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FACILITY Ensign Bickford Co-NE
I.D. NO CTD058509712
R-13

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: **The Ensign-Bickford Company**
Facility Address: **660 Hopmeadow Street, Simsbury, CT 06070**
Facility EPA ID #: **CTD058509712**

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.

BACKGROUND

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 EI 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 EI 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 ground water 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 Determinations status codes should remain in 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).

References

References used to prepare this Environmental Indicator Evaluation include the documents listed below. These can be found in the site file in the RCRA Records Center.

1. RCRA Facility Assessment, May 7, 1992.
2. Site Analysis, Ensign-Bickford Haz Pros, Inc. May 1993.
3. Part B Application, Revision 3.0. Section III B3, Existing Conditions: Groundwater, Surface Water, and Sediments, Volume I: Text, Figures, Tables. April 1997.
4. Groundwater Assessment, EBCo Operational Area West of Route 10/202. December 1997.
5. Technical Memoranda on Areas of Concern (AOCs 1-47), July 1998.
6. Description of Current Conditions, August 1998
7. Revised Draft "Documentation of Environmental Indicator Determination" forms, dated October 8, 1999.
8. Groundwater Assessment, EBCo Operational Area East of Route 10/202. October 1999.
9. AOC No Further Action Required Reports (6, 8, 9, 10, 13, 14a, 15, 21, 25, 26, 27, 28, 29, 31, 35, 37, 41, 45, and 47. November 4, 1999.
10. No Further Action Required Reports for AOCs (21,26, 31, 35, 37, 41, 45, and 47), March 1, 2000.
11. Supplemental Groundwater Screening, EBCo Operational Area East of Route 10/202. April 20, 2000.
12. Environmental Indicator Determination, Voluntary Corrective Action Program, Volumes 1-4, dated April 2001.
13. 2001 Annual Groundwater Sampling Summary Report, April 2002.
14. June 2002 Sampling Results, OB/OD Area, Operational Area East of Route 10/202, August 15, 2002.

15. June 2002 Sampling Results, AOCs 20, 23, 36, and 38, October 2, 2002.
16. Environmental Indicators Determination Update, September 9, 2002, volumes 1 and 2.
17. No Further Action Required Reports for AOCs (4, 5, 7, 9, 12, 17, 18c, 19, 21, and 31). February 24, 2003.
18. 2002 Annual Groundwater Sampling Summary Report, Open Burning/Open Detonating Area, March 2003.
19. Letter with attachments from Dorothy Hammett, Dyno Nobel, Inc. regarding property transfer, ECAF, and consent order, June 13, 2003.
20. 2,3,7,8-TCDD TE Work Sheet from M. Ballew, August 2003.
21. Description of Facility Controls, Dyno-Nobel, Inc., September 2003.
22. Groundwater Sampling Results- June 2002, September 2002, December 2002, March 2003 at AOCs 20, 23, 36, and 38, dated September 18, 2003.
23. June 2003 Sampling Results, OB/OD area, September 17. 2003.

A. Background Facility Information

The former Ensign Bickford Company, Inc. (EBCo) facility is located at 660 Hopmeadow Street (Routes 10/202) in Simsbury, Connecticut. EBCo has manufactured explosive products at this facility since 1851. On May 2, 2003, Dyno Nobel Inc. acquired certain assets of EBCo., including the business operation. Title to the property was vested in Simsbury Hopmeadow Street LLC (SHS), and the ownership interest in SHS was assigned to Dyno Nobel, Inc. At the time of the transaction, Dyno Nobel, Inc. entered into a Consent Order with the CTDEP, as discussed below. For purposes of this EI determination, the facility will continue to be referred to as EBCo.

