DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: Hercules, Inc., Parlin Plant
Facility Address: 50 South Minisink Avenue, Parlin, Middlesex County, New Jersey
Facility EPA ID#: NJD002521961

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) 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 objectives 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., nonaqueous 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 Resource Conservation and Recovery Information System (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

The 670-acre Aqualon Parlin Plant (Hercules) is a chemical manufacturing facility in Parlin, Middlesex County, New Jersey. The facility was originally built by the Union Powder Company in the late 1800's, and Hercules purchased the plant in 1915. The plant is presently owned by Aqualon Company, a unit of Hercules, Inc. The facility is located in a mixed residential and industrial area surrounded by DuPont to

the east, the Borough of Sayreville well field (SWF) and Perth Amboy well field (PAWF) to the south, mixed residences and various industries to the west, and a residential development (including a park) to the north. Three brooks are located on the site and discharge to the South River, west of the facility. The facility currently produces Natrosol® (hydroxy ethyl cellulose). Former products included nitrocellulose or NC for short (coatings, films, inks, adhesives, gelatin dynamite, lacquers, and propellants), nitric and sulfuric acid, parlon (chlorinated rubber), chlorafin (chlorinated waxes), acetate aldehyde, cellulose acetate, dichlorodiphenyltrichloroethane (DDT), acetic anhydride, acetic acid, penton (chemical resistant plastic), ammonia nitrate, polyethylene, and polypropylene.

The Natrosol® Manufacturing facility is the only remaining production plant owned and operated by Hercules, Inc. – Aqualon Division at the Parlin, New Jersey, location. However, it should be noted that Hercules still owns the entire 669-acre site in Parlin and is responsible for past activities (prior to Green Tree Chemical Technologies, Inc., operations).

The Natrosol® facility occupies only 14.7 acres of the 669-acre site and is completely fenced and separated from the former Green Tree Chemical Technologies, Inc., (Green Tree) NC plant. The Natrosol® facility has been manufacturing Natrosol®, a thickening agent, since 1975. Natrosol® is prepared by reacting cellulose with ethylene oxide and other chemicals–tertiary butyl alcohol (TBA), sodium hydroxide, nitric acid, and acetone. Weak solvents produced from the formulation are recovered by distillation. Still bottom effluent is discharged to the on-site sewer system.

The former Green Tree NC operation consisted of five areas involved with the production of NC, which was used as a film former for coatings, film, ink, and adhesives, and in the manufacturing of lacquers and lacquer solvents. In the past, it was also used in gelatin dynamite and propellant powders. The five areas that were involved in NC production included the No. 1 Acid Area (a storage area for acid deliveries), No. 2 Acid Area (acid concentrators), NC Nitration (where concentrated acid was mixed with cellulose), NC Purification (where excess acids were removed), and NC Dehydration (where NC was dried and prepared for shipment). The entire NC production area is also fenced and access is strictly controlled.

The NC production facilities detailed above were sold by Hercules to Green Tree in 2000. Green Tree owned the buildings and associated infrastructure involved with the production of NC. Hercules continued to own the land, which was only leased to Green Tree. The solid waste management units (SWMUs) listed in the EPA Hazardous and Solid Waste Amendments (HSWA) permits and New Jersey Department of Environmental Protection (NJDEP) New Jersey Pollution Discharge Elimination System (NJPDES)/Discharge to Groundwater (DGW) permits, which are present in and around the NC production facilities, are still the responsibility of Hercules.

In 2003, Green Tree ceased operations and abandoned the NC production facilities. At this time, Hercules is in the process of decommissioning the NC production facility and declaring it inactive. It should be noted that the former NC production facility remains completely fenced and secured. As stated above, access is strictly controlled.

An NJPDES/DGW permit (#NJ0083411) was issued to Hercules, Inc./Aqualon Co. on September 1, 1991. The permit required investigation and mitigation of potential threats to human health and the environment. The HSWA portion of the facility's RCRA permit (#NJD002521961) also required investigation of sixteen SWMUs at the property. Furthermore, an Industrial Site Recovery Act (ISRA) investigation in the Natrosol® portion of the plant was triggered by the transfer of Aqualon from joint to sole ownership by Hercules, Inc.

A Facility Background Report was submitted to NJDEP on December 2, 1991. Based on this report, the facility prepared a RCRA Facility Investigation (RFI) work plan for the site, which was approved by NJDEP and EPA in May 1992. The Draft RFI Report submitted in March 1994 grouped the original SWMUs and several newly identified areas of concern (AOCs) into several areas of investigation (AOIs) to facilitate and streamline the investigation and remedial activity. These AOIs were further evaluated during the focused Phase II RFI field effort, the Corrective Measures Study (CMS) and Risk Assessment for Landfills 15A-15D and Brook 2, and the CMS and Risk Assessment for the Former DDT Building and Brook 3. A Draft Site-Wide Phase II RFI report was submitted to NJDEP on April 15, 2002. Subsequent site investigation and cleanup efforts have included a Baseline Ecological Risk Assessment (BERA) for Brook 3 and the South River, additional groundwater plume delineation in the PAWF and Runyon Watershed Property, completion of the DDT remediation project at Brook 3 (nontidal-influenced portion) and in the former DDT Building Area, and formal closure of Landfills 15A through 15D, including the adjacent section of Brook 2.

To date, Hercules is still in the corrective action mode, working towards a final remedy to address the remaining (not yet remediated) AOCs and AOIs 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 SWMUs, regulated units (RUs), and AOCs), 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.

