.

Completed by: original signed by _____ Date: 09/26/00 _____
Michele Benchouk
Engineer
Booz Allen & Hamilton

Reviewed by: original signed by _____ Date: 09/27/00 _____
Pat Shanley
Geologist
Booz Allen & Hamilton

original signed by _____ Date: 09/28/00 _____
Clifford Ng, RPM
RCRA Programs Branch
EPA Region 2

original signed by _____ Date: 09/28/00 _____
Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: original signed by _____ Date: 09/29/00 _____
Raymond Basso, Chief
RCRA Programs Branch
EPA Region 2

Locations where references may be found:

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Clifford Ng, EPA RPM
(212) 637-4113
ng.clifford@epa.gov

Attachments

The following attachments have been provided to support this EI determination.

Attachment 1 – Site Map Showing SWMUs, AOCs, and Groundwater Monitoring Wells

Attachment 2 – North-South Geologic Cross-Section

Attachment 3 – CEA Boundary Map Showing Newark Branch Sewer in Relation to Site Location and CEA Boundary

Attachment 4 - Summary of Media Impacts Table

Attachment 5 - Map Showing Groundwater Flow at Other Side of Newark Branch Sewer Line

Attachments truncated, see facility file (MSS, 06/17/02)