EBCo produced blast initiation products for the commercial blasting industry and explosive devices for the aerospace industry. In the course of manufacturing, waste explosives and pyrotechnics were generated. EBCo was a Large Quantity Generator of hazardous wastes and a TSD with interim status. EBCo submitted a Part B Permit Application to CTDEP for three units at the site: an Open Burn/Open Detonation (OB/OD) unit, a Detonation Confinement Chamber (DCC), and a Lead Grinding System (LGS). EBCo ceased the open burning of heavy metal containing wastes (waste containing more than 0.1% heavy metals) in September 1994. EBCo entered into a consent order with CTDEP in 1995. EBCo did not conduct OB/OD activities after 1999, although the DCC and LGS continue to operate. On May 1, 2003, Dyno Nobel, Inc. entered into a consent order with CTDEP, which supercedes the 1995 consent order. The 2003 consent order covers matters such as use of the DCC and LGS units, the Part B application, closure of the OB/OD area, and Corrective Action. Dyno Nobel Inc. submitted an Environmental Condition Assessment Form (ECAF) in May 2003, and a two volume closure plan for the OB/OD area in June 2003.

The 356 acre site can be divided into two sections: 1) the 202 acre operational area west of Routes 10 and 202; and 2) the 154 acre operational area east of Routes 10 and 202 which is bounded to east by the Farmington River. The site is underlain by the New Haven Arkose, a

sedimentary rock. Depth to bedrock is approximately 100 to 200 feet beneath portions of the site, and at least 25 feet below grade at the shallowest point. A layer of glacial till mantles bedrock.

The **operational area west of Routes 10/202** is heavily wooded, with bunkers for the storage of raw materials and finished product in a number of locations, as well as a few process buildings. A mix of residential and commercial properties abut this portion of the site. The surficial geology is described as numerous small hills comprised of kame terrace deposits of fine to coarse sand. The topography and water table (located from 0 to 50 feet below grade) are highest along the western border and slope downward to the east toward the residential and commercial properties along the western side of Route 10/202. Hop Brook (class A), Stebbins Brook (class B/A), and Second Brook (class B/A) are the primary surface drainage features which discharge to the Farmington River (class B). Hazel Meadow Pond (class A) is a major surface water body on the western side of this area. Groundwater is classified as GA.

The **operational area east of Routes 10/202** includes the main manufacturing portion of the facility, located between Routes 10/202 and the railroad tracks. This area is predominantly covered by buildings, pavement, and landscaping. The topography, formed by terrace alluvium deposits, slopes gently toward the Farmington River. This area is predominantly above the 100 year flood zone. Hop Brook flows easterly through the northern portion of the main manufacturing area. A small drainage ditch flows north-westward, and provides drainage for part of the paved areas west of the railroad tracks. The depth to groundwater is generally less than 10 feet.

The operational area east of Routes 10/202 also includes facility property located between the railroad tracks and the Farmington River. This area is moderately wooded with several large open areas, and is used for various purposes, including the storage, testing, and detonation of products and wastes. Residential and light commercial properties abut this area on the northern, southwestern and southern boundaries. Topography is relatively flat and predominantly within the 100 year flood zone. Flood plain alluvium deposits overlie a silt/clay layer which thins to the west. The silt/clay layer varies from 1 to 18 feet in thickness, is found at depths of 6 to 17 feet below grade, and acts as a confining layer resulting in upward gradients in wells screened below this aquitard. The water table is typically 2 to 4 feet below grade. Several small intermittent brooks discharge to the Farmington River.

B. Basis for CA 750 Environmental Indicator Determination.

Groundwater is classified as GA. The nearest public water supply well is located approximately 1.7 miles west of the facility and all nearby businesses and residents are serviced by the municipal water supply. EPA compared groundwater data to CT RSR Groundwater Protection Criteria (GWPC) for a GA aquifer, and Surface Water Protection Criteria (SWPC). In addition, EBCo-calculated groundwater risk based concentration limits (RBCLs) for RDX were used for comparison against site data. EPA has not approved these EBCo-calculated criteria, which are

discussed in Volume 1, Tab 1 of the April 2001 EI. Mary Ballew of EPA Region I's Corrective Action Section provided information on typical background concentrations of 2,3,7,8-TCDD TE in surface water, and an approximate concentration corresponding to a 10-5 risk for drinking water.

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 and Reference(s):

Groundwater at the site is classified by CTDEP as GA, suitable for drinking, and the long-term goal is expected to be to achieve drinking water standards (GWPC), and where groundwater discharges to a surface water body, groundwater should meet SWPC.