Summary of SWMUs and AOCs: Based on all available information, 32 AOCs with soil and/or sediment impacts were identified at the Hercules Parlin site. No further action (NFA) was recommended for soil at six AOCs. Development of site-specific soil cleanup goals was recommended for 18 AOCs, and corrective measures were recommended for four AOCs. Remediation of soil/sediment has been completed at two AOCs. In addition, two of the original AOCs have been combined into other AOCs: the Fly-ash Lagoon was removed during construction of the Stormwater Retention Basin, and Impoundment I4 is considered part of the Former DDT Building Area.

During the Phase I RFI, the SWMUs and AOCs were grouped into several AOIs to facilitate on-going investigation and remediation efforts. The AOIs were defined largely as areas with distinct groundwater impacts. Due to the nature and areal extent of the observed contamination plumes however, impacted groundwater across the site is currently being addressed separately from the soil/sediment AOCs. Key concerns for groundwater at the Hercules site include a plume of TBA emanating from the Natrosol® Area and extending off site to the south and west, and a smaller plume of carbon tetrachloride (CT) and chloroform (CF) emanating from the Former Parlon Area. Volatile organic compound (VOC) contamination has also been identified in groundwater in the former landfill area. Groundwater monitoring programs are in place to monitor plume conditions quarterly and landfill area water quality annually (Refs. 8 and 12). Additional groundwater investigation was also recommended in the Phase II RFI Report for certain areas of the site where sporadic exceedances of New Jersey Groundwater Quality Criteria (NJ GWQC) have been reported.

Contamination at the Hercules SWMUs and AOCs has been reasonably delineated. Attachment 1 summarizes the soil/sediment AOCs by AOI. AOC descriptions were excerpted from the Phase I and Phase II RFI Reports (Refs. 2 and 7). The AOCs and AOIs are shown on Figure 3-1 of the Draft Site-Wide Phase II RFI Report (Ref. 7). Because of the site-wide nature of groundwater impacts, this medium is presented and discussed separately and independent of the AOI/AOC framework. Figures 2 and 3 in the Second Quarter 2004 Site-Wide Groundwater Monitoring Report (Ref. 12) show the current extent of plume contamination at the site.

References:

1. Interim Remedial Measures Report. Prepared by Dames & Moore. Dated September 6, 1993.
2. Draft RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated March 15, 1994.
3. Final Corrective Measures Field Studies and Risk Assessment, Landfills 15A-15D and Brook 2. Prepared by Dames and Moore. Dated March 31, 1997.
4. Focused Phase II RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated May 23, 1997.
5. Acid Spill Soil Sampling Report. Prepared by Dames & Moore. Dated January 7, 1999.

6. Focused Corrective Measures Study and Risk Assessment, Former DDT Building and Brook 3. Prepared by Dames & Moore. Dated August 30, 1999.
7. Draft Site-Wide Phase II RCRA Facility Investigation Report. Prepared by URS. Dated April 15, 2002.
8. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.
9. Remedial Action Completion Report, DDT Remediation Project (Brook 3 and Former DDT Building Area). Prepared by URS Corporation. Dated February 19, 2004.
10. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information. Dated August 23, 2004.
11. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information, Areas of Concern. Dated August 24, 2004.
12. 2004 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates. Dated September 10, 2004.

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.

Rationale:

The Hercules Parlin site is underlain by the Potomac-Raritan-Magothy (PRM) Formation. The most important water-bearing members of this formation include the Old Bridge (OB) and Farrington aquifers. The OB aquifer is encountered at depths less than ten feet below ground surface (bgs) in low-lying southwestern areas of the study area, along the three brooks, and in the Natrosol® and Former Parlon source areas. However, at the southern end of the site and in the vicinity of the groundwater recharge basins, OB groundwater is first encountered at depths up to 50 feet bgs. The average saturated thickness of the OB unit ranges from approximately ten feet in the northwestern portion of the plant to about 90 feet in the SWF south and southeast of the site (Ref. 1). Groundwater flow is generally toward the southwest, although a strong southerly component has been observed along the far eastern edge of the site (Ref. 17). The confined Farrington aquifer underlies the OB aquifer. The units are separated by a layer of dark gray clay and silty sand, which is present across the entire Hercules site, up to 90 feet thick in places (Refs. 3 and 5). This layer is believed to act as an aquitard; thus, groundwater investigation at the Hercules site has largely been limited to the OB aquifer.

As stated previously, three distinct groundwater impact areas have been identified to date at the Hercules site: a plume of TBA emanating from the Natrosol® Area, a smaller plume of CT and CF emanating from the Parlon Area, and VOC contamination beneath and down-gradient of Landfills 15A through 15D. All monitoring well locations are depicted on Figure 1 of the Second Quarter 2004 Site-Wide Groundwater Monitoring Report (Ref. 17).

TBA Plume Detail

The TBA plume has been associated with leakage from several existing TBA aboveground storage tanks (ASTs) in the Natrosol® Area (East AOI). Actions were taken by Hercules in 1992 to stop the leakage and mitigate harm to the environment (Ref. 18).

NJDEP has established a health-based interim groundwater standard of 100 micrograms per liter (µg/L) for TBA at Hercules. In the June 2004 groundwater monitoring report, TBA was reported above the interim

[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).

standard in 24 out of the 54 wells sampled (Ref. 17). The most significant TBA contamination is typically observed in shallow groundwater within the immediate source area, and in intermediate and deep groundwater within 1,000 feet down-gradient from the source. Over the past several sampling rounds, the highest TBA results were reported in source area well MW-74A—250,000 µg/L in March 2004, 160,000 µg/L in June 2004, and 190,000 µg/L in September 2004 (Refs. 13, 17, and 19 respectively).