Groundwater exceedences of SWPC and GWPC for GA areas for recent samples (collected prior to 2001) are listed in Table 2.6 of the April 2001 EI Determination, Volume 1, Tab 2. Groundwater contaminants with one or more exceedences of the GWPC include arsenic, barium, chromium, lead, nickel, thallium, vanadium, 1,1,1 TCA, PCE, Benzene, methylene chloride, TPH, and Bis(2-ethylhexyl)phthalate. Contaminants in monitoring wells located near surface water bodies with one or more exceedences of the SWPC include arsenic, chromium, copper, lead, and Bis(2-ethylhexyl)phthalate. In addition, the explosive RDX has been detected in groundwater samples above the EBCo calculated risk based concentration level of 17 ppb. EPA also reviewed groundwater data collected since submission of the April 2001 EI. In addition, Dyno Nobel's 5/03 ECAF provides additional information regarding maximum concentrations detected (Sheet 7) and data sorted by AOC (Sheet 8).

Footnotes:

[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).

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 and Reference(s):

The site is divided by Route 10/202 into two large areas, the western operational area and the eastern operational area.

Operational Area West of Route 10/202

The approximately 200 acre Operational Area West of Route 10/202 is situated hydrologically upgradient from the rest of the site. This area has an irregular topography, with surface elevation differences of up to 80 feet due to small hills. Surficial geology is described as predominantly kame terrace deposits, consisting of fine to coarse grained sand with occasional silt and fine gravel. Depth to bedrock ranges from 10 to 40 feet bgs.

In December 1997, EBCo submitted the Groundwater Assessment, EBCO Operational Area West of Route10/202. The purpose of the study was to gain a broad overview of the hydrogeology and soil and groundwater quality in the operational area west of Route 10/202. Thirteen sampling wells and nine piezometers (in Stebbins and Second Brook and near Hazel Meadow Pond) were installed, and four existing wells were sampled. Wells were sampled for Appendix IX constituents (excluding pesticides, herbicides, dioxins, and PCBs), and nitroaromatics and nitramines. Results were that no samples exceeded the Surface Water Protection Criteria (SWPC), although the Groundwater Protection Criteria (GWPC) were exceeded at several wells for PCE and its breakdown products, and some metals.

The following discussion focuses on several areas corresponding to groups of AOCs

within the western operational area.

AOC 20 and AOC 27 area. Groundwater flow direction in this area is to the south/southwest. Monitoring well MW-116 is located approximately 150 feet downgradient from AOC 20 (former distillation column and sump, not used since 1979) and AOC 27 (building 266 formic acid release). Groundwater sampling conducted in October 2000 did not detect elevated levels of explosives. However, sampling results from June 2002 detected RDX in well MW-116 at a concentration of 98.7 ppb (EPA has not approved the EBCo calculated GWPC of 17 ppb), which is significantly above historical levels for this well. To determine whether the June 2002 RDX result at MW-116 was an anomaly, MW-116 was re-sampled in August 2002. The results were that RDX was detected at a concentration of 7.9 ppb.

To further delineate groundwater contamination in this area, four wells (MW-123, 124, 125, and 126) were installed in 2001 from approximately 175 to 275 feet downgradient of AOCs 20 and 27, and two rounds of sampling were conducted. No VOCs were detected in the wells. RDX was detected at a concentration of 32.2 ppb in well MW-124. MW-126 is located approximately 100 feet directly downgradient of MW-124, and only 2.4 ppb of RDX was detected. RDX was not detected in MW-115, located approximately 500 feet downgradient of AOCs 20 and 27, or in a surface water sample collected from Stebbins Brook (SW-10).

In September 2002, December 2002, and March 2003, EBCo re-sampled wells MW-116, MW-123, MW-124, MW-125, and MW-126 for VOCs and explosives. VOCs were not detected. RDX concentrations in MW-116 ranged from 7.9 ppb in August 2002 (EBCo sampled wells MW-116, MW-115, and surface water from Stebbins's Brook for explosives in August 2002. No explosives were detected in MW-115 or the surface water sample) to 507 ppb in March 2003. RDX concentrations were also elevated in MW-124, with concentrations ranging from non-detect in September to 99.2 ppb in March 2003. Results for MW-123, MW-125 and MW-126 were low to non-detect. In general, results for RDX were significantly higher in March 2003 than historical results, when groundwater elevations were the highest ever recorded by EBCo.

Between April and July 2003, EBCo excavated approximately 200 cubic yards of RDX impacted soil. In addition, a new well was installed approximately 100 feet east of MW-116 in September 2003. According to Dyno Nobel, groundwater monitoring in this area will continue in order to assess the effectiveness of the soil remediation (ref 22).

Available information suggests that the extent of RDX contaminated groundwater in this area is defined by "clean" wells MW-123 to the east, MW-125 to the west,

and MW-126 to the (downgradient) south, and that RDX concentrations attenuate as groundwater moves away from the source. The fact that historically elevated concentrations of RDX in wells close to AOC 20 were detected in the spring of 2003 during a period of higher than ususal groundwater levels suggests that there was a relatively shallow source of RDX in nearby soils. Since EBCo has recently removed approximately 200 cubic yards of RDX contaminated soils from this area, it is likely that the RDX source has been removed and the plume will not migrate beyond MW-126. EPA concludes that the RDX plume is expected to remain within the existing area of contaminated groundwater. This assumption should be confirmed through future planned monitoring.

AOC 38 (upper and lower landfill, used between 1944 and 1972) area. Groundwater flow is toward the east in this area. Well MW-104, which is located approximately 200 feet upgradient of the upper landfill (AOC 38), was sampled in 1997. Results included slight exceedances of the GWPC for chromium and lead, and an order of magnitude exceedance for bis (2-ethylhexyl)phthalate. This well has been dry during subsequent sampling events.

Well MW-103 is located between the upper and lower landfills, approximately 400 feet downgradient of MW-104 and approximately 200 hundred feet upgradient of a wetland area and source of Stebbins Brook. In 1997, groundwater sampling of MW-103 detected exceedances of the GWPC and/or the SWPC for barium, beryllium, chromium, copper, lead, nickel, thallium, vanadium, and zinc. These exceedances were less than an order of magnitude above the GWPC and SWPC. In June and September 2002, EBCo re-sampled MW-103. No VOCs or explosives were detected. Results of metals analyses were similar to the 1997 results, although some metals were detected at somewhat higher levels. However, the samples contained very high turbidity, and the elevated metals concentrations were partially attributed by EBCo to the particulate matter in the samples. In order to try to obtain a more representative sample of metals in groundwater, In December 2002, EBCo installed sampling well MW-103A to replace well MW-103, which was found to be filling with silt. New well MW-103A was sampled in December 2002. Concentrations of metals were below GWPC.

Well MW-102 is located on the downgradient edge of the lower landfill. No elevated concentrations of VOCs, explosives, or metals have been detected in this well.

Well MW-117 is located approximately 300 feet south of the lower landfill and MW-103, and approximately 250 feet directly upgradient of Stebbins Brook. Groundwater sampling in 1997 detected a slight exceedance of the GWPC for benzene and bis(2-ethylhexyl)phthalate. Groundwater sampling conducted in 2001 did not detect VOCs or explosives, and metals were below GWPC and

SWPC. In June, September and December 2002, and March 2003, EBCo re-sampled well MW-117 for VOCs, metals, and explosives. VOCs and explosives were not detected. Metals were not detected above the GWPC.

Based on a review of the local topography, it is likely that shallow groundwater in the vicinity of MW-117 migrates toward and discharges to Stebbins Brook. A surface water sample (SW-10) was collected from Stebbins Brook in March 2001. No explosives were detected. Metals were not analyzed, and this is a data gap which should be addressed in the RFI. Well MW-115 is located on the opposite (downgradient) side of Stebbins Brook, approximately 1100 feet downgradient of MW-103. No elevated COCs have been detected in MW-115.

EPA concludes that the extent of possible metals- contaminated groundwater in the vicinity of the landfills and detected in wells MW-104 and MW-103 is bounded by MW-117 and Stebbins Brook, and it is unlikely that contaminated groundwater is migrating beyond the wetland. In fact, it is unclear that the groundwater is actually contaminated with metals, since the elevated metals were found in unfiltered samples with high turbidity. Subsequent sampling of replacement well MW-103A did not detect elevated metals.