The TBA plume extends off-site through the SWF area, but drops to acceptable concentrations in the vicinity of Bordentown Avenue. It should be noted that in accordance with the data collected during the September 2004 sampling event, TBA concentrations in the monitoring wells located along Bordentown Avenue (just north of the road) ranged from ND to 26 ug/l (well below the interim standard of 100 ug/l). A limited and separate area of TBA impacts were reported further south in the immediate vicinity of well MW-139 between Bordentown Avenue and Old Water Works Road. TBA concentrations in this well were just slightly above the interim standard during the March and June 2004 groundwater sampling rounds (120 µg/L and 110 µg/L, respectively) and below the interim standard in the September 2004 sampling round (33 µg/L). The edge of this isolated impact area is defined by well MW-140 (to the south) and the wells in the PAWF area (to the east) that do not exhibit TBA exceedances (Refs. 13, 17, and 19). It is important to note that as of the September 2004 sampling event, TBA does not exist above the interim standard of 100 ug/l south of Bordentown Avenue. No monitoring wells located in the PAWF/Runyon Watershed exceeded the interim standard for TBA. This further indicates control of the TBA plume.

The TBA plume also extends southwest of the main source area toward the Former DDT Building Remediation Area and well BDY-5. The TBA concentration in this well has frequently exceeded the interim standard of 100 µg/L, with detections reaching a high of 1,600 µg/L in December 2003 (Ref. 14) with recent sampling events exhibiting a downward trend (September 2004 results were 710 ug/l for this well). This portion of the plume is currently defined by TBA levels below the standard in well MW-108 and non-detected results in well MW-109 (annual monitoring of these two was recently re-instituted). These monitoring wells are located down-gradient of BDY-5.

CT/CF Plume Detail

A plume of VOC contamination—predominantly CT and CF—emanates from the Former Parlon Area of the Hercules plant. The source has been attributed to past spills within the Former Parlon Manufacturing Area. Because CT has not been detected in soil, the original contamination source no longer exists and no additional soil action is needed (Ref. 18).

At present, the VOC plume extends approximately 750 feet southwest of the source area (entirely within site boundaries) and is commingled with the northernmost portion of the TBA plume. Table 1 lists the maximum concentrations reported during the September 2004 sampling event.

Table 1—Maximum Detected VOC Concentrations in Groundwater in the Parlon Area September 2004 (Ref. 19)

Constituent	NJ GWQC (µg/L)	Max Conc. (µg/L)	Well
Carbon Disulfide	800*	3,400	MW-85B
Carbon Tetrachloride (CT)	2	21,000	RW-7
Chloroform (CF)	6	4,300	MW-85B
Methylene Chloride	2	36J	MW-85B
Tetrachlorethene (PCE)	1	120	RW-7

*Interim Standard

As shown in Table 1, the highest VOC concentrations were observed in an intermediate well within the suspected source area (well MW-85B), and in three recovery wells screened at intermediate depths within the OB aquifer (wells RW-6, RW-7, and RW-8). The leading edge of this plume appears to be bounded by low-level exceedances in wells MW-92B (4J ug/l CT in September 2004) and RW-8 (37 ug/l CT in September 2004), and non-detected VOC results in wells MW-93C, RW-9, and MW-91. Non-detected VOC results have also been reported for well RW-1, located at a considerable distance southwest (down-gradient) of the CT plume area.

VOC Impacts in the Landfill Area

Groundwater around Landfills 15A through 15D in the central portion of the Hercules site was impacted by VOCs and metal concentrations above applicable NJ GWQC. This was attributed to impacts before the area was closed and remedial measures implemented. The most significant contamination was located down-gradient and within the slurry wall surrounding Landfills 15C and 15D (prior to remediation). There were more minor impacts associated with Landfills 15A and 15B. A layer of light nonaqueous phase liquid (LNAPL), approximately ten feet thick, was also observed in and is believed to originate from Landfill 15C. The LNAPL consists of 91 percent tentatively identified semi-volatile organic compound (SVOC) alkanes, 8.6 percent tentatively identified VOCs, and 0.4 percent target compound list VOCs, pesticides, and polychlorinated biphenyls (PCBs) (Ref. 3). The LNAPL within Landfill 15C is now totally enclosed within the slurry wall that surrounds Landfills 15C and 15D.

Landfills 15A through 15D were formally closed in 2000 (Ref. 15). To reduce the quantity of leachate generated and minimize contaminant transport to groundwater, Hercules repaired the cap over Landfill 15A and installed new covers over Landfills 15B, 15C, and 15D. Hercules also constructed a slurry wall around Landfills 15C and 15D from the ground surface into the underlying clay layer to fully contain landfill wastes, the observed LNAPL, and associated dissolved phase contamination. A system is also in place beneath Landfills 15C and 15D to maintain groundwater elevations within the slurry wall at a lower level than elevations outside the slurry wall, thereby creating an inward hydraulic gradient across the slurry wall and preventing migration of impacted groundwater away from the source areas and toward Brook 2. Groundwater extracted from within the slurry wall is permitted for discharge to the on-site chemical sewer and treatment at the Middlesex County Utility Authority wastewater treatment plant.

To monitor effectiveness of the completed corrective measures, Hercules has established a program for annual post-closure monitoring of landfill groundwater (Ref. 8). NJDEP approved the monitoring program on July 24, 2003, and the first annual sampling event was conducted in September 2003. Monitoring wells currently included in the sampling program, including newly-installed wells MW-133 and MW-134, are shown on Figure 2 of the September 2003 Landfill Post-Closure Groundwater Monitoring Report (Ref. 10). Table 2 presents the maximum VOC exceedances reported during the September 2003 landfill groundwater sampling round, as well as the maximum concentrations for iron exceedances.

Table 2—Maximum Detected Concentrations in Groundwater at the Landfill Area September 2003 (Ref. 10)

VOC Constituent	NJ GWQC (µg/L)	Maximum Conc. (µg/L)	Well
PCE	1	4 J	MW-134
Vinyl Chloride	5	12	MW-1
Metal Constituent	**NJ GWQC (µg/L)**	**Maximum Conc. (µg/L)**	**Well**
Total Iron	300	56,200	MW-3
Dissolved Iron	300	9,500	MW-3

It is important to note that the results from the September 2004 sampling event are even lower for the VOCs (3J ug/l PCE in MW-134 and 4 ug/l vinyl chloride in MW-1).

Both PCE and vinyl chloride are relatively new constituents of concern for the landfill area, and both were reported only slightly above their respective NJ GWQC. Vinyl chloride was detected only in well MW-1, up-gradient of Landfill 15A. PCE was reported in the area down-gradient of the landfills and Brook 2, approaching the estimated edge of the TBA plume discussed above. No pesticide exceedances were reported in groundwater during the two sampling events.

Iron exceedances were reported both up-gradient and down-gradient of the landfill area, and can be attributable to elevated background levels of iron in the aquifer. According to documentation from Hercules (Ref. 18), iron levels in groundwater throughout the area often exceed the NJ GWQC of 300 µg/L. It is also important to note that local Municipal Utility Authorities must treat groundwater for high iron content before the water is sent to the public. Because this constituent is not considered a hazardous constituent under RCRA (as listed in 40 CFR Part 261, Appendix VIII), iron will not be addressed further in this EI determination.

References:

1. Groundwater Interim Remedial Measures Report. Prepared by Dames & Moore. Dated April 18, 1994.
2. Draft RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated March 15, 1994.
3. Final Corrective Measures Field Studies and Risk Assessment, Landfills 15A-15D and Brook 2.

Prepared by Dames and Moore. Dated March 31, 1997.
4. Focused Phase II RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated May 23, 1997.
5. Letter to Paul Harvey, NJDEP, from Frank McLaughlin, NJDEP. Re: 1997 Fourth Quarter Groundwater Monitoring/Annual Summary Report (5/5/98) and 1998 First Quarter Groundwater Monitoring Report (7/29/97). Dated August 18, 1998.
6. Focused Corrective Measures Study and Risk Assessment, Former DDT Building and Brook 3. Prepared by Dames & Moore. Dated August 30, 1999.
7. Draft Site-Wide Phase II RCRA Facility Investigation Report. Prepared by URS. Dated April 15, 2002.
8. Post-Closure Groundwater Monitoring Program Work Plan, Landfills 15A, 15B, 15C, and 15D. Prepared by URS. Dated February 20, 2003.
9. 2003 Third Quarter (September) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated December 2, 2003.
10. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.
11. Remedial Action Completion Report, DDT Remediation Project (Brook 3 and Former DDT Building Area). Prepared by URS Corporation. Dated February 19, 2004.
12. 2003 Fourth Quarter (December) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated March 31, 2004.
13. 2004 First Quarter (March) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated June 4, 2004.
14. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information. Dated August 23, 2004.
15. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information, Landfill Closure and Post-Closure Monitoring. Dated August 24, 2004.
16. Remedial Action Work Plan – Brook 3 Tidal Portion. Prepared by URS. Dated August 31, 2004.
17. 2004 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated September 10, 2004.
18. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Documentation of Environmental Indicator Determination, RCRA Corrective Action CA725. Dated October 15, 2004.
19. 2004 Third Quarter (September) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated January 26, 2005.

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:

TBA Plume Stabilization

In November 1996, Hercules initiated a short-term groundwater recovery program to control TBA plume migration and protect the down-gradient well fields until a long-term remedy could be selected and implemented. Recovery wells RW-10 and RW-11 were installed along the southern plume edge in 2002 to supplement the interim remedial program.

Groundwater recovery operations currently in place have stabilized the TBA plume, as indicated by the fact that the plume's general shape and extent has not changed significantly since monitoring was initiated in 1994--with the exception of the recently identified small impact area around well MW-139. To illustrate this stabilization, Table 3 presents TBA concentrations over the past year in some of the most significant plume boundary wells.

[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.

Table 3—TBA Concentrations in Groundwater Along the Plume Boundary (µg/L)
(Interim Standard = 100 µg/L)

Well	Location	9/2003	12/2003	3/2004	6/2004	9/2004
South of Source Area						
MW-101C	Within plume edge	290	26	290	91	26
MW-100C	On plume fringe	1.2	7.2	4.0	6.7	1.2
MW-113	Just outside plume area	2.0	ND	ND	ND	29
MW-112	Outside plume area to the southwest	ND	ND	ND	ND	ND
Isolated Area of Contamination South of Main Plume						
MW-139	Center of impacted slug area	200	110	120	110	33
MW-140	On fringe of impacted area	47	38	48	5.0	5.1
West of Source Area						
BDY-5	Within plume	280	1,600	1,100	970	710
MW-108	On plume fringe	ND*	NS	NS	4.0	NS
MW-109	Outside plume area	ND*	NS	NS	ND	NS

Refs. 9, 11, 13, 18, and 21
ND: Not detected
NS: Well not sampled during this quarterly monitoring event

* Data presented actually dates from the second quarter of 2003 for well MW-108 and from the second quarter of 2002 for well MW-109 (Refs. 8 and 5, respectively). As approved by NJDEP, well MW-109 had been removed from the groundwater monitoring program, and the sampling frequency for well MW-108 had been reduced due to lack of TBA contamination. Well MW-108 has since been reincorporated into the groundwater monitoring program , and another sentinel well may be added for on-going monitoring in the vicinity of well BDY-5 (Refs. 18 and 20).