AOC 36 and AOC 37 area. Groundwater flow is to the southwest in this area. Monitoring well MW-118 is located directly adjacent to AOC 37 (Latex caulk/paper site, dumped in the 1960's). Table 2.6 of Volume 1 of EBCo's 4/01 EI indicates a groundwater sample from MW-118 contained an order of magnitude exceedance of the GWPC for PCE, and a minor exceedance of 1,1,1 Trichloroethane. In addition, TPH was detected at a concentration of 3,600 ppb in MW-101, located adjacent to AOC 37. Numerous micro wells were installed in this area and sampled in December 2000. The data indicate that wells located further downgradient from the AOCs had lower concentrations of PCE, and the furthest downgradient micro wells (approximately 250 feet downgradient from the AOCs) had concentrations below criteria.

In order to further evaluate this area, EBCo installed additional wells (MW-127S, MW-127D, MW-128, and MW-129) and sampled the new wells and MW-118 in June, September, and December 2002 and March 2003 for VOCs, ETPH, and MNA parameters. VOCs detected above the GWPC were 1,1,1-TCA, 1,1-DCE, carbon tetrachloride, and PCE. The highest concentrations of VOCs were found in wells MW-118 (108 ppb PCE, 431 ppb 1,1,1-TCA) and MW-129 (101 ppb PCE), which is located adjacent to AOC 36 (waste cutting oil site, where 500 gallons of waste cutting and lubricating oils were dumped annually from the mid 1970's to 1979.) PCE was also detected at a concentration of 33.8 ppb in MW-128, located approximately 150 feet directly downgradient of MW-118. VOCs were generally not detected in MW-127S and MW-127D, which are located

approximately 350 feet downgradient of both AOCs. Extractable petroleum hydrocarbons (ETPH) were detected in well MW-127S at concentrations ranging from 232 ppb (GWPC of 100 ppb) in June 2002, to 92 ppb in March 2003.

EPA concludes PCE concentrations in shallow groundwater attenuate downgradient from the source area, and that the extent of PCE contamination in shallow groundwater is defined by downgradient well MW-127S. (Although the most recent sample results detected PCE slightly above the GWPC, the average of the four rounds is below the GWPC, thus the extent of PCE in shallow groundwater is expected to be in this area). Limited data regarding deeper groundwater quality (MW-127D) indicates PCE is not a problem, although the most recent sampling detected carbon tetrachloride at levels slightly above the GWPC of 5 ppb. The unconsolidated surficial deposits consist primarily of fine to coarse sand, so transmissivity is likely to be relatively high. Since AOCs 36 and 37 have not been used since the 1970's, the contaminant plume has probably reached a state of equilibrium, and so contaminated groundwater is expected to remain within the existing area of contaminated groundwater. Recent sampling results do not indicate any significant changes or that PCE is migrating beyond the existing area of contamination. Dyno Nobel plans to conduct additional monitoring of these wells (Page 5, Attachment 2, 9/02 EI Update).

AOC 22 Area. AOC 22 consists of former waste shock tube storage areas and former loading dock sumps at a former PETN mix house. MW-110 is located approximately 300 feet west and downgradient of AOC 22, and approximately 100 feet upgradient of Second Brook. Groundwater sampling conducted in October 1997 detected 10 ppb of PCE in MW-110. EPA concludes that any PCE in shallow groundwater in this area is unlikely to migrate beyond Second Brook, and that contaminated groundwater in this area is expected to remain within the existing area of groundwater contamination. Although it is not critical to this EI, the RFI should further characterize groundwater conditions in this area to better define the extent of contamination and possible sources.

Operational Area East of Route 10/202.

In 1999, EBCo submitted the Groundwater Assessment, EBCO Operational Area East of Route 10/202. The report describes a groundwater screening assessment program which included drilling and groundwater sampling via direct push technology at numerous locations. Groundwater samples were analyzed for VOCs, explosives, and metals. In addition, some points were sampled for TPH, SVOCs, and dioxins. EBCo also installed seven monitoring wells and six piezometers. Seventeen wells were sampled. Three wells were sampled for modified Appendix IX constituents.