As indicated by these data, TBA concentrations at the down-gradient edges of the plume have stabilized. Furthermore, clean and/or below standard wells exist outside the TBA plume area to allow for early detection of any unexpected plume migration.

It should be noted that, although TBA concentrations in well BDY-5 increased between the third and fourth quarters of 2003, contaminant concentrations have since been declining. Furthermore, TBA concentrations in groundwater down-gradient of well BDY-5 (as measured in wells MW-108 and MW-109) remain well below the interim standard of 100 µg/L. This area will continue to be monitored on an annual basis to ensure that any unexpected plume migration is adequately addressed. In addition, as indicated in the Modified Remedial Action Work Plan (RAWP) for TBA Impacted Groundwater Remediation (Ref. 20), Hercules will conduct an evaluation regarding the possible need for another sentinel well west of well BDY-5.

Also according to the Modified RAWP (Ref. 20), Hercules will continue to extract groundwater from wells SWF-A, RW-4, RW-10, and RW-11 (located within the main body of the TBA plume) for ex-situ treatment. Effluent from the treatment system will continue to be discharged into existing recharge basins 1, 2, and 3. Groundwater modeling data has been used to confirm that extraction well and recharge basin

locations are appropriate. However new well and/or recharge basin locations may be needed if the plume configuration changes over time.

Hercules also plans to conduct a focused Remedial Design Investigation to assess the extent to which TBA is naturally attenuating along the plume fringe and within the isolated TBA impacts around well MW-139 (Ref. 20). With no TBA migration toward the Runyon Watershed area, the isolated area of contamination around well MW-139 is also expected to decrease over time due to dilution and possibly aerobic biodegradation (as suggested by the current monitoring data). A work plan for the natural attenuation assessment is currently scheduled for submittal to NJDEP during the first calendar quarter of 2005 (Ref. 20). Hercules is also preparing documentation to establish a Classification Exception Area (CEA) for TBA-impacted groundwater, and expects to submit this material to NJDEP within the same time frame (Ref. 20).

CT/CF Plume Stabilization

In November 1996, Hercules implemented a groundwater extraction and air stripping treatment system to control contaminant migration and reduce VOC concentrations. According to the Second Quarter 2004 Groundwater Monitoring Report (Ref. 18), operation of this system has stabilized the CT/CF plume within the current area of contamination. Specifically, source area groundwater contamination is being withdrawn from the aquifer for treatment, and discharge of treated effluent groundwater into the recharge basins just south and down-gradient of the plume limits any down-gradient migration of contaminants. This assessment is supported by the fact that the CT/CF plume configuration has remained fairly consistent over time.

In the Second Quarter 2004 Groundwater Monitoring Report (Ref. 18), Hercules notes that wells RW-8 and MW-92B along the most down-gradient edge of the monitored CT/CF plume area have reported various exceedances of NJ GWQC for VOCs over the past year of monitoring. Thus, there is the possibility that impacted groundwater is present between the recovery well, RW-8, and the recharge basins. Fluctuating VOC concentrations in recovery well RW-8 may be attributable to on-going groundwater recovery operations, which pull contaminants toward the well from the surrounding aquifer area. Consequently, these exceedances are of less concern than those reported in well MW-92B.

As shown in Table 4, levels of the two key contaminants in well MW-92B (CT and CF) have been decreasing since 2002. (Ref. 21.) Levels of PCE appears to be fluctuating with slight exceedence in the September 2004 report. As a result, VOC concentrations in this well (and recovery well RW-8) will continue to be monitored and RW-8 will be pumped as necessary to prevent migration of CT. (Note that the recharge basins are located down-gradient from RW-8.) The perimeter of the CT/CF plume remains within the confines of the recovery well/recharge basin network. (If there is migration of the CT/CF plume beyond the recovery well and recharge network, the plume would still be contained within the existing area of impacted groundwater as defined by the much larger TBA plume.) It is reasonable to consider that groundwater VOC contamination in this area is also considered stable for purposes of this EI.

Table 4—VOC Concentrations in Well MW-92B (µg/L)

VOC Constituent	NJ GWQC	9/2003	12/2003	3/ 2004	6/ 2004	9/2004
CT	2	68	50	35	5	4J
CF	6	6 J	BS (5J)	BS (5)	ND	ND
PCE	1	ND	1 J	7	9	3J

Refs. 9, 11, 13, and 18
ND: Not detected; BS: Below standards; J: Laboratory estimated concentration

Landfill Area Groundwater Stabilization

As discussed in the response to Question 2, Hercules has constructed a slurry wall around Landfills 15C and 15D to contain LNAPL and dissolved-phase contamination in this area. Groundwater is routinely extracted from within the slurry wall to maintain an inward hydraulic gradient and prevent migration of impacted groundwater away from the landfill area.

As shown on Figure 2 from the September 2003 Landfill Post-Closure Groundwater Monitoring Report (Ref. 10), Brook 2 flows along the southern and western boundaries of the landfill area before moving off to the southwest. Analysis of groundwater flow indicated that Brook 2 is a gaining stream, receiving groundwater from the landfill area (Refs. 10 and 15). During landfill closure, debris was observed in Brook 2 and bottom sediments were found to have been impacted by landfill contaminants. Consequently, the slurry wall was expanded to also enclose a portion of the original channel of Brook 2. The channel was diverted and relocated through non-impacted land approximately 30 feet away from the landfills.

To monitor effectiveness of these corrective measures, Hercules monitors landfill groundwater and surface water quality in the new channel of Brook 2 annually (Ref. 7). In September 2003, PCE and vinyl chloride were detected slightly above their respective NJ GWQC (Ref. 10). As noted above, the concentration of these constituents decreased as seen in the data from the September 2004 sampling event. These appear to be new constituents of concern for the landfill area. Vinyl chloride was detected only in well MW-1 (up-gradient of the landfill area), and PCE was detected only in wells MW-99B, MW-133, and MW-134 (down-gradient of the new Brook 2 channel). Based on these new detections and limited distribution patterns, it is probable that neither constituent was related to landfill operations. As stated, these constituents were evaluated upon receipt of data from the September 2004 post-closure groundwater monitoring event and the concentrations of these constituents are declining. Concentrations of other VOCs that were previously detected in this location (e.g., benzene) dropped below applicable standards or to non-detect concentrations between the September 2002 and September 2003 sampling rounds (Refs. 6 and 10). Consequently, those contaminants appear to have been stabilized and no longer present concerns with regard to landfill groundwater.

Pumping within the slurry wall at Landfills 15C and 15D creates an inward hydraulic head and ensures that the most significant groundwater contamination will not migrate to the surrounding area. Groundwater containing low-level vinyl chloride exceedances *outside* the slurry wall and *up-gradient* of Brook 2 is expected to move toward and discharge into surface water. In this manner, Brook 2 appears to act as a hydraulic barrier to contaminant migration. PCE contamination on the down-gradient (southern) side of Brook 2 is expected to move southwest, commingling with the TBA plume. Because known groundwater contamination at the landfill area is expected to remain within the existing area of impact, this area can be considered stable for purposes of this EI.

References:

1. Groundwater Interim Remedial Measures Report. Prepared by Dames & Moore. Dated March 15, 1994.
2. Letter to Paul Harvey, NJDEP, from Frank McLaughlin, NJDEP. Re: 1997 Fourth Quarter Groundwater Monitoring/Annual Summary Report (5/5/98) and 1998 First Quarter Groundwater Monitoring Report (7/29/97). Dated August 18, 1998.
3. Letter from Karl R. Vetter, Dames & Moore, to Paul Harvey, NJDEP. Re: Bimonthly Sayreville Well Field Sampling Program. Dated April 13, 2000.
4. Draft Site-Wide Phase II RCRA Facility Investigation Report. Prepared by URS. Dated April 15, 2002.
5. Final 2002 Second Quarter (June) Groundwater Monitoring Report. Prepared by URS. Dated November 12, 2002.
6. Final 2002 September Landfill Semiannual Groundwater Monitoring Report. Prepared by URS. Dated February 10, 2003.
7. Post-Closure Groundwater Monitoring Program Work Plan, Landfills 15A, 15B, 15C, and 15D. Prepared by URS. Dated February 20, 2003.
8. 2003 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated October 10, 2003.
9. 2003 Third Quarter (September) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated December 2, 2003.
10. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.
11. 2003 Fourth Quarter (December) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated March 31, 2004.
12. Remedial Action Work Plan for TBA Impacted Groundwater Remediation. Prepared by Roux Associates, Inc. Dated June 1, 2004.
13. 2004 First Quarter (March) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated June 4, 2004.
14. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information. Dated August 23, 2004.
15. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information, Landfill Closure and Post-closure Monitoring. Dated August 24, 2004.
16. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information, Areas of Concern. Dated August 24, 2004.
17. Remedial Action Work Plan – Brook 3 Tidal Portion. Prepared by URS. Dated August 31, 2004.
18. 2004 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated September 10, 2004.
19. Letter to Sam Poku, Hercules, from Paul Harvey, NJDEP. Re: Draft Remedial Action Work Plan for TBA Groundwater. Dated November 9, 2004.
20. Letter to Paul Harvey, NJDEP, from Karl Vetter, Roux Associates, Inc. Re: Modified Remedial Action Work Plan for TBA Impacted Groundwater Remediation. Dated December 7, 2004.
21. 2004 Third Quarter (September) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated January 26, 2005.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

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

_____ 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.

Rationale:

Three brooks (Brook 1, Brook 2, and Brook 3) flow across the Hercules site from east to west. All three brooks discharge to the South River, located west-southwest of the facility.

Brook 1 is located in the northern portion of the facility, running roughly parallel to the Conrail Raritan River Railroad, and north of the Demolition Debris Area and the Iron Oxide Lagoon. Refer to Figure 5-1 of the Draft Phase I RFI (Ref. 1) for a detailed map of the flow path of Brook 1. Although this brook receives groundwater discharge from the surrounding area (Ref. 1), such groundwater does not appear to be impacted above applicable NJ GWQC. As shown on Figure 3-1 of the Draft Site-Wide Phase II RFI (Ref. 5), Brook 1 is located at a significant distance from groundwater contamination in the Landfill 15, Natrosol® and Former Parlon areas. Furthermore, Brook 1 does not cross the area currently impacted by the TBA or CT/CF plumes. Finally, the Draft Site-Wide Phase II RFI Report recommended no further action for Brook 1 (Ref. 5). Thus, Brook 1 does not appear to be impacted or threatened by groundwater contamination at the site and will not be discussed further in this EI determination.