A total of 112 groundwater samples were collected at screening points/areas and 31

monitoring wells were sampled. Numerous screening points/areas contained metals concentrations above the GWPC. However, the samples collected at screening points/areas exhibited high turbidity. The report concludes that the direct push technology caused agitation of the surrounding groundwater, and the high turbidity likely contributed to widespread elevated metals concentrations, with arsenic, chromium, and lead the most often detected. Samples from standard monitoring wells were sampled using low flow methods and were generally not turbid, and elevated concentrations of metals were generally not detected.

Based on these results, EBCo conducted additional groundwater investigations in the eastern area which are provided in Supplemental Groundwater Screening, EBCO Operational Area East of Route 10/202, April 20, 2000. The investigation focused on the installation and sampling of six new wells and six existing wells downgradient of targeted screening areas and screening points with elevated concentrations of COCs. Results of the sampling indicated only a minor exceedence of the GWPC for lead in one well. No VOCs or TPH were detected from the selected wells sampled. These results help to support the theory that high turbidity caused the exceedances of metals at numerous screening points/areas sampled previously.

The Operational Area East of Route 10/202 includes the main manufacturing portion of the facility west of the railroad tracks, and the eastern most portion of the facility between the railroad tracks and the Farmington River.

Area between Route 10/202 and the railroad tracks. The main manufacturing area is located between Route 10/202 and the railroad tracks, and includes portions of Hop Brook and small drainage ditches. Depth to groundwater is generally less than 10 feet. The surficial geology is described as a continuation of the relatively coarse grained kame terrace deposits found in the western operational area. This area includes several AOCs north of Hop Brook (AOCs 1, 2, 4, 5, 6, and 28) and AOCs (3, 26, 46, 30, 25, 47, 33, 8, 32, 34, 40, 9, 10, and 11) south of Hop Brook. Groundwater generally flows from west to east. Numerous groundwater screening points and monitoring wells have been installed and sampled in this area. Exceedances of GWPC have been detected in numerous screening points and screening areas. As discussed above however, many of the exceedances for metals is thought to be related to the high turbidity in the sample as a result of the direct push technology.

The area north of Hop Brook between Route 10/202 and the railroad tracks includes numerous groundwater sampling points in the vicinity of AOCs 1 and 2. Elevated concentrations of chromium, lead, and barium were detected in several screening points (SP204-01 through SP204-04) in this area. However, groundwater sampling of standard monitoring wells MW-206, MW-208, and MW-209 from this area did not detect elevated metals, except for 15.6 ppb lead in

a duplicate sample from MW-206. Other groundwater sampling results for this area included a few minor exceedances for VOCs and TPH. However, these exceedances were sporadic and duplicate samples or samples from nearby screening points did not exceed GWPC.

The area south of Hop Brook between Route 10/202 and the railroad tracks includes many screening points/areas with concentrations of the metals lead, chromium, arsenic, and barium above GWPC. As discussed above, EBCo has attributed these high metals concentrations to problems with turbidity in screening points. Analysis of groundwater samples from standard monitoring wells generally did not exhibit elevated metals concentrations. In general, there were only a few minor exceedances of VOCs, typically methylene chloride, a common laboratory contaminant. A concentration of 16.8 ppb of methylene chloride was detected in MW-207. Concentrations of explosives, SVOCs, and TPH were generally below GWPC.

Area between the railroad tracks and Farmington River. This area lies downgradient from the area discussed above, and consists of relatively flat floodplain (fine to medium sand with some silt) deposits. Much of the area's surficial sands are underlain by approximately 20 feet of silt and clay, which in turn overlies a lower sand unit. The area lies within the 100 year flood zone, and the water table is typically 2 to 4 feet below grade with several small intermittent brooks which discharge to the Farmington River. The area contains many AOCs (44, 42, 43, 17, 29, 18c,19, 39, 15, 16, 18a, 18b, 14a, 14b, 13, 24, 35, 41, and 12), including the OB/OD area, and numerous groundwater screening points and monitoring wells. Exceedances of the GWPC have been detected at numerous groundwater sampling locations.

The metals lead and chromium were the most common contaminant detected above GWPC. However, as discussed above, EBCo has attributed the elevated metals results to problems with the direct push technology used to perform the screening points. Results of analysis of groundwater samples from standard monitoring wells in this area found generally lower metals concentrations. In addition, there have been a few sporadic detections of VOCs (primarily methylene chloride, a common laboratory contaminant) at concentrations slightly above GWPC. Contamination was generally not found in screening points and areas and standard monitoring wells directly upgradient of the Farmington River, with the exception of 16 ppb of PCE detected in point SP003-08.

OB/OD area. EBCo has conducted quarterly or semi-annual groundwater monitoring in the OB/OD area since 1991. The vertical groundwater gradient is upward, helping to prevent contaminated groundwater in the upper aquifer from entering the lower aquifer below the silt/clay aquitard. Groundwater sampling has

detected low levels of PCE and breakdown products, although none of the detected VOCs exceeded their respective GWPC or SWPC, and concentrations show a slight downward trend over time. Lead, copper, and/or nickel exceed the GWPC and/or SWPC in several wells, and RDX has been detected above the calculated GWPC of 17 ppb.

EBCo. submitted the 2002 Annual Groundwater Sampling Summary Report for the OB/OD Area in March 2003 which describes the June and December 2002 sampling events (which occurred after the 130 feet long by 8 feet high sand berm was removed in mid December 2001). EBCo's report includes a discussion of Point of Compliance (POC) wells MW-6, MW-7, and MW- 8 S/D, which are approximately 300 feet upgradient of the Farmington River, and MW-12 and MW-14, which are within 70 feet of a small stream. Results were that metals exceeded GWPC at three POC wells.

In general, concentrations of metals were highest in wells located in the vicinity of the OB/OD source area. MW-03, located at the southwest corner of the OB area, contained the highest levels of lead (1,870 ppb), copper (2,790 ppb) and nickel (606 ppb). Samples from wells located further downgradient from the source area contained lower concentrations of metals. For example, wells MW-07 (57 ppb copper, 14.2 ppb lead) and MW-14s (272 ppb copper, 186 ppb nickel), are located approximately 150 feet downgradient of the OB area. Samples from the furthest downgradient wells, MW-17S (located approximately 200 feet upgradient of the Farmington River) and MW-16S (located approximately 40 feet upgradient of a small tributary to the Farmington River), had one detection above the SWPC (copper at 130 ppb in MW-17s), and concentrations of nickel slightly above the GWPC of 100 ppb.

EPA concludes that the extent of metals contamination in this area is well defined by the existing monitoring well network. Concentrations of metals have remained fairly consistent over time, with some contaminants showing a slight decrease. Contamination attenuates downgradient from the source area, and the furthest downgradient wells near the Farmington River show only slight exceedances of applicable criteria. The OB/OD area has not been used for several years, and EBCo has recently removed a large lead contaminated sand berm. Therefore, contaminated groundwater is expected to remain in the existing area of contaminated groundwater.

[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.

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 and Reference(s):

Contaminated groundwater (groundwater contaminated above the GWPC and/or SWPC) is likely discharging to several water bodies on site.

Operational Area West of Route 10/202.

Stebbins Brook. AOC 38 (upper and lower landfill) is located approximately 200 feet upgradient from the source area of Stebbins Brook. Groundwater sampling of MW-103 detected exceedances of the GWPC and/or the SWPC for barium, beryllium, chromium, copper, lead, nickel, thallium, vanadium, and zinc. However, the samples contained very high turbidity, and the elevated metals concentrations were partially attributed by EBCo to the particulate matter in the samples. EBCo recently installed sampling well MW-103A to replace well MW-103, which was found to be filling with silt. New well MW-103A was sampled in December 2002. Concentrations of metals were below GWPC. Concentrations of metals in MW-102, located at the downgradient edge of the lower landfill, were below GWPC. In summary, it is not clear whether or not groundwater contains metals above GWPC or SWPC in this area. Although not critical to this EI, the RFI should better characterize conditions in this area.

Second Brook. Analysis of a groundwater sample from MW-110, located near Second Brook, detected 10 ppb of PCE.

Operational Area East of Route 10/202.