As stated in the response to Question 3, groundwater from the landfill area flows toward and discharges into Brook 2 (Ref. 10). Although not specifically discussed in the record file, groundwater may also be discharging to Brook 2 as it flows along between the Former Parlon Area and the three recharge basins. This conclusion is supported by data in the Draft Phase I RFI (Ref. 1) showing increases in flow volume measured between Sampling Station 8 (SS-8) located upstream of the Former Parlon Area and Sampling Station SS-7 located just south of Landfill 15D. Refer to Figures 6-1 and 7-1 of the Draft Phase I RFI (Ref. 1) for a detailed map of the flow path of Brook 2 and sampling station locations. Groundwater in this area has been impacted by both the TBA and CT/CF plumes. However, at this distance from the source area, TBA and VOC contamination is predominantly located in the intermediate and deep portions of the OB aquifer (Ref. 12). Based on estimates of stream size presented in the Draft Phase I RFI (Ref. 1), Brook 2 appears to be fairly shallow in the vicinity of Sampling Station SS-8 and the groundwater recovery well network. Consequently, impacted groundwater from lower portions of the aquifer is unlikely to be discharging to shallow surface water. As a result, only the portion of Brook 2 adjacent to the landfill area will be considered further in this EI determination.

Brook 3 is located in the southwestern portion of the facility, as shown on Figure 8-1 of the Draft Phase I RFI (Ref. 1). According to the Draft Final Focused Corrective Measures Study for the Former DDT Building and Brook 3 (Ref. 4), groundwater does discharge to surface water in this area. However, groundwater discharging into Brook 3 does not appear to be impacted above applicable NJ GWQC. As shown on Figure 3 from the Second Quarter 2004 Groundwater Monitoring Report (Ref. 12), only the headwaters of Brook 3 overlap the TBA plume finger extending to well BDY-5. However, as also shown on the figure, TBA contamination in this area is present in the deep portion of the OB aquifer (Refs. 9 and

12). Consequently, TBA-impacted groundwater is unlikely to discharge to surface water in Brook 3. It should also be noted that, while Brook 3 and the South River were historically impacted by pesticides from the Hercules site, this contamination was attributed to direct waste discharge from the former DDT Process House (Ref. 3), rather than groundwater discharge. (It should be noted that an ecological risk-based sediment cleanup goal of 20.8 mg/kg was calculated for total DDT during the 1998 Focused CMS and Risk Assessment (Ref. 4). Remedial activities for the non-tidal-influenced portion of Brook 3 were completed in 2001 and included temporary brook diversion, excavation/dredging of 5,660 tons of contaminated sediment, and consolidation of the dewatered sediment into the swale between on-site Landfills 15C and 15D (Ref. 8). Post-excavation sampling confirmed that total DDT above 20 mg/kg was removed from the excavated areas (Ref. 8).) Thus, groundwater discharges into Brook 3 will not be discussed further in this EI determination.

References:

1. Draft RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated March 15, 1994.
2. Final Corrective Measures Field Studies and Risk Assessment, Landfills 15A-15D and Brook 2. Prepared by Dames and Moore. Dated March 31, 1997.
3. Focused Phase II RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated May 23, 1997.
4. Draft Final Focused Corrective Measures Study and Risk Assessment, Former DDT Building and Brook 3. Prepared by Dames & Moore. Dated August 30, 1999.
5. Draft Site-Wide Phase II RCRA Facility Investigation Report. Prepared by URS. Dated April 15, 2002.
6. Post-Closure Groundwater Monitoring Program Work Plan, Landfills 15A, 15B, 15C, and 15D. Prepared by URS. Dated February 20, 2003.
7. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.
8. Remedial Action Completion Report, DDT Remediation Project (Brook 3 and Former DDT Building Area). Prepared by URS Corporation. Dated February 19, 2004.
9. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information. Dated August 23, 2004.
10. Letter to Clifford Ng, EPA, from Karl Vetter, Roux Associates. Re: Environmental Indicator Status Information, Landfill Closure and Post-closure Monitoring. Dated August 24, 2004.
11. Remedial Action Work Plan – Brook 3 Tidal Portion. Prepared by URS. Dated August 31, 2004.
12. 2004 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated September 10, 2004.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] 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 ecosystems at these concentrations)?

   X If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] 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 ecosystem.

   ____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] 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 concentrations[3] 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:

In determining whether groundwater to surface water discharges are significant for EI purposes, reported contaminant concentrations are compared to New Jersey Surface Water Criteria (NJ SWQC) and NJ GWQC (multiplied by a factor of ten to account for dilution, dispersion, and other mitigating factors). The NJ SWQC were developed to ensure that surface water quality is acceptable for various activities, which may include human consumption, primary and secondary contact recreation, and industrial or agricultural usage. Based on current status of surface water in Brook 2, NJ SWQC for Freshwater Class FW-2 surface water bodies may apply.

As stated in the responses to Questions 3 and 4, minor groundwater impacts north of Brook 2 and outside the landfill area slurry wall is expected to move toward and discharge into surface water. This area is monitored on an annual basis by sampling at wells MW-1, MW-3, MW-3B, MW-59A, and MW-59B, as shown on Figure 2 of the September 2003 Landfill Post-Closure Groundwater Monitoring Report (Ref. 1). During the September 2003 sampling round, vinyl chloride was the only hazardous constituent exceeding NJ GWQC detected in these wells (Ref. 1). The vinyl chloride detection of 12 µg/L exceeded both the NJ GWQC of 5 µg/L and the NJ SWQC of 0.0830 µg/L. However, vinyl chloride is not present in well MW-1 at a concentration greater than ten times the applicable NJ GWQC (50 µg/L). This screening value

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

appears to be particularly appropriate for use in evaluating the significance of vinyl chloride discharges on surface water quality, given the distance (and likelihood of dilution and dispersion) between well MW-1 and Brook 2. It should be noted that this analysis does not take into account the lower concentrations of these constituents found during the September 2004 sampling event.

Because vinyl chloride concentrations in the landfill area do not exceed ten times the applicable NJ GWQC, groundwater to surface water discharges at Hercules can be considered insignificant for purposes of this EI determination.

References:

1. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.