Hop Brook. Hop Brook flows easterly across the northern portion of this area and

discharges to the Farmington River. PCE was detected in point SP206, located approximately 100 feet north of Hop Brook.

Drainage Ditch near AOC 17. This small intermittent drainage ditch flows northeastward before joining with Hop Brook. This ditch provides drainage for part of the paved areas west of the railroad tracks. Minor exceedances of the GWPC for arsenic, chromium, and methylene chloride have been detected in sampling points and/or wells near this drainage ditch.

Streams/Ditches in the central section of site. The headwaters of another small intermittent brook are located approximately 100 feet south of the OB/OD area. The brook meanders easterly across the flood plain until it discharges to the Farmington River. Minor exceedances of the GWPC for lead, chromium, and methylene chloride have been detected in a few sampling points and/or wells near these streams/drainage ditches.

Stebbins Brook has it's origin in the operational area west of Route 10/202. It is directed to a culvert on the west side of Route 10/202, and reemerges at the southern portion of the property (at AOC 24), and eventually discharges to the Farmington River. There are several small tributaries to Stebbins Brook which flow from wetlands to the south. Slight exceedances of the GWPC for barium and chromium were detected in MW-21, located within 100 feet of one of the drainage ditches.

Farmington River. PCE was detected at a concentration of 16 ppb in sampling point SP003-08, located within 100 feet of the Farmington River.

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 eco-systems 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 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 concentration[3] of <u>each</u> 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 and Reference(s):

As discussed in the response to Question 4 above, the maximum concentrations of contaminants detected in monitoring wells near surface water bodies are typically only slightly above the GWPC or SWPC. In some instances, elevated metals have been detected in screening points/areas, but these values are thought to be related to elevated turbidity in the sample caused by the direct push technology. Low flow sampling of groundwater from standard monitoring wells in these same areas has not resulted in the detection of elevated metals concentrations greater than an order of magnitude above GWPC.

In the **Operational Area West of Route 10/202**, EBCo recently installed sampling well MW-103A to replace well MW-103, which was found to be filling with silt. New well MW-103A, located near the source area for Stebbins Brook, was sampled in December 2002. Concentrations of metals were below GWPC. There is no evidence to indicate that concentrations of contaminants in groundwater near Stebbins Brook are increasing, or that there are likely to be any unacceptable impacts to the brook. A groundwater sample from MW-110, located near Second Brook, detected 10 ppb of PCE. This well has not been resampled recently, but it is unlikely that concentrations of PCE in this range would have unacceptable impacts to Second Brook.

In the **Operational Area East of Route 10/202**, 6.9 ppb of PCE was detected in point SP206, located approximately 100 feet north of Hop Brook. Minor exceedances of the GWPC for arsenic, chromium, and methylene chloride have been detected in sampling points and/or wells near the drainage ditch near AOC 17. These exceedances may be due in part to high turbidity in the samples. Similarly, minor exceedances of the GWPC for lead, barium, chromium, and methylene chloride have been detected in wells and screening points near streams and ditches in the central section of site and near Stebbins

Brook. In addition, PCE was detected at a concentration of 16 ppb in sampling point SP003-08, located within 100 feet of the Farmington River. In conclusion, there is no evidence to indicate that concentrations of contaminants in groundwater near these surface water bodies are increasing. In fact, the long term monitoring of wells in the OB/OD area show slow decrease in contaminant concentrations. EPA concludes that it is unlikely that there are any significant impacts to surface waters.

[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 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 eco-systems), 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 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):

[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.

Dyno Nobel plans to continue to monitor groundwater wells at several locations, including the OB/OD area (reference 23), and at AOCs 20 and 36 (reference 22).

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 EBCo facility , EPA ID # CTD058509712, located at 660 Hopmeadow Street, Simsbury, CT. 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 (signature) Robert W. Brackett Date 11/20/03
(print) Robert W. Brackett
(title) RCRA Facility Manager

Supervisor (signature) [signature] Date 11/20/03
(print) Matthew R. Hoagland
(title) Chief, RCRA Corrective Action Section
(EPA Region or State) EPA New England

Contact telephone and e-mail numbers

(name)_Robert W. Brackett
(phone #)_ 617-918-1364
(e-mail) Brackett.bob@epa.gov