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 ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ 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 ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including an ecologist) adequately protective of receiving surface water, sediments, and ecosystems, 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 ecosystem.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale:

Not applicable. See the response to Question 5.

[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.

Rationale:

Hercules currently conducts quarterly groundwater sampling across the site and on neighboring property to monitor the status of the TBA and CT/CF plumes outlined in the response to Question 2. An average of 48 monitoring wells are included in this on-going site-wide monitoring program each quarter. A total of 47 wells were sampled during the September 2004 sampling event and a total of 54 wells were sampled during the June 2004 sampling event (monitoring well MW-109 was added to the June 2004 sampling event at the request of NJDEP). Specific wells and analytical parameters comprising the quarterly monitoring program are listed in Table 5.

Table 5—Quarterly Site-Wide Groundwater Monitoring Program (Ref. 3)

Monitored Wells	Analytical Parameters
BDY-5, DW-1D, DW-8D, DW-10D, EPA-2, EPA-5, MW-74A, MW-74C, MW-79, MW-95C, MW-96C, MW-97B, MW-98B, MW-99B, MW-100C, MW-101C, MW-107, MW-108, MW-110, MW-111, MW-112, MW-113, MW-137, MW-138, MW-139, MW-140, MW-141, MW-142R, OB-27, RW-4, RW-10, RW-11, SWF-A, SWF-E, SWF-K	TBA via Method SW 8015B
MW-52, MW-73, MW-76, MW-85B, MW-85C, MW-88B, MW-88C, MW-91, MW-92B, MW-92C, MW-93C, MW-94, RW-1, RW-3, RW-6, RW-7, RW-8, RW-9	TBA via Method SW 8015B Target Compound List (TCL) VOCs via Method OLM03.2

Furthermore, according to the Modified RAWP for TBA Impacted Groundwater Remediation (Ref. 4), an updated (and potentially expanded) plume monitoring program will be included in the Remedial Design Report, currently scheduled for submittal in June 2005. The Remedial Design Report will also include an evaluation regarding the need for another sentinel well west of BDY-5 (Ref. 4).

A program of annual post-closure groundwater and surface water monitoring is also in place at the landfill area (Ref 1). Groundwater samples are collected from wells MW-1, MW-3, MW-3B, MW-59A, MW-59B, MW-99B, MW-133, and MW-134. Surface water samples area collected from three locations along the portion of Brook 2 adjacent to the landfill area. These sampling points (B-1, B-2, and B-3) are shown on Figure 2 from the September 2003 Landfill Post-Closure Groundwater Monitoring Report (Ref. 1). All groundwater and surface water samples from the landfill area are analyzed for the following parameters:

- TCL VOCs (Method OLM03.1)
- Dissolved and total iron (Methods SW 7380 and SW 3005A, respectively)
- Targeted pesticides 4,4-DDD, 4,4-DDE, and 4,4-DDT (Method SW8081A/8082)

PCE, which has recently been detected as a new constituent of concern in landfill wells (outside the slurry wall) and at well MW-92B, will be monitored particularly closely during upcoming sampling rounds.

References:

1. Letter to Paul Harvey, NJDEP, from Monica McHugh and Neil Rivers, Roux Associates. Re: September 2003 Landfill Post-Closure Groundwater Monitoring Report. Dated February 10, 2004.
2. Remedial Action Work Plan for TBA Impacted Groundwater Remediation. Prepared by Roux Associates, Inc. Dated June 1, 2004.
3. 2004 Second Quarter (June) Site-Wide Groundwater Monitoring Report. Prepared by Roux Associates, Inc. Dated September 10, 2004.
4. Letter to Paul Harvey, NJDEP, from Karl Vetter, Roux Associates, Inc. Re: Modified Remedial Action Work Plan for TBA Impacted Groundwater Remediation. Dated December 7, 2004.

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 Hercules, Inc., Parlin Plant, EPA ID# NJD002521961, located at 50 South Minisink Avenue, Parlin, Middlesex County, 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 if 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: _____ Date:_____
Michele Benchouk
Engineering Consultant
Booz Allen Hamilton

Reviewed by: _____ Date:_____
Lucas Kingston
Consultant
Booz Allen Hamilton

Also reviewed by: _____ Date:_____
Clifford Ng, RPM
RCRA Programs Branch
EPA Region 2

_____ Date:_____
Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: _____ Date:_____
Adolph Everett, P.E., 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 NJDEP Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Clifford Ng, EPA RPM
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Ng.Clifford@epa.gov

Attachments

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

- Attachment 1—Summary of AOC Status at the Hercules Parlin Plant Site
- Attachment 2—Summary of Media Impacts Table

Page Held for EPA Insertion of Attachment 1 – Summary of AOC Status at the Hercules Parlin Plant Site

Attachment 2 – Summary of Media Impacts Table
Hercules, Inc., Parlin Plant

AOI	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
TBA Plume Area Groundwater	Yes	No	No	No	No	No	No	▸ On-going quarterly groundwater monitoring on and off site ▸ Remedial Action Work Plan submitted for groundwater recovery and treatment in main plume area and evaluation of natural attenuation along plume fringes ▸ CEA planned	TBA
CT/CF Plume Area Groundwater	Yes	No	No	No	No	No	No	▸ Groundwater recovery, treatment, and discharge to recharge basins ▸ On-going quarterly groundwater monitoring ▸ CEA planned	VOCs
Landfill Area Groundwater	Yes	No	No	No	No	No	No	▸ Slurry wall constructed around Landfills 15C and 15D, with hydraulic head maintenance system ▸ Landfills closed ▸ Annual post-closure groundwater and surface water monitoring	PCE Vinyl Chloride Iron LNAPL